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The
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**Towards Evidence-Based Practice:
Investigating Attitudes, Practices and Perception of
Undergraduate Physiotherapy Students at a Higher
Education Institution in Abu Dhabi**

نحو الممارسة المبنية على الأدلة: دراسة الآراء والممارسات لهذه التطبيقات
لدى طلاب العلاج الطبيعي في المرحلة الجامعية الأولى في مؤسسات التعليم
العالي في أبو ظبي

by

MARIAN GRACE GABOR

**A thesis submitted in fulfilment
of the requirements for the degree of
DOCTOR OF PHILOSOPHY IN EDUCATION**

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October 2019

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ABSTRACT

Evidence-based practice (EBP) is an essential component in health care related practices. It is crucial for all students undertaking programmes in these areas to develop appropriate attitudes, practices and perceptions to enable them to operate effectively as professionals after training. A review of available literature shows a gap in research about physiotherapy students' propensity to adopt EBP in the undergraduate clinical practice within the United Arab Emirates. The purpose of this study is to investigate physiotherapy students' attitudes, practices and perceptions toward EBP at the beginning of their advanced clinical placement and after one year based on a study of a higher education institution offering Bachelor of Science in Physiotherapy in the emirate of Abu Dhabi. A mixed-methods approach was done using an explanatory sequential design. Consenting physiotherapy students and their clinical educators took part in the study. Quantitative data gathering constituted the first two stages of the study wherein a close-ended survey using a validated tool was provided to student participants (n=26) to establish their EBP profile before (baseline) and after one year of advanced clinical placement (post-ACP). Stage 3 of the study involved focus group interviews with the students (n=14) and key-informant interviews with their clinical educators (n=12) to further expound on the factors that lead to students' propensity towards EBP. Findings of thematic analysis revealed (1) various clinical education strategies positively affecting and enhancing the attitudes, practices and perceptions of students toward EBP including clinical discourse and case presentation; (2) facilitators to EBP within the undergraduate clinical placement such as EBP-oriented clinical educators and availability of facilities for search while (3) barriers include delay of clinical education within the curriculum and lack of time and motivation; and (4) one of the institutional policies affecting the phenomenon is the span of treatment protocols covered by health insurance.

نبذة مختصرةنبذة مختصرة

ان الممارسة القائمة على البراهين والأدلة EBP والمتعلقة بالرعايه الصحيه هي من الأهمية بمكان لجميع الطلاب الذين ينفذون برامج في هذه الدراسات لتطوير السلوك المهني الملائم والتصورات المناسبة لتمكينهم من العمل بفعالية كمهنيين متمرسين بعد التدريب. توضح الدراسات العلميه المتوفره في هذا المجال وجود فجوة في البحث العلمي حول عدم لجوء طلاب العلاج الطبيعي إلى اعتماد EBP في الممارسة السريرية في دراستهم الجامعية في دولة الإمارات العربية المتحدة. ان الغرض من هذه الدراسة هو استكشاف مواقف طلاب العلاج الطبيعي وممارساتهم وتصوراتهم تجاه EBP في بداية تدريبهم السريري المتقدم وبعد سنة واحدة بناءً على دراسة لمؤسسات التعليم العالي التي تمنح درجة البكالوريوس في العلاج الطبيعي في إمارة أبو ظبي . في طريقة عمل هذا البحث, تم اتباع نهج مختلط باستخدام تصميم تنابعي توضيحي. شارك طلاب العلاج الطبيعي والمشرفين السريريين على تدريب الطلبة في هذه الدراسة. شكلت عملية جمع البيانات الكمية أول مرحلتين من الدراسة حيث تم تقديم مسح عن قرب باستخدام أداة تم التحقق منها للطلبة المشاركين وعددهم 26 لإنشاء ملف تعريف EBP الخاص بهم عند بدء الدراسة وبعد عام واحد من برنامجهم السريري المتقدم (ACP). تضمنت المرحلة الثالثة من الدراسة مقابلات جماعية مركزة مع الطلاب وعددهم 14 ومقابلات مع مصادر المعلومات الاساسيه من المدربين السريريين للطلبة وعددهم 12 لمزيد من التوضيح للعوامل التي تؤدي إلى ميل الطلاب نحو ال EBP. كشفت نتائج التحليل الموضوعي:

(1) ان استراتيجيات التعليم السريري المختلفة تؤثر إيجابيا وتعزز المواقف والممارسات وتصورات الطلاب تجاه ال EBP

بما في ذلك المخاطبات السريريه وعرض الحالة

(2) قلة وجود المشرفين على مبدا ال EBP داخل التدريب السريري وعدم توفر التسهيلات للبحث العلمي في عيادات

واماكن التدريب السرسري

(3) تأخير بدء التعليم السريري ضمن المناهج والخطط الدراسية وعدم وجود الوقت الكافي والدافع لتطبيق هذه المبادئ

(4) واحدة من السياسات المؤسسية التي تؤثر على هذه الظاهرة هي مدى بروتوكولات العلاج التي يغطيها التأمين الصحي

في الدولة.

DEDICATION

“Education is the only inheritance that we can give you.” I grew up listening to this constant reminder of my parents, Papa Ed and Mama Linda. This thesis, which is a symbol of my commitment to academia, is my way of honouring the words of my dear parents. If it was not for how they brought me and my siblings up, I would not have had the perseverance to pursue further studies.

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CHAPTER ONE: INTRODUCTION

1.1 Introduction

Physiotherapy is an allied health profession that provides services aimed at developing, preserving and reconditioning people's optimal movement and functional ability when threatened by consequences of ageing, traumatic injury, communicable/non-communicable diseases, medical conditions, syndromes or environmental factors. Professionals who provide these services are called physical therapists, or in many countries, physiotherapists ("World Confederation for Physical Therapy" 2016; Dean et al. 2013; Falvey et al. 2016).

Physiotherapists conduct extensive examination of patients to be able to formulate a diagnosis, prognosis and appropriate treatment plan for the patient (Magee 2014). It is also the role of physiotherapists to implement the intervention program created for the patient and to assess the outcome of the treatment (O'Sullivan, Schmitz & Fulk 2019; Magee 2014). Being an independent practitioner, physiotherapists must possess the prerequisite knowledge and skills for clinical decision-making. With the variety of assessment and treatment methods inculcated to physiotherapists during the 4-5 years of undergraduate education, clinical decision-making and thus, clinical approach is bound to be variable at the practitioner, institutional and global level.

The profession has safeguarded its practice by establishing educational accreditation standards (Connolly, Lupinnaci & Bush 2001). In order to standardise practice, the World Confederation for Physical Therapy (WCPT) made recommendations on their "guideline for physical therapist professional entry level education" regarding general expectations on attributes and qualifications for the award of the degree. The guideline is intended for physiotherapy educators particularly curriculum developers, health and education authorities, professional regulatory bodies and government policy makers. The educational standards set

by WCPT highlights the importance of educating physiotherapy students on the use of research to inform their clinical decision-making and practice, aptly called evidence-based practice (EBP) (“World Confederation for Physical Therapy” 2017).

This chapter presents a brief background of the study based on available literature regarding EBP in physiotherapy education at the entry level and physiotherapy practice, involving either clinicians in the allied health, students or both. It is then followed by a problem statement stemming from the gap identified from the literature. To justify the need for this study, a rationale of conducting the study is also stated together with the problem statement. The purpose of the study establishes the goals of the study. After which, the purpose of the study is translated to research questions to reflect the specific aims of the study. A list of significance of the study towards various stakeholders (i.e. students, academics/curriculum designers, clinical educators, health care policy makers and health insurance providers) is also presented in this chapter. To ensure that all terms used in this cross-disciplinary study of education and health sciences are operationally defined, a list of terms commonly used in this study and its brief definition is provided under “Definition of Terms”. Lastly, an overview of the thesis covering what is to be expected in each chapter draws this chapter to a close.

1.2 Background

Evidence-based practice is the use of available literature obtained through a systematic search and application of evidence as guide to clinical decision making in the care of patients (Dawes et al. 2005; Hurley, Denegar & Hertel 2011). It originated from evidence-based medicine (EBM) which is defined as “...the conscientious, explicit and judicious use of current best evidence in making decisions about the care of individual patients” (Sackett, Rosenberg & Muir Gray 1996, p.71). Evidence-based practice is simply the use of research to inform ones’

clinical practice as compared to the traditional practice that is based on clinical experience and expertise alone (Bridges, Bierema & Valentine 2007; Sabus 2008).

According to the policy statement of WCPT (2017) regarding EBP, physiotherapists have the responsibility to utilize best available evidence in providing patient care. With EBP, the time, effort and cost spent on ineffective interventions for patient care are minimised. Its adoption and practice are highly recommended to ensure quality patient care (Condon et al. 2016). Organisations are encouraged to put in place adequate support structures and learning opportunities to guarantee the delivery of excellent physiotherapy services. Adoption of EBP is believed to be easily attainable in institutions that promote and facilitate it through availability of learning opportunities and facilities. Consequently, physiotherapists are expected to critically appraise their practice, construct research questions out of their gap in practice, access the best evidence to inform their practice, implement the procedures suggested by evidence, and last but not the least, evaluate the outcomes of their evidence-based practice (“World Confederation for Physical Therapy” 2017).

Considering that knowledge and skills prerequisite to evidence-based practice has never been part of the undergraduate physiotherapy curriculum a few decades back, the adoption of its practice was deemed a radical paradigm shift (Bosman 2015). Transition to EBP underwent a long and tedious process of needs assessment, continuing education sessions and development training aimed at inculcating the five essential competencies towards a research-informed practice: (1) identifying clinical problems of patients, (2) formulating the clinical problem into a clinical question, (3) effective and efficient search of research evidences, (4) evaluation of outcomes, and (5) ability to reflect on the entire EBP process (Holloway et al. 2004). In response to the demand of the healthcare arena to emphasize EBP on clinical practice, medical and allied health education institutions have considered the change to adapt and embed EBP

into the content and learning experience of undergraduate allied health students to prepare them as they enter healthcare practice (Maudsley & Strivens 2000).

In various developed and developing countries where physiotherapy education is overseen by their respective regulatory bodies, curriculum recommendations reflect the compliance to WCPT's physiotherapy education guidelines. In the United States of America, entry-level requirements have included EBP as one of the pillars of physiotherapy practice (APTA 2013). The Commission on Accreditation in Physical Therapy Education (Commission on Accreditation in Physical Therapy Education 2014) states EBP as one of the required elements for contemporary physical therapy education. In Australia, "knowledge and understanding of theoretical concepts and principles relevant to physiotherapy practice including evidence-based practice" is a component of key competencies and foundational abilities of entry-level physiotherapists ("Australian Physiotherapy Council" 2017). The Council of Canadian Physiotherapy University Programs (2009) gives a notable enhancement to EBP in the content of entry-to-practice physiotherapy curriculum alongside content areas that need such as research and cultural competence and sensitivity. In the Philippines, one of the program outcome expectations of the Commission on Higher Education for Bachelor of Science in Physical Therapy include "demonstrating research-related skills in the application of best practice evidence in the performance of various roles in different practice settings" (Commission on Higher Education 2017, p. 5). In the "Model Curriculum Handbook-Physiotherapy" of India's Ministry of Health and Family Welfare Allied Health Section, skills-based outcomes for Bachelor of Physiotherapy graduates include the ability to suggest application of research findings into practice (Ministry of Health and Family Welfare Allied Health Section n.d.). In the UAE, the Ministry of Higher Education and Scientific Research

governs the educational policies of all higher education institutions. However, there is no particular guidelines mandated for offering a Baccalaureate degree in physiotherapy.

1.3 Statement of the Problem and Rationale

Undergraduate students of allied health care programs are expected to adopt an evidence-based practice (EBP) upon entry to the professional practice after they graduate (Olsen et al. 2013). The long-standing notion among undergraduate students that studying research and EBP is “perplexing and dull” leading to “negative attitudes, anxiety and stressors” (Burrows & Baillie 1997; Celia & Falkenstein 2007) has been replaced by positive attitudes towards research and EBP (McEvoy, Lewis & Luker 2018; Stronge & Cahill 2011; Griffin & Hindocha 2010; Burgoyne, O’Flynn & Boylan 2010). However, when graduates enter professional clinical practice, the reliance on evidence for patient care does not reflect what is taught in the undergraduate level. There is still a gap between the literature available and literature used in actual practice (Bostwick 2013).

Numerous studies have been done exploring EBP and research literacy among allied health practitioners (Heiwe et al. 2011; Lizarondo et al. 2012) like nurses (Penno 2008; Black et al. 2015; Hines, Ramsbotham & Coyer 2016), occupational therapists (Zimmerman 2008; Stronge and Cahill 2011), and physical therapists/physiotherapists (Jette et al. 2003; Newman 2013). Some studies in Australia, Norway and South Africa have involved students as participants in investigating various EBP constructs (Long et al. 2011; McEvoy et al. 2011; Frantz et al. 2011; Olsen et al. 2013; Hess & Frantz 2016; McEvoy, Lewis & Luker. 2018). However, none of the available published literature has been written about physiotherapy students’ propensity to adopt EBP in the undergraduate clinical practice within the United Arab Emirates (UAE). One relevant research in the UAE focuses only on general practitioners’ attitudes and beliefs towards clinical practice guidelines (Baynouna Al Ketbi & Zein Al Deen

2018). Another study stated that UAE is the pioneer of evidence-based medicine in the Gulf region after establishing a national committee on Evidence Based Health Care in 1998 (Al-Almaie & Al-Baghli 2003). Neither study addresses the currently stated problem, nor did they involve the practice field of physiotherapy as they are focused on evidence-based medicine. Moreover, the prior study only covered a partial aspect of evidence-based practice (i.e. use of clinical practice guidelines).

Despite wider acceptance and integration of EBP into physiotherapy practice in the past two decades, there are notable challenges that remain unaddressed (Steglitz et al. 2015). Because results of previous studies are not generalizable, a study is required to identify the possible facilitators and challenges towards EBP within the physiotherapy setting in Abu Dhabi.

According to a systematic review in 2013, there is little evidence recommending teaching strategies to effectively improve competency in EBP (Levesque & Yeung 2015). Hence, another reason behind the need for this study is to investigate what are deemed as effective strategies in inculcating the EBP process among physiotherapy undergraduates of Abu Dhabi thereby positively influencing students' attitudes, practice and perception towards adopting a research-informed practice.

The support of health care managers has been established as a facilitator towards EBP implementation in various contexts (Dannapfel & Nilsen 2016). The presence of organisational support is a positive indicator of research uptake to inform practice (Salbach et al. 2010). Whether management support towards the Abu Dhabi Economic Vision 2030 of having an evidence-based healthcare sector exists within the context of health care institutions in Abu Dhabi remains abstract. The lack of an explicit guideline on how managers of clinical placements in Abu Dhabi should provide support towards an EBP-inclined institution

necessitates the conduct of this study. Considering that certain policies at the institutional and extra-organisational level have been shown to impact EBP implementation in the field of physiotherapy (Karin et al. 2009; Fruth et al. 2010), it is also necessary to investigate how institutional policies within the clinical placements in Abu Dhabi influence EBP implementation in the local context.

1.4 Purpose of the Study

In view of the above gaps, this study establishes a threefold purpose. The first purpose of the study is to investigate the attitudes, practices and perceptions of physiotherapy undergraduate students in Abu Dhabi towards EBP upon entry to advanced clinical placements. It will also examine how one academic year of advanced clinical placement affects these constructs. To investigate the attitudes towards EBP, the researcher had to look at the values, emphasis, and degree of importance placed by the physiotherapy students upon EBP and their perceived compatibility between clinical practice and EBP. Practices reflects the students' understanding of common research terms and implementation of EBP with clinical practice. Perceptions on the other hand are general feeling of the students regarding their own use of evidence into practice including their self-perceived confidence in EBP implementation.

The second purpose of the study is to describe the different facilitators and barriers towards EBP implementation during undergraduate clinical practice. The facilitators and barriers modulate the attitudes, practices and perception of undergraduate physiotherapy students towards EBP. In this context, facilitators are factors that aids physiotherapy students to implement the EBP processes within the clinical placement setting in Abu Dhabi. The barriers, on the other hand, are factors that serve as hindrance or challenges towards students' implementation of EBP within clinical placements.

The third purpose of the study is to identify the clinical education strategies, management support provided and institutional policies in clinical placements that affect EBP implementation among physiotherapy undergraduates. Clinical education strategies are ways used by clinical educators in Abu Dhabi to positively enhance students' attitude, practices and perception towards EBP. Management support reflects the attention and resources allocated by operational managers of clinical placements towards EBP implementation. Institutional policies are mandates regarding provision of physiotherapy services aligned with the national health care policies.

Although research and evidence-based practice are closely linked, this study do not include the ability of undergraduate students to conduct research. This study also gathers insights from clinical educators who closely supervised physiotherapy students during their clinical placements.

To fulfil the purpose of the study, a set of established theoretical frameworks in the field of behavioural study, physiotherapy practice epistemology and leadership were utilised to keep the implementation of study well-guided and theory informed.

1.5 Research Questions

Based on relevant literature, it is the assumption of the researcher that students' EBP knowledge learned from taught modules prior to clinical placement will only be enhanced and further developed into actual skills if the venue of their clinical practice provides a conducive environment for adopting a research-guided clinical practice. To investigate on this assumption and to achieve the purpose of the study, the researcher identified three research questions to guide this study:

Research question 1: What are the attitudes, practices and perceptions of undergraduate physiotherapy students towards evidence-based practice at the start of and after one year of advanced clinical placements?

Research question 2: What are the facilitators and barriers towards an evidence-based practice within the advanced clinical placements?

Research question 3: How do clinical education strategies, management support and institutional policies influence the students' propensity to adopt an evidence-based practice?

Specific objectives to answer the first research question include identifying the students' awareness of EBP, how relevant they see EBP in the practice of physiotherapy, their intentions of using EBP, their understanding of EBP-related terminology, the frequency of implementing the processes of EBP, their self-perceived confidence towards implementing EBP and how they rate themselves in complementary skills requisite to implementing EBP (i.e. research skills, computer skills, etc.). All of these were investigated involving eligible physiotherapy students within one-academic year period of advanced clinical placements (ACP) with a baseline measurement (during the first month of ACP) and after all ACPs were completed. Clinical educators' perspectives were taken to identify specific attitudes or qualities they look for in students that emanate inclination to EBP and strategies on how to positively enhance students' perception towards EBP.

To answer the second research question, specific objectives include describing each factor that enabled the implementation and integration of the EBP processes during undergraduate clinical practice. In this study, these factors are referred to as facilitative factors or facilitators of EBP. Simultaneously, factors that hinder in executing the steps needed to implement a research-informed practice were also investigated. These so-called barriers could

either be an environmental factor (i.e. facilities, people, policy, etc.) or an inherent factor (i.e. characteristics inherent to the student) posing difficulty towards physiotherapy students' implementation of EBP during advanced clinical placements. These needed both the students' and clinical educators' perspective to answer the question with triangulation.

For the third research question, one of the specific objectives is to describe clinical education strategies used by clinical educators to bolster students' adoption of EBP during undergraduate clinical practice. To identify the influence of managers of hospitals and clinics towards EBP implementation, the level of support from the management was also explained in terms of attention given to EBP, resources allocated for its implementation, rewards provided for EBP practitioners, etc., Another specific objective was to identify institutional policies that directly or indirectly impacted the inclination of students towards EBP.

This study is different from other previous studies involving students as participants have received fully integrated EBP modules during the first two and a half years of the undergraduate program prior to entering undergraduate clinical placements. Students' attitudes, practice and perception towards EBP and its processes was measured during the early part of the undergraduate advanced clinical placements. The same constructs were also investigated after exposure to advanced clinical placements. The research questions were explored considering the theory of planned behaviour (TPB) (Ajzen 1985, 2002), the epistemology of physiotherapy practice (Edwards & Richardson 2008) and primary mechanisms of embedding culture in an organisation (Schein 2010).

1.6 Significance of the Study

The results of the present study are beneficial to physiotherapy students, physiotherapy academics, physiotherapy clinical educators and the health care policy makers including third-party payers (i.e. health insurance companies).

1.6.1 Significance to education

Students are better prepared for clinical practice if they know what is required from them to transition better from undergraduate studies to actual health practice. Academics may best prepare students into adopting a research-informed practice if gaps in undergraduate preparation are identified through students' perspective. Curriculum developers and academics have the duty to facilitate among students the quality of life-long learning fundamental to an evidence-based physiotherapy practice. This facilitation is highly recommended to be started at an undergraduate level and should extend even after attaining the Bachelor of Physiotherapy degree through continuing professional development opportunities (World Confederation for Physical Therapy 2011). Data from this study directly and indirectly detected the areas of curriculum that need improvement in relation to EBP knowledge and skills training of undergraduate students.

The same is true for the undergraduate clinical practice program being provided by clinical educators. The expected outcome is that undergraduate clinical practice helps in increasing students' propensity to adopt EBP. Knowledge about the undergraduate clinical practice's contribution towards EBP through the perspectives of both students and clinical educators can aid in shaping the learning strategies and students' experience during clinical training. A list of clinical education strategies used by clinical educators in embedding EBP into the students' undergraduate clinical practice is provided in this study. Moreover, a list of ways to positively enhance students' attitudes, practices and perceptions towards EBP is provided.

1.6.2 Significance to health care policy makers

Healthcare services in Abu Dhabi including physiotherapy will continue to experience a growing demand due to a constantly rising population (Department of Health Abu Dhabi

2018). In accordance to the Abu Dhabi Economic Vision 2030, it is expected that Abu Dhabi's economy will run a fully capable and sustainable healthcare sector catering to the needs of its citizens and residents by the year 2030. It is essential to conduct studies that will support the vision of Abu Dhabi which includes premium healthcare (Abu Dhabi Government 2008). The Department of Health Abu Dhabi highlights seven principles in primary care delivery: (1) patient-centred, (2) comprehensive, (3) coordinated, (4) accessible, (5) committed to quality and safety, (6) evidence-based, and (7) integrated. Patient assessment and treatment are expected to be evidence-based and aligned with culturally and socially acceptable best practices.

In order to meet Abu Dhabi's increasing need for home-grown qualified allied health practitioners which will support the achievement of the Abu Dhabi Economic Vision 2030, the government through the patronage of Her Highness Shaikha Fatima bint Mubarak Al Nahyan, founded a health sciences college with the aim of increasing locally-trained allied health professionals joining the workforce. The health science institution has campuses in the Emirate of Abu Dhabi, Emirate of Ajman and Morocco and caters to female students of all nationalities. In the earlier years of the programme, UAE nationals in particular are bound by an agreement to serve government hospitals after the degree has been awarded. Currently, they are not restricted to work in government hospitals alone.

The health care policy makers may gather recommendations from this study regarding the gaps in support towards EBP implementation and the prerequisites needed to boost the reliance of health care practitioners on scientific evidence for a more time- and cost-efficient patient care. From this study, the investigation demonstrated some clinical environments that were conducive towards adopting EBP while others did not show the same propensity to use of evidence. Considering this, perhaps health care policy makers and administrators of hospitals

and clinics may need to provide more support in terms of protected hours for searching evidence, free access to a wide array of research journal databases and task-specific training to make health care institutions in Abu Dhabi inclined towards providing an evidence-based management.

1.6.3 Significance to health insurance system

The Emirate of Abu Dhabi has improved access to health care services by making substantial improvements into health insurance reform (Hamidi & Akinci 2014). With regard to physiotherapy services, health insurance companies can align their adjudication rules and guidelines for reimbursement based on evidence-based management and treatment. Currently, the majority of the physiotherapists employed within UAE at the moment is comprised of expatriates. Physiotherapy clinicians trained abroad might have diversified clinical approaches which are context-dependent and based on personal practice-based knowledge, which means that each individual clinical practice approach might not be generalizable. One way to unify and standardise the varying clinical approaches is through adopting an evidence-based practice. With clinical approach guided by research, patient management is more generalizable across practitioners and institutions (Bernhardsson et al. 2015). This ensures that health insurance comprehensively covers effective, valid and cost-efficient physiotherapy interventions. Ensuring that current undergraduate physiotherapists trained within UAE are EBP-ready makes it easier to meet the vision for a more standardised and practical health insurance claims policies.

1.7 Definition of Terms

Considering this is a cross-disciplinary study between education and health sciences, particularly in the field of physiotherapy, it is important to establish the operational definition of the following terms used throughout the study:

- Assessment – refers to evaluation or physical examination conducted by physiotherapists to confirm patients' symptoms to narrow down the appropriate diagnosis and plan the suitable treatment.
- Attitudes – the values, emphasis, degree of importance placed upon EBP and perceived compatibility between clinical practice and EBP.
- Barriers – factors that serve as hindrance or challenges towards students' implementation of EBP within clinical placements.
- Clinical educator – a physiotherapy clinician who also possesses the roles and responsibilities of taking physiotherapy students under their supervision during undergraduate clinical training.
- Clinical placement – undergraduate clinical practice required for physiotherapy students to fulfil requirements for the award of the degree. This is usually done in different hospitals or clinics in bouts of weeks or months and is usually held after all taught modules have been finished. Physiotherapy students undertaking clinical placement are supervised by licensed physiotherapists to ensure adequate training, case exposure and patient safety.
- Evidence-based practice – a clinical practice framework wherein decision-making and approach to patient care is guided by a combination of research evidence, best practice experience and patient preference.
- Facilitators – factors within clinical placements that aids students to implement the EBP processes within the clinical placements.
- Perceptions – the general feeling of an individual regarding his or her own use of evidence into practice. Self-perceived confidence in EBP implementation is included in the operational definition of perception in this study.

- **Physiotherapy** – services aimed at developing, preserving and reconditioning people's optimal movement and functional ability when threatened by consequences of ageing, traumatic injury, communicable/non-communicable diseases, medical conditions, syndromes or environmental factors. An example is when a person sustains a sporting injury involving the knee ligament, physiotherapy treatment such as mobilisation and strengthening exercises is needed for the injured person to slowly recover conservatively or after a surgery, and gradually attain his previous functional level (i.e. go back to sports). Another example is when an elderly person had a stroke. The usual symptoms presented include weakness or paralysis and lack of sensation of one side of the body opposite to the side of the brain affected due to blockage or bleeding of an artery. The neurological symptoms presented by the patient are addressable by physiotherapy with the aim of restoring function and integration of patient back to society.
- **Physiotherapist** – also known as physical therapist. A fully trained and licensed provider of physiotherapy services.
- **Physiotherapy academic** – a trained physiotherapist who specialised in delivering undergraduate modules through lectures and practical sessions. This may refer to curriculum developers, lecturers and anyone who is involved in the creation and delivery of physiotherapy curriculum content areas.
- **Physiotherapy clinician** – a trained physiotherapist whose main role is to deliver patient care in hospitals, clinics, hospice and various health care venues.
- **Physiotherapy student** – an undergraduate student taking taught modules and attending clinical placement towards the achievement of a Baccalaureate degree in physiotherapy.

- Practices – reflected from an individual's understanding of common research terms and use of EBP with clinical practice.
- Treatment – any intervention applied to manage patients' impairments, activity limitation and/or participation restriction. This may be in a form of manual therapy, exercise, electrotherapy, orthotics, prosthetic training and more.

1.8 Overview of the Thesis

The study contains five chapters starting with this chapter introducing the physiotherapy profession, physiotherapy entry-level education and how evidence-based practice fits into the curriculum. This chapter also briefly gave an overview of regulatory bodies of physiotherapy education based on available information from select developed & developing countries.

Chapter 2 contains an extensive review of the literature covering studies on EBP in physiotherapy practitioners and students, its history showing the paradigm shift from an experience-based practice, the attempts at embedding EBP into physiotherapy curriculum, summary of previous studies and a section discussing theoretical frameworks upon which this study is grounded on.

Chapter 3 details the methodology used in this mixed-methods study including the rationale for using such approach, participant recruitment, site and context of study, data gathering methods, research instrumentation tools, quantitative statistical analysis and qualitative thematic analysis, and ethical considerations.

All data aggregated from the quantitative tool and interview questions are presented in Chapter 4 arranged according to the sequence of research questions and the specific objectives.

The study concludes in Chapter 5 which synthesizes the whole research by providing summary of findings, relates these findings with previous studies, summarizes the recommendations based on the findings of the study, its implications to physiotherapy

education and health care arena, and the limitations of this study that would warrant recommendations for further research.

1.9 Summary of the chapter

This chapter presented a brief introduction of the profession of physiotherapy and highlights the services rendered, scope of practice and pre-requisite knowledge and skills needed to become a practicing physiotherapy clinician. Introducing the profession of physiotherapy is necessary as this study involves the grassroots of physiotherapy practice: entry level students taking Bachelor of Physiotherapy in a health science education institution in Abu Dhabi, UAE.

The chapter also presented a study background sourced from relevant literature featuring studies already done in developed and developing countries featuring evidence-based physiotherapy practice, evidence-based practice in curricula and existing studies within the UAE. The background highlights the gap in literature which directed the need for this study to address the problem stated.

The purpose of the study pointed out the goals of this research. Research questions were aligned with the purpose of the study and reflected specific guides for collecting information contributory to the fulfilment of the overall purpose of the study.

A subsection presents the stakeholders to whom benefits of the findings of this study are directed to. A list of terms commonly used in this study accompanied by their corresponding operational definitions was also presented.

Lastly, the overview of thesis provides a bird's eye view of the whole study, from beginning to end.

CHAPTER TWO: LITERATURE REVIEW

2.1 Introduction

This chapter presents a comprehensive review of available literature regarding evidence-based practice (EBP) in physiotherapy curriculum and clinical education. The aim of the literature review is to identify and critically analyse current body of knowledge relating to EBP across different contexts of physiotherapy practice. The review enables the researcher to position the purpose of the study in light of the current available literature. The purpose of the study is to investigate the attitudes, practices and perceptions towards EBP of physiotherapy undergraduates in Abu Dhabi upon entry to advanced clinical placements and how one academic year of advanced clinical placement affect these constructs. Another purpose of this study is to describe the different facilitators and challenges towards EBP implementation during undergraduate clinical practice. Lastly, this study also identifies the clinical education strategies and institutional policies in clinical placements that affect EBP implementation among physiotherapy undergraduates, including ways used by clinical educators in Abu Dhabi to positively enhance students' attitude, practices and perception towards EBP. This literature review directs the researcher in understanding previously studied constructs, current theories and methodologies used in earlier research. Based on this literature review, the researcher was guided into choosing the appropriate theoretical framework to adopt and/or modify. This literature review also provided an opportunity to choose the suitable methodologies to answer the following research questions:

Research question 1: What are the attitudes, practices and perceptions of undergraduate physiotherapy students towards evidence-based practice at the start of and after one year of advanced clinical placements?

Research question 2: What are the facilitators and barriers towards an evidence-based practice within the advanced clinical placements?

Research question 3: How do clinical education strategies, management support and institutional policies influence the students' propensity to adopt an evidence-based practice?

This chapter is composed of two main sections. The first section presents definition of EBP based on the original concept of evidence-based medicine (EBM). Subsections are dedicated for its brief history and how physiotherapy curriculum integrated the teaching of knowledge and skills pre-requisite to EBP. Another subsection is dedicated for previous studies published in the past decade (presented in chronological order) determining the status of EBP into physiotherapy education and clinical practice in North America, South America, Europe, Australia and Asia especially in neighbouring Gulf countries. Specific findings of previous studies regarding constructs similar to the ones used in this thesis are given emphasis on the latter part of the first section.

After going through the content of relevant literature, the second section presents relevant theories used to frame and guide the investigation to answer the research questions. The theoretical framework of this study utilizes concepts from behavioural and epistemological perspectives such as Ajzen's (1985, 2002) theory of planned behaviour (TPB) and Edwards and Richardson's (2008) epistemology of physiotherapy practice. Another framework focuses on the management perspective of an organisation particularly Schein's (2010) primary embedding mechanism, which was also used by Dannapfel and Nilsen (2016) in a qualitative research involving managers of physiotherapy clinics in Iceland.

The relevant literature was located using a search strategy containing keywords and synonyms for evidence-based practice, physiotherapy curriculum, physiotherapy clinical

education and physiotherapy practice, with the use of appropriate Boolean operators, truncations and wildcards. An extensive search of literature was done in databases Academic Search, CINAHL, Education Research Complete, ERIC, MEDLINE, Professional Development Collection and ProQuest. This chapter ends with a summary of the significant points of key topics presented and re-stating the importance of laying out this background information to serve as foundation of the succeeding chapters.

The literature review follows a historical review approach that starts from the adoption of evidence-based medicine to evidence-based practice in the field of physiotherapy, how it was integrated into physiotherapy education and physiotherapy practice. Previous studies from the past decade were reviewed and presented in chronological order to showcase the trends of the most recent studies. The review also highlights the geographical location where each study was conducted.

2.2 Review of Literature

This section defines evidence-based practice and its processes and gives a brief history of the challenges that arose during the transition to it by clinical practitioners within the past four decades. This section also describes how EBP has been interjected into the content of physiotherapy education. Furthermore, this section operationally defines and cites previous studies related to the constructs being investigated in this study based on existing literature retrieved through systematic search strategies. Afterwards, a synthesis of studies according to the constructs being investigated in the current study is presented. These constructs are physiotherapists and physiotherapy students' attitude, practice and perception towards EBP. Facilitators and barriers to EBP in various contexts are also discussed in this section, including precedent findings of investigations regarding educational interventions to improve EBP implementation and the roles of management and institutional policies towards an EBP-inclined

health care institution. The review of related literature is shaped to establish the context by which the constructs and variables were investigated in this thesis.

2.2.1 What is evidence-based practice?

There is a multitude of definitions of evidence-based practice present in the literature. Since evidence-based practice is an outgrowth of evidence-based medicine (EBM), it is noteworthy to start from its root definition and see how the definitions evolved over the past two decades as other health care professions adopted it.

“Evidence-based medicine is an ability to assess the validity and importance of evidence before applying it to day-to-day clinical problems” (Oxman, Sackett & Guyatt 1993; Guyatt & Rennie 1993 in Dawes et al. 2005, pp.2-3).

“Evidence-based medicine is the conscientious, explicit and judicious use of current best evidence in making decisions about the care of individual patients” (Sackett, Rosenberg & Muir Gray 1996, p.71). It is the “integration of best research evidence, with clinical expertise, and patient values” (Sackett et al. 2000, p.1).

On the other hand, EBP is closely defined to EBM as the collecting of scientific evidence to use as basis for clinical decision making (“CAPTE Evaluative Criteria PT Programs” 2014). It is an important component of an effective clinical practice requiring clinicians to opt for the most effective intervention based on scientific findings and clinical expertise (Bury 1996).

In this research, the operational definition of EBP is adopted from Hurley, Denegar and Hertel’s (2011) definition of EBP. The definition was deemed most appropriate for this study as it elaborates the five steps of the EBP process and includes students (i.e. not limited to professional practitioners) as one of the “doers” of the practice:

“a systematic inquiry process through which students and/or practitioners (1) assess, (2) ask, (3) acquire, (4) appraise, and (5) apply evidence to answer clinical problems (p.31).

2.2.2 History, resistance to and acceptance of EBP in physiotherapy

Despite having a long history of improving best outcomes in the field of healthcare, EBP is still in its infancy (Newman 2013). It is considered as a paradigm shift among many practitioners considering that EBP may not have been part of their curricula in undergraduate or they may not have been exposed to it or taught about it during their professional career (Hurley, Denegar & Hertel 2011). Moving from an autonomous practice based on clinical experience to one that is based on scientific evidence is considered a radical shift in practice (Bithell 2000). Bosman (2015) described it as a slow and tedious process. As early as four decades ago, physiotherapists reported limitations to adopting an evidence-based practice due to financial constraints to conduct research and lack of access to participants who can be part of the research projects (Ballin et al. 1980). Lack of time has been identified as the topmost barrier against EBP. Time to develop and master skills, time to access, appraise and apply evidence has been identified as impediments for an evidence-based practice (Sackett et al. 2000; Jette et al. 2003; Iles & Davidson 2006). In a study involving critical care nurses in the USA, common challenges noted were lack of EBP knowledge, perceived notion of EBP being time-consuming, and resistance to adopting an evidence-based physiotherapy practice among colleagues and workplace managers (Makic et al. 2015). And despite the significant increase in volume of available high-quality research studies within the last two decades (Maher et al. 2001), the use and access of scientific evidences by physiotherapists has not caught up in pace (Metcalf 2001; Bosman 2013).

Response to EBP has not been all negative. An increased awareness and involvement towards EBP have been noticed since the early 1990's (Zimmerman 2008). Clinical practice guidelines were developed by utilizing scientific evidences in the same decade (Newman 2013). Within the past decade, it has been noted that EBP is adopted and applied within research-intensive organizations that provide the high level of support towards the practice (Zimmerman 2008). Today, EBP has undoubtedly become the primary practice framework in the field of medicine and allied health care, especially in physiotherapy (van Trijffel, Oostendorp & Elvers 2019).

2.2.3 EBP as an entry-level requirement

A research-informed practice has become an expected professional attribute in healthcare (Newman 2013). According to the policy statement of World Confederation for Physical Therapy (WCPT), physiotherapists should be equipped with knowledge and skills for EBP (World Confederation for Physical Therapy 2017), a policy that was also reflected in their physiotherapy entry-level education guideline (World Confederation for Physical Therapy 2011). According to the Sicily Statement on EBP, upon graduation of health care practitioners, they must possess the ability to “search, appraise and apply new knowledge” into their clinical practice and be life-long learners in order to adapt to future career changes (Dawes et al. 2005). Physiotherapists must be capable of utilizing EBP within their day-to-day practice (Bridges, Bierema & Valentine 2007). Even The Joint Commission (2001) and other health insurance providers or third-party payers require proof of application of intervention based on current scientific evidence (Thomason 2010).

Many countries are either on their way to establishing or has already established EBP as part of their entry-level requirements such as United States of America (USA) (“CAPTE Evaluative Criteria PT Programs” 2014), Australia (Long et al. 2011), and Sweden (Nilsagard

& Lohse 2010) to name a few. This entry-level requirement was further elaborated by USA through the vision statement of the American Physical Therapy Association (2013). The APTA recognizes EBP as one of the pillars of physiotherapy practice, with the expectation that physiotherapists contribute to research and use research to inform their practice (Newman 2013). The search and review of literature did not detect any studies pertaining to evidence-based physiotherapy practice in UAE.

With EBP becoming an entry-level professional requirement, it is advocated that education and training should start at the earliest possible time and should be integrated throughout the undergraduate program (Glasziou, Burls & Gilbert 2008).

2.2.4 The EBP process

The use of scientific evidence to inform clinical decision-making involves a five-fold process. First, it starts with writing an answerable focused research question based on a clinical problem that needs answers. Second, the answerable question will trigger the need to acquire the best evidence through systematic searching. Third, evidences gathered are to be critically appraised prior to applying it to the clinical scenario at hand. Lastly, the clinician must reflect and evaluate steps 1 to 4 in order to evaluate the effectiveness of the intervention towards patient outcomes. This model was popularized as “The 5A Model” of EBP involving the steps Ask, Acquire, Appraise, Apply and Assess (Cook, Jaeschke & Guyatt 1992).

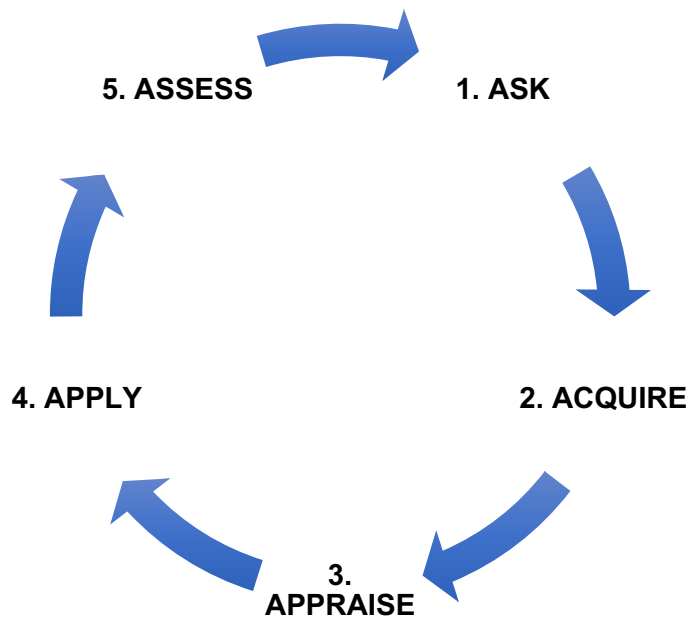


Figure 2.1 The Five Steps of Evidence Based Practice (Cook, Jaeschke & Guyatt 1992)

The five-step model is the basis of EBP teaching and clinical practice (Dawes et al. 2005). The model outlines the entry-level requirements for training healthcare students and professionals in EBP.

ASK. One of the strategies for converting a clinical scenario into a focused question is by breaking it down into components using the PICO (Glasziou, del Mar & Salisbury 2003) framework wherein P stands for patient/problem/population, I for intervention or management, C for comparison (optional) and O for outcome (Sackett et al. 2000).

ACQUIRE. Before acquiring research evidences, one must be knowledgeable as to what are the types of evidences available in literature. There is a wide array of quality evidence available in print and online. Clinical observations, for example, are interpretations of what is seen and observed in a clinical scenario. Scientific evidences could also be in a form of clinical researches. Clinical research includes case-series studies, controlled trials, and randomized controlled trials. The advantages of clinical researches over clinical observations and theories about mechanisms is that it discounts bias that might arise from interpretations of clinical

observations and it gives the effect size index. Randomized controlled trials are considered as the most sophisticated design considering that it eliminates bias by having an intervention and a control group, ensuring that patient recovery is due to the intervention itself and not by mere chance alone (Herbert et al. 2011).

APPRAISE. Critical appraisal of evidence is a research skill that entails higher order thinking skills. Parkes et al. (2001) defined it as a process of assessment and interpretation of research evidence through systematic consideration of its validity, reliability and relevance.

APPLY. This entails application of the results of steps 1-3 into practice. After a systematic search and appraisal of evidence that can answer the focused research question, the individual will integrate the findings from the research evidence with his or her clinical expertise and with consideration of patient perspectives (Dawes et al. 2005).

ASSESS. The act of assessing or evaluating an individual's performance from steps 1 to 4 serves as an audit of the whole process. Without this important step, there is no opportunity to reflect on the process that the individual undertook to apply research evidence into the care of patients (Ivers et al. 2012).

The five-step process of EBP has been cited and adapted in various studies. Booth (2009) rehashed the model to insert the realities of pragmatism and practicality in patient care. Facchiano & Snyder (2012) added a sixth step into the process which is dissemination of the outcome. Table 2.1 summarizes the studies that utilized the same EBP model, depicting slight modifications in the nomenclature or arrangement of process.

Table 2.1 The five-step EBP process models in published literature

Study	Processes					
	<i>Step 1</i>	<i>Step 2</i>	<i>Step 3</i>	<i>Step 4</i>	<i>Step 5</i>	<i>Step 6</i>
Cook et al. 1992 Sackett et al. 2000 Dawes et al. 2005 Prasad 2007 Tilson 2010	Ask	Acquire	Appraise	Apply	Assess	--

Study	Processes					
<i>Authors and year</i>	<i>Step 1</i>	<i>Step 2</i>	<i>Step 3</i>	<i>Step 4</i>	<i>Step 5</i>	<i>Step 6</i>
Straus et al. 2011 Herbert et al. 2012						
Booth 2009	Articulate	Assemble	Assess	Agree	Adapt	--
Long et al. 2011	Ask	Access	Appraise	Apply	Assess or adapt	--
Facchiano & Snyder 2012	Ask	Acquire	Appraise	Apply	Assess	Disseminate
Olsen et al. 2014	Ask	Search	Appraise	Integrate	Evaluate	--

Knowing how to do this 5-step process of EBP equips an individual with the necessary skills set to adopt a research-informed clinical practice. In this study, the researcher investigated the undergraduate physiotherapy students' attitudes, practices and perceptions towards the processes involved in EBP at the beginning of their advanced clinical placements. After one year of advanced clinical placements, the researcher noted whether there are any changes in how the students perceive EBP and its processes.

2.2.5 EBP in undergraduate physiotherapy education

Physiotherapy education is an “entry-level professional education from an accredited program in preparation for the licensing of physiotherapists” (APTA 2003, p.31). The curriculum is designed to include essential content and provide learning experiences to students with the aim of achieving learning outcomes needed for entry-level physiotherapy practice (World Confederation for Physical Therapy 2011). With the need for adopting EBP upon entry-level practice, Maudsley & Strivens (2000) encourages educators to adapt to the needs of students to ensure that they possess the professional requirements as they enter into healthcare practice.

How is EBP taught in undergraduate physiotherapy education? Traditionally, instructions on introduction to research, research design and statistical approaches have been

part of physiotherapy education. This is capped off by submitting a graduate research project at the end of the program. In recent curriculum design and development, research and EBP has been promoted to be taught and embedded throughout the physiotherapy curriculum to encourage its use in future areas of practice (“CAPTE Evaluative Criteria PT Programs” 2014). In other areas of allied health education, medical educators use journal clubs and web-based coursework to teach EBP to students (Sabus 2007).

There is no single approach or gold standard considered as most effective in teaching EBP knowledge and skills (Long et al. 2011). Hence, healthcare education institutions have established innovative ways of teaching and embedding research into the curriculum. Lewis (2010) identified three models of EBP training: (1) EBP training courses delivered in a standalone manner, (2) EBP training embedded within the courses, and (3) mixed approach wherein standalone and integrated EBP training courses are provided to students. The use of problem-based learning (Sackett et al. 2000) or case-study approach (Burnett 2005) or case-based scenarios (Heiss & Basso 2003) has been deemed as an effective approach to promote the use of research by students to address patient problems with current best practice according to scientific evidence. Problem-based learning or “learning by inquiry” is helpful in developing the habit of searching for current research evidence available (Sackett et al. 2000, p.29). Through the case-study approach, students demonstrated better commitment in research and improved their attitudes towards it in the process (Burnett 2005). Heiss & Basso (2003) added that students showed increased confidence in reading and understanding research articles through case-based learning. While content-based approach to delivering EBP teaching and learning experiences received negative feedback from students, problem-based learning proved to be effective in promoting EBP competence among undergraduate physiotherapy students early into the programme (Lennon et al. 2019).

In India, a study explored EBP teaching and learning experiences in higher education institutions offering Bachelor of Physiotherapy. A desk review of the curricula of thirteen undergraduate and eleven post-graduate physiotherapy programs revealed that EBP competencies are included in students' learning experience at varying degrees (Panhale, Bellare & Jiandani 2017). However, the delivery of EBP content lacks a systematic approach across the universities and exhibits a disconnect to clinical education. Panhale, Bellare & Jiandani (2017) conducted the document review and exploration of EBP training within each curriculum using the five-steps of EBP (Cook, Jaeschke & Guyatt 1992) as framework: ask, acquire, appraise, apply and assess. Results of the undergraduate curricula review showed that knowledge and skills needed to conduct step 1 (i.e. formulating a research question using the PICO framework) and step 2 (i.e. search of existing literature) were taught by more than half of the undergraduate programs under the research methodology module and were assessed through a research project, synopsis preparation or data collection for undergraduate students and dissertation for post-graduate students. Content pertaining to step 3 (i.e. critical appraisal, levels of evidence, interpretation of effect size index, etc.) was the least taught EBP aspect. In post-graduate curricula, all five steps of EBP were taught. In order of popularity of usage, teaching strategies utilised were didactic lecture, seminars, journal club, and research article critique. Content delivery lasted for 20-60 hours per year in an undergraduate curriculum while 50-360 hours per year in a post-graduate curriculum. Student performance were evaluated through university or college examination with essay questions focusing on treatment protocol and problem-based learning, written assessment methods particularly project presentation for undergraduates and dissertation for post-graduates (Panhale, Bellare & Jiandani 2017).

In a study in South Africa involving final-year undergraduate physiotherapy students (Hess & Frantz 2016), it was found out that even though the students are aware of the concepts

of EBP and was prepared for it through the research modules taught prior to their clinical practice, they still were not able to implement it fully due to reasons such as lack of competence and the reliance on their clinical instructors' treatment choices. The researchers recommended that teaching of EBP principles should not only be limited during their on-campus research modules but should continue throughout the undergraduate clinical practice (Hess & Frantz 2016).

In a mixed-methods study conducted in a university in Cape Town, South Africa, researchers utilised three data gathering methods namely, (1) a curricula review, (2) focus group discussion of lecturers, and (3) survey of the students to gather, to assess the teaching and learning of 'evidence-based health care' among undergraduate physiotherapy, occupational therapy, human nutrition, and speech, language and hearing therapy students. The document of the four programs revealed that most of the 'evidence-based health care' learning outcomes were mostly delivered in theory modules but not in clinical modules. This information was triangulated by the lecturers who participated the focus group discussion reiterating that courses teaching EBP knowledge and skills were mostly delivered during the third- and fourth-year levels within the four-year programs. Among the teaching strategies used were problem-based learning and journal clubs. Searching skills were facilitated by the university's library department through a hands-on practical session. Students were required to conduct a systematic review which reiterates the application of the first three steps of EBP: ask, acquire and appraise. From the perspectives of the students who participated in the survey, conducting a systematic review was deemed an effective approach in learning the EBP principles. It gave them the opportunity to apply the theoretical concepts into a systematic review that they wrote on their own. The conduct of a systematic review, however, was not part of the formal assessments of the module, unlike Biostatistics and Research methodology. Students expressed

in the survey that assessment of EBP understanding and application needed to have more weight in test and exams coverage and need to be emphasised in clinical modules as well. The inadequate integration to clinical courses made some students feel the gap in independent and research-informed clinical decision-making skills. All in all, EBP competencies were deemed as partly addressed across the four programs of the university (Schoonees, Rohwer & Young 2017).

In a study involving undergraduate physiotherapy students and their clinical instructors, Olsen et al. (2013) explored physiotherapy students' beliefs, experiences and attitudes in using EBP in undergraduate clinical practice, together with the views of clinical instructors and teachers. The integrative analyses done on the views of students, clinical instructors and teachers yielded four themes as shown in Fig. 2.2. describing four emergent themes from how students practice in an evidence-based manner. The results of the study noted that: (1) there is an attempt to apply EBP, (2) students are novices in clinical practice, (3) students prioritize clinical practice more than EBP, and (4) students lack the role models to guide them to adopting EBP. Physiotherapy students exhibited confidence in searching for evidence and used this during teaching sessions, writing case reports, group discussions and planning patient care. On the other hand, students relied more on their clinical instructors' guidance as this was deemed more time-efficient than accessing research databases or consulting clinical practice guidelines. Students gave more importance to the clinical practice experience more than EBP with the aim of gaining more practical experience rather than searching for articles. This impression was even confounded by the students' observation that EBP was not a routine practice among their clinical instructors' and that there is no culture of EBP within their clinical placements as evidenced by clinical practice guidelines that were not up to date. This suggests that physiotherapists who also play the role as clinical instructors to student physiotherapists are in

a crucial position to influence and model EBP to students during their clinical placement (Olsen et al. 2013). From the findings of the study, Olsen et al.'s (2013) created a model of EBP implementation in clinical physiotherapy education. This model closely relates to what this study is aiming to explore. It was established that students did attempt to applying EBP into their clinical practice by searching and utilizing research evidence, but struggled due to various reasons, one of which is that students felt less confident in their searching skills. Being novices in clinical practice, students felt it is easier and less time-consuming to acquire information from the clinical instructors rather than searching for research evidence on their own. Students deemed EBP as a 'non-clinical activity' hence they prioritized actual clinical practice experience over the adoption of EBP. For the students, it is also important that the clinical practice setting is conducive for EBP in terms of availability of role models who will foster the culture of use of research to inform clinical practice (Olsen et al. 2013).

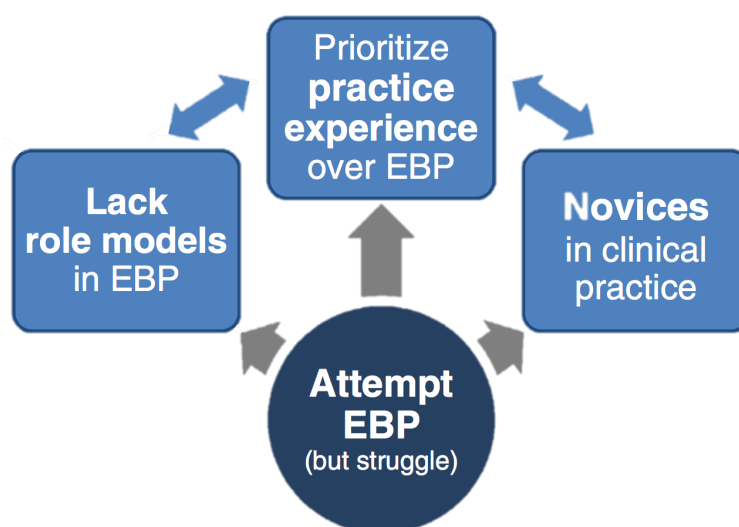


Figure 2.2 A conceptual model of students' use of EBP in clinical practice (Olsen et al. 2013, p. 6)

Table 2.2 Summary of Previous Studies (2009-present) Investigating Evidence-based Practice Constructs in the Field of Physiotherapy Practice

Study	Participants		Study Design	Constructs/Outcomes/Variables/Focus of Study									Location
	Students	Clinicians		Knowledge	Skills	Attitudes	Beliefs	Behaviours	Practices	Perceptions	Intervention	Barriers/Enablers	
Frant & Diener 2009			Within stage mixed methods										South Africa
Karin et al. 2009			Qualitative, focus group										Belgium
Fruth et al. 2010			Pre-post intervention										USA
Palaima 2010			Qualitative										USA
Salbach et al. 2010			Exploratory cross-sectional										Canada
Nilsagard & Lohse 2010			Cross-sectional descriptive & comparative										Sweden
Long et al. 2011	UG MS		Longitudinal, pre-post										Australia
McEvoy 2011	UG		Prospective, observational, longitudinal										Australia
Heiwe et al. 2011			Cross-sectional survey										Sweden

Study	Participants		Study Design	Constructs/Outcomes/Variables/Focus of Study									Location
	Students	Clinicians		Knowledge	Skills	Attitudes	Beliefs	Behaviours	Practices	Perceptions	Intervention	Barriers/Enablers	
Gorgon et al. 2012			Probability survey										Philippines
Lizarondo et al. 2012			Pre-post, mixed methods study										Australia
Cimoli 2012			Quantitative survey study										Australia
Dizon, Grimmer-Sommers & Kumar 2012			Systematic Review										[Systematic Review]
Dizon, Grimmer-Sommers & Kumar 2012			Qualitative, descriptive										Philippines
Olsen et al. 2013	UG		Qualitative, interpretive										Norway
Dannapfel, Peolsson & Nilsen 2013			Qualitative, inductive approach										Sweden
Newman 2013			Cross-sectional, qualitative interview										USA
Bernhardsson et al. 2014			Cross-sectional survey study										Sweden
Bernhardsson et al. 2014			Non-randomized controlled trial										Sweden

Study	Participants		Study Design	Constructs/Outcomes/Variables/Focus of Study									Location
	Students	Clinicians		Knowledge	Skills	Attitudes	Beliefs	Behaviours	Practices	Perceptions	Intervention	Barriers/Enablers	
Bozzolan et al. 2014	UG		Mixed methods study										Italy
Skinner et al. 2014			Prospective cross-sectional survey										Australia
Scurlock-Evans, Upton & Upton 2014			Systematic review										[Systematic Review]
Levesque & Yeung 2015			Intervention study										Canada
Hill et al. 2015			Cross-sectional, multi-survey										USA
Romney et al. 2015			Cross-sectional										Canada
Al-Enezi & May 2015			Cross-sectional										Kuwait
Ramirez-Velez et al. 2015			Cross-sectional										Colombia
Ramirez-Velez et al. 2015a			Cross-sectional										Colombia
Silva, Costa & Costa 2015			Cross-sectional, descriptive										Brazil
Olsen et al. 2015			Non-randomized controlled study										Norway

Study	Participants		Study Design	Constructs/Outcomes/Variables/Focus of Study									Location
	Students	Clinicians		Knowledge	Skills	Attitudes	Beliefs	Behaviours	Practices	Perceptions	Intervention	Barriers/Enablers	
Bernharsson et al. 2015			Cross-sectional										Sweden
Diermayr et al. 2015			Cross-sectional										Austria
Taylor 2015			Qualitative, grounded theory approach										USA
Panhale, Bellare & Jiandani (2017)			Observational										India
Phadke, Makhija & Singh 2015			Cross-sectional										India
Perraton et al. 2016			Prospective, cross-sectional										Australia
Perraton et al. 2016a			Long term pre-post study										Australia
Hess & Frantz 2016	UG		Mixed method, cross-sectional										South Africa
Dannapfel & Nilsen 2016			Qualitative										Sweden
Arnadottir & Gudjonsdottir 2016			Cross-sectional, web-based survey										Iceland
Owen 2016			Critical reflection										

Study	Participants		Study Design	Constructs/Outcomes/Variables/Focus of Study									Location
	Students	Clinicians		Knowledge	Skills	Attitudes	Beliefs	Behaviours	Practices	Perceptions	Intervention	Barriers/Enablers	
Wanjiry, Kabara & Millimo 2016			Descriptive, cross-sectional										Kenya
Tadyanemhandu et al. 2016			Descriptive, cross-sectional										Zimbabwe
Condon et al. 2016			Scoping review										[Scoping review]
Shaikh & Gad 2017			Cross-sectional										India
Yahui & Swaminathan 2017			Cross-sectional										Malaysia
Beshir, Woreta & Kebede 2017			Cross-sectional										Ethiopia
Ahmadi et al. 2017			Cross-sectional survey study										Afghanistan
Quarey & Kwakye 2018			Cross-sectional										Ghana
McEvoy, Lewis & Luker 2018			Mixed methods										Australia
Dao et al. 2018			Cross-sectional										Viet Nam
Stander, Grimmer & Brink (2018)			Systematic review										[Systematic review]
Lennon et al. 2019			Mixed methods study										Ireland

Study	Participants		Study Design	Constructs/Outcomes/Variables/Focus of Study									Location
	Students	Clinicians		Knowledge	Skills	Attitudes	Beliefs	Behaviours	Practices	Perceptions	Intervention	Barriers/Enablers	
Reis et al. 2019			Cross-sectional										Brazil
Alrowayeh et al. 2019			Mixed methods										Kuwait

UG = undergraduate, MS = master's degree, DPT = Doctor of Physical Therapy, CE = clinical educator

Shaded cells in blue indicate participant type and outcomes investigated in the studies.

As seen in Table 2.2, there are numerous studies regarding various constructs towards evidence-based practice in the field of physiotherapy. The following subsections synthesize the constructs related to this study namely: physiotherapists' and physiotherapy students' attitudes, practices and perceptions towards EBP; facilitators and barriers towards EBP; educational strategies used to increase EBP implementation; and the impact of management and institutional policies in implementing EBP.

2.2.6 Attitudes towards EBP across the globe

The concept of EBP and its integration to the practice of physiotherapy has been viewed positively by students, academics and clinicians. Discussed below are several reasons why EBP is viewed positively.

In Heiwe et al.'s (2011) cross-sectional survey involving physiotherapists, occupational therapists and dieticians of a university hospital in Sweden, EBP is viewed as necessary and that using evidence supports clinical decision making in providing physiotherapy care to patients. In another study in Sweden that aimed at understanding how physiotherapists grasp the concept of evidence applied into their work, geriatric physiotherapists cum clinical educators viewed EBP as a duty and a necessity propelled by willingness and interest to have research evidences as the basis of treatment methods for patients. "Being able to derive treatment methods from scientific journals provided a sense of certainty in decision making concerning the patients' methods of treatment" (Snöljung, Mattsson & Gustafsson 2014, p. 762). A research-informed practice confers a sense of autonomy among physiotherapists knowing that their choice of treatment is backed up by evidence (Snöljung, Mattsson & Gustafsson 2014). Still in Sweden, Bernhardsson et al. (2013) found that most phsyiotherapists reported having positive attitudes based on their perception that EBP is a necessary framework for physiotherapy practice and that clinical practice guidelines are important.

Positive attitudes towards EBP were also reported among Brazilian physiotherapists who are in favour of a research-informed practice because of a three-fold reason: (1) it is vital to clinical practice, (2) it provides improvement in patient care, and (3) it is important to clinical decision making (Silva, Costa & Costa 2015). These findings paralleled that of a probability survey conducted in the capital of Philippines involving physiotherapists in tertiary hospitals. Filipino physiotherapists showed positive attitudes towards EBP based on affirmative responses from participants regarding EBP's necessity and usefulness in physiotherapy practice and EBP's added value to treatment outcomes (Gorgon et al. 2012). Malaysian physiotherapists deemed EBP as necessary for everyday practice and is requisite to provision of quality health care to patients (Yahui & Swaminathan 2017). Moreover, Dao et al. (2018) reported that majority of the physiotherapists in Viet Nam also see the necessity and usefulness of EBP to patient care and keeping their practice updated. Majority also agreed that the demands of EBP to their daily practice were not unreasonable. Afghan physiotherapists also reported having positive attitudes towards EBP saying that it is useful in their day-to-day clinical practice, that it improves quality of patient care, and that it supports clinical decision making (Ahmadi et al. 2017). Beshir, Woreta & Kebede 2017 also noted Northwest Ethiopians to being positive about EBP because it improves the quality of patient care.

In Colombia, a study (Ramírez-Velez et al. 2015) that involved physiotherapists reported mixed views towards EBP. Positive attitudes indicate that EBP is a necessity in physiotherapy practice, that the literature and research findings were beneficial for day-to-day physiotherapy practice, and that EBP was favourable to improving quality patient care. Physiotherapists indicated that there is a necessity to increase the use of research and that they are interested to improve necessary background skills to integrate EBP into their practice. Despite positive attitudes and beliefs to EBP, physiotherapists also viewed that EBP places an

excessive demand on physiotherapists, EBP does not consider the limitations of their clinical practice setting, and that EBP fails to consider patient preferences. Despite being interested and motivated toward EBP, incorporating it to everyday practice will not increase the practitioners' monetary compensation (Ramírez-Velez et al. 2015).

Positive attitudes are also reflected in a physiotherapist's motivation (Karin et al. 2009), willingness to change practice if presented with evidence that is contradictory to what they usually practice (Fruth et al. 2009), propensity to imbibing new practices (Arnadottir & Gudjonsdottir 2016) and openness to furthering ones' EBP proficiencies and develop their EBP skills (Gorgon et al. 2012).

For physiotherapists in Austria who engage in evidence-based physiotherapy practice, the use of evidence in practice is believed to reinforce their professional profile. It is the physiotherapists' responsibility to search and evaluate research evidences (Diermayr et al. 2015). However, in other settings, the use of findings on journal articles to inform clinical practice is preceded by the use of treatment techniques (1) based mainly on what was initially taught as part of physiotherapy education, (2) based on what has always worked for certain conditions, (3) based on prior experience, and (4) based on a continuing education course relevant to practice (Al-Enezi and May 2015). Tadyanemhandu et al. (2016) also cited that knowledge from undergraduate studies was cited as the primary source of evidence-based information among physiotherapists in Zimbabwe.

In Maharashtra, undergraduate physiotherapy students reported that the most important rationale for adopting EBP is (1) to have uniformity in patient assessment and treatment, (2) to provide better patient care, (3) to ensure accurate assessment is conducted, (4) to comply with government policies, (5) to avoid data misinterpretations or errors and the least point is (6) for insurance purposes (Shaikh & Gad 2017). The rationale regarding insurance purposes aligns

with Beshir, Woreta & Kebede's (2017) claims that reimbursement rate increases when physiotherapists implement EBP into their daily practice.

Less common finding from previous studies include physiotherapists having positive attitudes towards EBP because of the need to comply with government policies (Shaikh & Gad 2017). A unique finding of association was seen in the work of Tadyanemhandu et al. (2016) wherein physiotherapists in Zimbabwe who exhibited positive attitudes towards EBP were seen more in public hospital setting than in private hospitals.

Researches from within two decades ago confirmed that clinical practitioners in the field of physiotherapy have already had positive attitude towards use of research to inform their clinical practice (e.g. Jette et al. 2003; Stevenson, Lewis & Hay 2004; Iles & Davidson 2006; Nelson & Steele 2007; Schreiber 2007).

In a scoping review conducted by Condon et al. (2016) included studies involving EBP skills of physiotherapists published between 1990 to 2013. The review found that physiotherapists in general aim to access research as a confirmation or assurance that their treatment was appropriate rather than as a basis of new information (Condon et al. 2016).

2.2.7 Practices reflecting use of EBP across the globe

In the past decade, studies have shown a good proportion of physiotherapists and students applying evidence into their daily physiotherapy practice. These practices are reflected through the following synthesis and are presented using the 5A model of EBP (Ask, Acquire, Appraise, Apply and Assess) (Cook, Jaeschke & Guyatt 1992).

The first EBP step, "Ask" or the ability to formulate a focused question, is evident among practitioners in Sweden wherein physiotherapists use clinical practice guidelines to guide their practice (Nilsagard & Lohse 2010). Physiotherapists in Northwest Ethiopia also

have a good knowledge level and awareness of clinical practice guidelines, however, formulating questions daily is only a practice among the minority of physiotherapists (Beshir, Woreta & Kebede 2017).

The second EBP step, “Acquire” which includes searching and accessing research from databases, is an ability found among physiotherapists (Nilsagard & Lohse 2010; Silva, Costa & Costa 2015) and students (Olsen et al. 2013) as well.

The third EBP step, “Appraise” or the ability to critically appraise a literature, is either viewed as doable (Nilsagard & Lohse 2010;) or difficult by practitioners (Gorgon et al. 2012) and students (Olsen et al. 2013).

The fourth EBP step, “Apply” or the ability to translate research findings to apply to patients, is evident in a study by Bernhardsson et al. (2015). However, other studies found physiotherapists having the lack of ability to do this step (Ramírez-Velez et al. 2015; Silva, Costa & Costa 2015).

The fifth EBP step, “Assess” or the evaluation of the results of one’s application of evidence into practice, is an area of the EBP process that was not covered and emphasised much within the studies of this decade.

Not all studies showed full integration of EBP within physiotherapy practice with only a minority of the participants exhibiting EBP engagement (Gorgon et al. 2012; Diermayr et al. 2015). Transitioning from undergraduate to workplace implementation of EBP, McEvoy et al. (2011) followed students from graduation into the first two years of working as physiotherapists and found that the participants EBP profile’ exhibited regression in practice and relevance of EBP with physiotherapy practice (McEvoy et al. 2011).

With regard to practice, Palaima (2010) identified four possible roles of physiotherapists according to their EBP activities within their respective organisations. These four roles are: (1)

‘EBP team contributor’, (2) ‘EBP initiator’, (3) ‘EBP middle ground’, and (4) EBP independent practitioner. The ‘EBP team contributor’ participates and contributes in the team’s effort in implementing EBP. The ‘EBP initiator’ serves as the originator of EBP discussion within the team. The ‘EBP middle ground’ is someone who operates in between experienced clinicians and new graduates. Lastly, the ‘EBP independent practitioner’ operate on their own EBP implementation without teamwork and despite awareness of colleagues’ non-implementation of EBP. An organisation with an established EBP culture paves way to more evidence-based practitioners. The new clinical practice environment where a physiotherapy graduate works has a remarkable influence in the role that the graduate will assume regarding EBP implementation. In a clinical environment where EBP is a norm, new graduates become more inclined to being ‘EBP contributors’ whereas, in a clinical practice environment wherein EBP is not yet fully embraced, the new graduate may either assume the role of being an initiator, an independent practitioner or someone who mediates between expert opinion reliant clinicians versus EBP-reliant clinicians (Palaima 2010).

2.2.8 Self-perceived confidence towards EBP implementation

With regard to perception towards EBP implementation, physiotherapists are confident in their ability to apply recommendations from research evidence to their clinical practice. Among the 5 steps of the EBP process, there are certain steps wherein practitioners feel more confident over the other steps. Condon et al. (2016) synthesized from different studies that physiotherapists in general possess the knowledge and confidence in translating encountered patient problems into a research question. Moreover, searching studies, or the Acquire step, is where physiotherapists feel very confident about (Fruth et al. 2009; Gorgon et al. 2012). On the

other hand, physiotherapists feel less confident in their critical appraisal skills set (Gorgon et al. 2012).

Students also feel confident with their searching skills (Olsen et al. 2013). Students' self-efficacy and confidence in formulating a research question to guide literature search, confidence in asking patients' preference in treatment, and confidence in applying evidence to practice is increased with previous research experience (Romney et al. 2015). Completing a 4-year entry-level physiotherapy program effected a positive shift in thinking, understanding, perception and confidence towards EBP (McEvoy, Lewis & Luker 2018). On the other hand, it is also possible that entry-level and final-level physiotherapy students do not significantly differ in the knowledge and attitudes, and that both levels of students do not possess the self-perceived confidence in their EBP abilities (Reis et al. 2019).

2.2.9 Facilitators towards EBP in various contexts of physiotherapy practice

This subsection synthesizes the constructs related to the factors that enabled or facilitated EBP implementation in the field of physiotherapy. Similarly, the barriers or challenges met by participants from previous studies are mentioned in this subsection.

Within the past decade, various key indicators, predictors, qualities and facilitators were noted as influential in a positive way towards one's adoption and implementation of EBP. For example, the number of years of working experience (Quartey & Kwakye 2018) positively contributes towards EBP. Academic preparation induces EBP readiness (Salbach et al. 2010). The academic community is encouraged to further the integration and promotion of use of evidence into the curricula to develop among students the habit of consulting research articles for every clinical question that would arise, which would concomitantly increase journal readership in future clinical practice (Yahui & Swaminathan 2017).

Having EBP knowledge (Nilsagard & Lohse 2010; Dannapfel, Peolsson & Nilsen 2013; Beshir, Woreta & Kebede 2017) and possessing appropriate EBP skills (Dannapfel, Peolsson & Nilsen 2013) facilitates EBP implementation.

Having positive attitudes and beliefs (Salbach et al. 2010; Dannapfel, Peolsson & Nilsen 2013; Arnadottir & Gudjonsdottir 2016; Beshir, Woreta & Kebede 2017) engages a physiotherapist into a research-informed practice.

Research participation (Salbach et al. 2010, Dannapfel, Peolsson & Nilsen 2013), allowing conduct of research project (Dannapfel & Nilsen 2016) and possessing the motivation to work in building a uniform clinical practice guideline (Dannapfel, Peolsson & Nilsen 2013) facilitates EBP.

Having a background of being a clinical educator (Salbach et al. 2010) encourages EBP adoption. Working with colleagues with background in research or with post-graduate degrees (Dannapfel, Peolsson & Nilsen 2013), having advisors, physiotherapy leads as role models, teachers and coaches (Nilsagard & Lohse 2010; Dannapfel & Nilsen 2016), and having supervisors with inclination to EBP (Nilsagard & Lohse 2010; Skinner et al. 2014) also inclines physiotherapists towards EBP. Skinner et al. (2014) was able to name the following factors as indicators of a positive research culture within an organisation: research propagation events, managers who constantly attend research events, organisations that offer training modules for enhancing research capacity and organisations that recognise and celebrate research achievements within the department.

Conference attendance, professional networking and taking part with external meetings (Dannapfel, Peolsson & Nilsen 2013) allow for a better EBP involvement. Physiotherapists from Indianapolis, USA indicated that when evidence-based information is received in a

synthesized format, it helps in the utilisation of information and implementation of evidence (Fruth et al. 2009).

2.2.10 Practitioner, literature and workplace related barriers towards EBP

Over the past decade, the complete integration of EBP in physiotherapy practice has not been fully realised due to variables challenges that could be either (1) inherent within the practitioner, (2) stemming from the literature and scientific evidences, or (3) imposed by the environment of the workplace.

Barriers inherent within the practitioner. Among students being novices in clinical practice is considered a challenge towards EBP implementation (Olsen et al. 2013). Among physiotherapy clinicians, a negative attitude towards EBP (Shaikh & Gad 2017) and lack of interest (Diermayr et al. 2015; Shaikh & Gad 2017; Quartey & Kwakye 2018) and poor self-efficacy (Quartey & Kwakye 2018) are definitely considered barriers. Individual attitudes of the physiotherapists with some having intrinsic motivation to utilize evidence and others having minimum to absent motivation is another inherent barrier (Karin et al. 2009). The source of divide was attributed to the fact that younger physiotherapists received formal EBP training in universities whereas older colleagues did not.

Number of years of practice may also make a physiotherapist resistant to the use of evidence to inform their practice especially when they see that what they have been doing in the past works just fine. Those practicing for more than 20 years were resistant to EBP due to the fact that they see their way of doing things works. Moreover, they do not have time after work to go for formal training due to social reasons (Karin et al. 2009).

Weak critical appraisal skills (Gorgon et al. 2012; Quartey & Kwakye 2018), lack of appropriate research skills (Ramírez-Velez et al. 2015; Diermayr et al. 2015; Wanjiru, Kabara & Milimo 2016; Ahmadi et al. 2017; Quartey & Kwakye 2018), unfamiliarity to statistical

analyses (Ramírez-Velez et al. 2015; Reis et al. 2019), and the inability to critically analyse the research study (Fruth et al. 2009; Silva, Costa & Costa 2015) are all considered as barriers towards EBP implementation. Inability to translate research findings and apply to patients is also a hindrance towards EBP (Ramírez-Velez et al. 2015; Silva, Costa & Costa 2015). Limited English language ability limits EBP inclination as well (Ramírez-Velez et al. 2015; Silva, Costa & Costa 2015; Diermayr et al. 2015; Reis et al. 2019). Moreover, when the scientific language is difficult to comprehend, it becomes a barrier to utilization of research evidence to inform clinical practice (Karin et al. 2009).

Barriers related to the literature and scientific evidence. Scarcity of studies relevant to one's practice is a challenge towards fulfilling an evidence-informed practice (Fruth et al. 2009; Bernhardsson et al. 2014). The incongruence of research findings to patient cases was also considered as one of the barriers by Diermayr et al. (2015). Inapplicability of evidences to unique patients and lack of generalisability of research findings are challenges to practicing EBP (Quartey & Kwakye 2018; Alrowayeh et al. 2019). Karin et al. (2009) reported low to moderate applicability to patients of results of evidences. Moreover, with evidence being scattered across different locations and platforms, physiotherapists' EBP engagement gets limited (Wanjiru, Kabara & Milimo 2016). Case studies are preferred over randomized controlled trials due to the complexity of RCTs, but case studies are not considered a high-level evidence (Karin et al. 2009).

One of the least commonly reported barriers but equally important issue in promoting EBP is the incomplete reporting of intervention leading to a difficulty in application of intervention to patient care (Yamamoto et al. 2017). The poor description of intervention contributes to inability to replicate or translate intervention into clinical practice leading to a

much larger concept known as “clinical research waste” (Glasziou et al. 2014; Ioannidis et al. 2014).

Barriers imposed by the environment of the workplace. Insufficient time is the most commonly cited barriers towards implementing EBP (Heiwe et al. 2011; Cimoli 2012; Bernhardsson et al. 2014; Diermayr et al. 2015; Perraton et al. 2016; Wanjiru, Kabara & Milimo 2016; Tadyanemhandu et al. 2016; Shaikh & Gad 2017; Reis et al. 2019; Alrowayeh et al. 2019). Insufficient time to search and read the literature was reported by Fruth et al. (2009). Access is time-consuming and overwhelming due to the number of available studies which makes finding the applicable one quite hard (Karin et al. 2009). The lack of protected time for searching and appraising proved to be a huge barrier towards evidence-based physiotherapy practice within tertiary hospitals in the Philippines (Gorgon et al. 2012) and among physiotherapists Ghana (Quartey & Kwakye 2018). Similarly, Snöljung, Mattsson and Gustafsson (2014) reported that any process related to EBP did not have a protected allocated time within working hours of physiotherapists in Sweden. This barrier is in close connection with having a substantial workload or caseload as this causes lack of time (Yahui & Swaminathan 2017). Physiotherapists had to do the sourcing of information outside working hours (Condon et al. 2016). Even in teaching EBP, the lack of time may warrant a delivery of content that is not evidence-based (Frantz & Diener 2009).

Lack of access to literature is a barrier towards a research-informed practice (Fruth et al. 2009; Gorgon et al. 2012; Silva, Costa & Costa 2015; Perraton et al. 2016; Ahmadi et al. 2017). Scarcity of available guidelines (Bernhardsson et al. 2014), scarcity of information resources (Diermayr et al. 2015; Alrowayeh et al. 2019) and limited online access among public servants (Tadyanemhandu et al. 2016) align with lack of access to literature. Only Shaikh and Gad (2017) reported availability of resources as the number one factor affecting EBP

implementation, more than time. Not having access to online databases outside work was also reported as a barrier by (Beshir, Woreta & Kebede 2017). Evidence-based teaching is also hampered by lack of access to current literature (Frantz & Diener 2009).

Putting altogether the considered barriers that are pertaining to infrastructure and facilities, lack of equipment needed to apply the recommendations of evidence is one barrier noted (Fruth et al. 2009; Wanjiru, Kabara & Milimo 2016; Quartey & Kwakye 2018) with the possibility of incurring a higher cost for utilising the evidence-based intervention (Silva, Costa & Costa 2015). Lack of a fully functional library is also considered a barrier among the facilities category (Frantz & Diener 2009).

Isolation from peers like having to work in a setup with low staffing serve as deterrent to adopting EBP as well (Quartey & Kwakye 2018).

There are patient-related variables that also hinder in the implementation of EBP (Fruth et al. 2009). Poor compliance is one (Fruth et al. 2010) and the uniqueness of certain patients whose condition is not addressable by recommended treatment from evidences because of non-generalizability (Quartey & Kwakye 2018). Patient's unique qualities and expectations also seem to influence EBP implementation as exhibited by cases wherein patients receive similar treatment but end up having different outcomes (Karin et al. 2009).

Lack of role models among students (Olsen et al, 2013; Bernhardsson et al. 2014a) and delayed feedback of clinical educators to students served as obstacles towards students' EBP implementation (Bernhardsson et al. 2014a).

Comparing the above recent findings to the findings of studies from two decades ago, it was found that older physiotherapists and those who have been practicing longer were less likely to show propensity to adopt evidence-based practice, the reason being not knowledgeable or skilful in the access and use of scientific literature (older physiotherapy curriculum did not

use to have EBP training embedded in it). The factor, “time spent in direct patient care”, dictates that patient care is most likely to still be based on clinicians’ expertise and experience, hence physiotherapists who have longer time spent in direct patient care are less likely to be inclined in the use of research to inform their practice (Bridges, Bierema & Valentine 2007). Even physiotherapy students stated that instructions received within the clinics were based on the experience and continuing education of their clinical instructors more than research evidence (Sabus 2008).

2.2.11 Educational strategies used to increase EBP engagement

Within two decades ago, the trend of most of the studies focused on profiling the evidence-based practice of physiotherapists, including exploring the facilitators and barriers towards its implementation (e.g. Jette et al. 2003; Bridges, Bierema & Valentine 2007; Stevenson, Lewis & Hay 2004). In the past decade, we have seen the rise of studies investigating various strategies to increase physiotherapists’ and allied health professionals’ engagement to EBP. Following are educational strategies applied to clinicians and students to enhance EBP uptake.

EBP educational strategies for the physiotherapy clinicians. One of the noted education strategies from previous studies is the provision of a tailor-fitted presentation focused on presenting scientific evidences to back up treatment of conditions. Findings showed that evidence-based presentation regarding the topmost chosen topic of an institution did show an increase in interest towards EBP among participants. Physiotherapists gained new information from the evidence-based presentation and their interest in EBP increased as well. Three months after the evidence-based presentation, majority of the participants were able to apply the information into their day to day practice. with more than half expressing interest for additional information regarding the same topic. Most of the participants reported that receiving the

evidence-based information in a synthesized format through a presentation really helped their utilisation of the information. Participants also believed that future evidence-based presentations on chosen topics would be beneficial (Fruth et al. 2010).

Journal club membership improved actual knowledge, perceived knowledge and attitudes of physiotherapists towards EBP (Lizarondo et al. 2012). In a study in Australia that involved nutritionists, occupational therapists, physiotherapists, speech pathologists, and social workers who were invited to 6 monthly sessions of an innovative structured journal club called International Care for Allied Health Evidence (iCAHE) wherein facilitated discussion and self-help kits on statistics were provided. After 6 months of iCAHE journal club, significant improvements to actual and perceived knowledge were seen across the disciplines. The greatest gain in self-perceived knowledge was reported by physiotherapists, followed by occupational therapists, nutritionists, speech pathologists and social workers. Only physiotherapists showed significant improvements in attitude. Significant improvements for EBP uptake were seen among speech pathologists and occupational therapists only (Lizarondo et al. 2012).

Still in Australia, a 3-hour EBP workshop utilising a variety of teaching-learning strategies (i.e. didactic presentations, group discussion and practical skills application) increased the use of research to support clinical decision making among physiotherapists. The frequency of searching scientific articles also increased from once a month to fortnightly and weekly combined. Frequency of reading scientific evidence also increased after the workshop. Perceived EBP skills were higher (from fair to good) and positive attitudes were enhanced. A high regard to EBP was reported based on the improved patient care it provided (Cimoli 2012).

A multi-component intervention program involving provision of printed and electronic guidelines, seminar, website, links, newsletter/email reminders, patient information leaflets and email and telephonic support significantly improved awareness of guidelines and awareness of

where to access guidelines among physiotherapists who received the program compared to the control group (Bernhardsson et al. 2014a).

A theory-informed instructor's development workshop created for orthopaedic manual physiotherapy instructors in Canada with the purpose of promoting EBP implementation into the teaching pedagogy of the instructors was well-received indicating high satisfaction to towards the impact of the workshop (Levesque & Yeung 2015). The workshop dealt with different aspects of the 5-step EBP process including focused question development, search and appraisal of evidence.

A 6-month interactive and clinically integrated training program provided significant increase in EBP knowledge, skills, behaviour and attitudes among physiotherapy clinical educators (Olsen et al. 2015). The training program included (1) workshops with a mixture of lecture and small-group activities, (2) five individual written assignments with reflections, (3) supervision and guidance via phone and/or email, and (4) a pass-or-fail oral examination demonstrating the application of the EBP steps to an actual case with a concurrent demonstration of how to supervise students through the same EBP process. Teaching and learning strategies utilised in the program were based on the concept of experiential learning (Vygotsky 1986; Lave & Wenger 1991, cited in Olsen et al. 2015) with emphasis on learning according to context, situation and experience within the clinical venue itself. Specific to the workshop delivery, it was made to be problem-based done in small groups to keep the session interactive and grounded to the process of clinical-decision making. Long-term follow-up after 6 months from the training program showed that EBP knowledge, skills and beliefs (not behaviour) were significantly improved (Olsen et al. 2015).

Another strategy is by critical reflection using Mezirow's transformative learning theory (Owen 2016). Through critical reflection, it was established that the process of reflection

widened the author's appreciation and awareness towards EBP combined with sound clinical judgment in care of dementia patients. Relying on good quality research for planning patient care provides empowerment in further implementing evidence-based physiotherapy practice (Owen 2016).

EBP educational strategies for the students. A 3-week intensive EBP training programme provided to physiotherapy post-graduate students resulted into improved intention to access and use evidence by at least once per week right after the training program, indicating systematic reviews, clinical practice guidelines, randomised controlled trials and case studies as main sources of evidence for their future clinical practice. Long-term follow up showed positive responses towards EBP implementation with the same order of preference to systematic reviews, clinical guidelines, randomised controlled trials and case studies as the main sources of evidence used for a research-informed clinical practice. There was no association between use of evidence to time since graduation (Perraton et al. 2016).

In undergraduate and post-graduate physiotherapy programs, formal courses regarding key principles of EBP were provided. Undergraduates exhibited significant changes and larger effect size in EBP actual knowledge and practice compared to post-graduates after undergoing a 13-week theory course regarding key principles of EBP and a 6-week clinical course with integrated EBP. The larger improvement among undergraduates may be attributed to the fact that they have had lesser formal exposure to EBP as compared to the post-graduate students. Moreover, undergraduate students were required to undergo a formal assessment examining their EBP knowledge which could have stimulated their learning, whereas post-graduate students implemented EBP as a learning opportunity more than a required assessment (Long et al. 2011).

Interactive courses within the undergraduate combined with authentic assessment tasks such as compilation of patient files, short EBP format of studies, and Journal Club showed that students valued EBP more and students got equipped with requisite knowledge. Moreover, integrating EBP within clinical courses caused significant change among undergraduate physiotherapy students with regard to actual knowledge and practice (Bozzolan et al. 2014).

Bozzolan et al. (2014) emphasizes that formal education in EBP provides the requisite knowledge and skills but will not be enough to for skills like data interpretation, statistical analysis and analysis of validity of the study. Similarly, according to Hill et al. (2015), a curriculum with research courses improves students' knowledge, skills and attitude towards EBP. However, attending research courses as part of the physiotherapy curriculum and completing clinical internship do not change students' views of EBP's compatibility with physiotherapy practice. Clinical internship, on the other hand, improves students' view on the relevance of EBP to physiotherapy practice. Students' knowledge, skills and positive attitude were found to have improved throughout the curriculum, but clinical experience did not have any additional effect to these constructs (Hill et al. 2015).

Collegiate discourses, whether informal (day-to-day discussions with colleagues) or formal (meetings), are also a significant educational strategy within the workplace. Physiotherapists reported that they usually consult their colleagues for second opinion regarding a certain physiotherapy intervention (Dannapfel, Peolsson & Nilsen 2013).

From a systematic review, didactic sessions, interactive sessions, use of printed materials, discussion & feedback, reminders, role-play, online support, opinion leaders and peer assessment are some of the knowledge translation strategies noted by Stander, Grimmer & Brink (2018).

2.2.12 Management Support towards EBP culture

Presence of organisational support is a determinant associated with the use of research to inform practice (Salbach et al. 2010). Aside from this, having an explicit management requirement and having an EBP culture within the organisation (Dannapfel, Peolsson & Nilsen 2013) facilitates EBP. Similar with establishing commitment to engage in clinical research (Nilsagård, Westerdahl & Forsberg 2019), managers and physiotherapists should come to a consensus and make a standpoint on whether the department should actively engage in making EBP as their physiotherapy practice framework.

Based on Schein's (2010) first embedding mechanism, when a leader pays attention to, measures and controls a behaviour within an organisation, the behaviour will proliferate. Conversely, if managers pay attention to EBP implementation, then EBP culture within an institution will flourish. However, despite the level of attention of managers give towards EBP, if efforts are not directed towards critical issues such as non-compliance, productivity issues or budget, then the push of managers towards adopting an EBP culture will not be realized (Dannapfel & Nilsen 2016).

Management support can be reflected through allocation of funding (Skinner et al. 2014) and provision of facilities such as availability of internet access (Salbach et al. 2010; Beshir, Woreta & Kebede 2017), and journal database access (Dannapfel, Peolsson & Nilsen 2013). Organisations offering training modules (Skinner et al. 2014; Tadyanemhandu et al. 2016) and cultivation of expertise among staff (Skinner et al. 2014) enhance EBP propensity of practitioners. When budget allocation and EBP-related activities like training programs are insufficient (Dannapfel & Nilsen 2016), EBP engagement is also low.

When the management allows protected time for practitioners to search and digest evidence, EBP implementation increases (Nilsagard & Lohse 2010; Beshir, Woreta & Kebede

2017). Providing manpower is also a form of managerial support. On basis of Schein's "recruitment, selection, promotion and excommunication" embedding mechanism, leaders need to recognise the significance of appointing a physiotherapist with a special responsibility of overseeing capacity building for EBP. The special appointment and role lead into upgradation of EBP implementation strategy in a more structured way (Dannapfel & Nilsen 2016). Having a specially appointed person that is of full-time equivalent staff for research (Skinner et al. 2014) enhances EBP engagement.

With regard to allocation of rewards, recognition of research involvement and recognition and celebration of research achievements is also a strategy used by certain organisations to increase EBP engagement among clinical practitioners (Skinner et al. 2014). In addition to that, awarding special status, salary increase, continuing professional education, dedicated days for Bachelor or Master thesis, and allowing conduct of research projects are some of the ways by which expertise and involvement in EBP was valued in an organisation (Dannapfel & Nilsen 2016). However, retaining physiotherapists with more experience and competence in research proved to be difficult as they tend to get employed in universities (Dannapfel & Nilsen 2016).

Conversely, lack of support from the organisational management (Fruth et al. 2009; Frantz & Diener 2009; Perraton et al. 2016; Wanjiru, Kabara & Milimo 2016; Quartey & Kwakye 2018) is challenge towards EBP. With the perception of EBP as 'time-consuming', management may view this as a deterrent to cost-effective time spent towards providing care to patients, hence, the lack of encouragement and support from an organisational perspective (Yahui & Swaminathan 2017). Lack of support from colleagues (Diermayr et al. 2015; Shaikh & Gad 2017; Quartey & Kwakye 2018) is another barrier towards EBP as colleagues are viewed

as sources of evidence-based information through formal and informal discourses (Dannapfel, Peolsson & Nilsen 2013).

Lack of EBP culture (EBP is not a norm) within an organisation influences the EBP role a new graduate chooses once they enter the work force (Palaima 2010). This was also felt by physiotherapy students in clinical placements wherein EBP is not a routine practice (Olsen et al. 2013).

In Belgium, the cost-cutting imposed by the ministry of health care to remove ineffective treatments had a drawback in the application of evidence-based treatment because costs were also not provided for equipment or training needed to implement the evidence-based treatment (Karin et al. 2009).

2.2.13 Impact of institutional and national policies on EBP implementation

Lack of policies facilitating use of research in the workplace does not facilitate EBP engagement (Gorgon et al. 2012; Diermayr et al. 2015; Ahmadi et al. 2017). Lack of support from physicians hamper the practice of EBP within hospitals and clinics (Fruth et al. 2009). Physicians' referrals or recommendations may be inconsistent with the evidence-based protocol that a physiotherapist wants to adopt (Fruth et al. 2010; Karin et al. 2009). However, in certain places where physiotherapists do not have the freedom to curate their own care plan, they need to follow the protocol provided by the physician (Karin et al. 2009). This is related to another barrier that is extra-organisational: lack of autonomy to practice (Karin et al. 2009).

Lack of autonomy to practice limits the freedom of physiotherapists to curate their own assessment and treatment protocols, which in turn limits their propensity to seek information from evidence (Karin et al. 2009).

2.2.14 EBP in the UAE context

Going through the different information regarding various constructs of EBP as described in different settings across the globe establishes the need for contextual considerations for the current study. Context is a vital element in understanding collective entities. A multilevel perspective is fundamental to establishing context. Considering and understanding context can move theory and research beyond just an individual level of analysis (Ostroff 2019). According to McCormack et al. (2002, p. 101), evidence-based practice context is defined as “the specific environment in which implementation, utilization and creation of evidence may take place”. Various contextual factors exist at the (1) individual level, (2) environmental level, (3) organizational level, and (4) cultural level. These contextual factors influence EBP in actual delivery of health care services (Dougherty et al. 2013).

In Chapter 1, one of the problems stated is the lack of relevant studies in the UAE regarding EBP in the field of physiotherapy, more specifically among students undertaking undergraduate clinical training. In the context established at the beginning of the study, it is imperative to look at the concept of cultural competence (Papadopoulos 2006) to later assist in the analysis of two particular dynamics in this study: (1) the implicit requirement of cultural competence embedded in the meaning of EBP which is “the integration of best research evidence with clinical practice and patient values” (Sackett et al. 2000, p.1), and (2) the cultural competence of clinical educators and students with regard to teaching and learning EBP within the clinical placements (i.e. cultural competence in education).

In the UAE, being a clinical practitioner providing health care services to a predominantly Muslim population requires cultural competence (Papadopoulos 2006). Muslim patients make healthcare decisions according to a complex amalgamation of religious beliefs, social, cultural and traditional views. Among these factors, health care decision-making of

Muslim patients is dominated by religious viewpoints with subtle influence of social, cultural and traditional principles. This stresses the need for healthcare providers to possess a level of understanding of the religious, social and cultural domains in providing healthcare services to Muslim patients (Papadopoulos 2006). In the concept of EBP (Fig. 2.3), the need for cultural competence is prerequisite to the careful integration of patient values and preferences into the implementation of EBP.

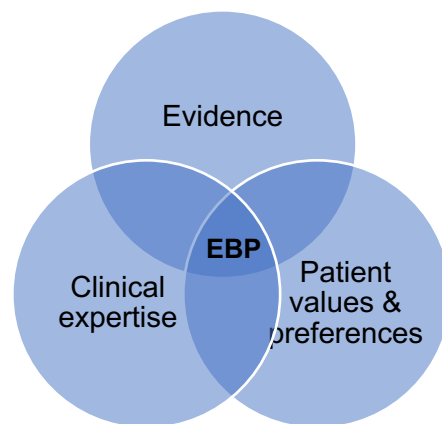


Figure 2.3 Evidence-based practice as an integration of best practice evidence, clinical expertise and patient values & preferences (Sackett et al. 2001).

Cultural competence is defined as “the capacity to provide effective health care taking into consideration people’s cultural beliefs, behaviours and needs” (Papadopoulos 2006). According to the Papadopoulos, Tilki and Taylor model (Fig. 2.4), developing cultural competence starts with raising cultural awareness through assessment of one’s personal value base and beliefs formed from an early age. The second step is to gain cultural knowledge covering similarities and differences in health and illness of societies and organisations to allow for understanding of current practice and future contribution into it. The third stage in the model entails the crucial development of proper interpersonal relationships with patients or clients, known as cultural sensitivity (Papadopoulos 2006). Once the gained awareness, knowledge and sensitivity gained from the first three stages are synthesized, cultural competence is achieved. Equipped with the appropriate assessment and treatment skills (i.e. clinical expertise), a

culturally competent physiotherapist is able to respect patient’s religious, social, cultural and traditional beliefs (i.e. patient’s values and preferences) and integrate best practice evidence to implement a research-informed clinical practice (Sackett et al. 2001).

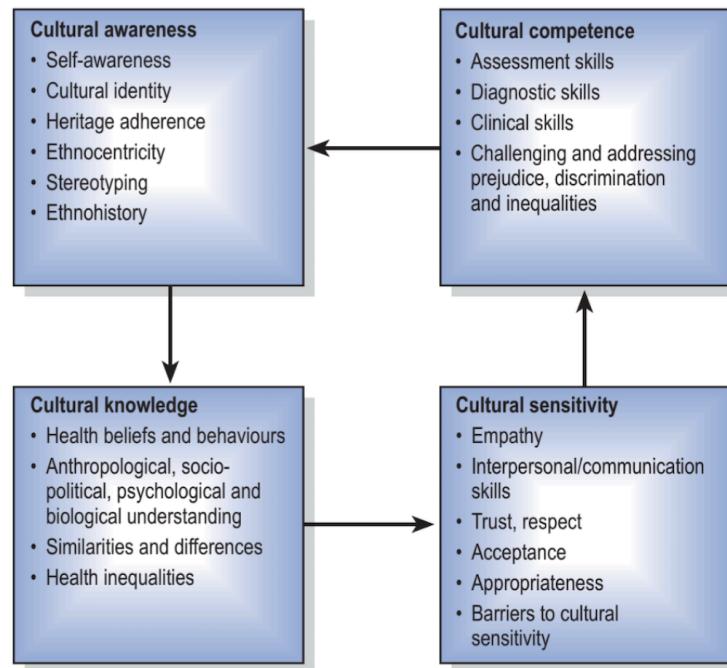


Figure 2.4 The Papadopoulos, Tilki and Taylor model for developing cultural competence (adopted from Papadopoulos 2006).

In educating students, primary language, cultural beliefs, values and practices need to be appreciated by the educator (Starr 2009). Language and culture are intertwined in the learning process, with the premise that “culture can influence what students learn, as well as how they perceive and respond to the information being presented” (Starr 2009, p. 484). Not only does the cultural background of the student affects their perception in learning. Even the culture within the clinical placement environment impacts a students’ learning experience (McCallum et al. 2016). Currently, there is a dearth of literature regarding physiotherapy clinical educators’ lived experiences in educating students from different a different cultural background, or clinical education provided by foreign practitioners in a predominantly Muslim country.

2.3 Theoretical Framework

The attitudes, practices and perceptions of undergraduate physiotherapy students was investigated in the light of the following theories: Ajzen's (1985, 2002) theory of planned behaviour (TPB) and Edwards and Richardson's (2008) epistemology of physiotherapy practice. The institutional policies and management perspectives was interpreted using Schein's (2010) primary embedding mechanism of creating a culture within an organisation.

2.3.1 Theory of Planned Behaviour

The TPB is a prominent model relating attitude to behaviour, detailing the bases of an individual's decision to perform a particular behaviour. The TPB model implies that an individual will carry out behavioural decisions according to available information. The model has five constructs namely (1) attitude, (2) subjective norm, (3) perceived behavioural control, (4) intention and (5) behaviour.

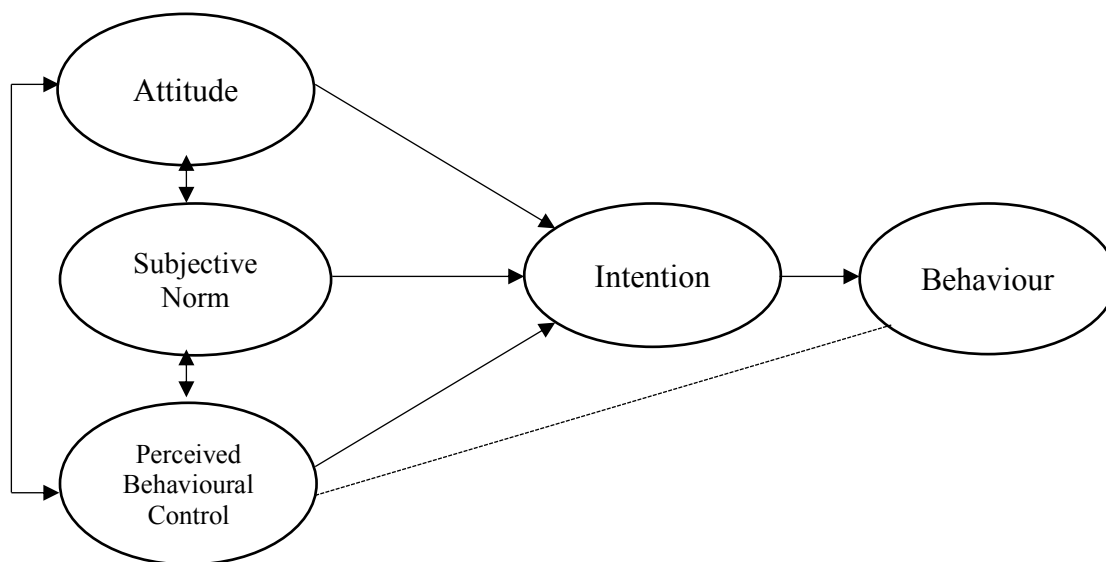


Figure 2.5 Theory of Planned Behavior by Ajzen (1985, 2002)

The TPB model shows that an intention to carry out a certain human behaviour is anchored onto (1) positive or negative attitudes or “behavioural beliefs” towards that behaviour, (2) subjective norms also known as the individual's perception of a certain behaviour based on

influences by peers and the culture surrounding the individual, and (3) perceived behavioural control which pertains to the individual's ease or difficulty in doing the behaviour. Conversely, a more favourable attitude, subjective norm and perceived control directly facilitates the performance of an intended behaviour (Ajzen 2002).

The TPB has been applied as a theoretical framework in studies involving different educational fields such as, but not limited to entrepreneurship (e.g. Heuer & Kolvereid (2014), nursing and midwifery (e.g. Kelleher et al. 2016; Ward 2012), distance education (e.g. Tagoe & Abakah 2014), entertainment (e.g. Bae & Kang 2008), and professionalism training (e.g. Archer et al. 2008). It has also been used in Diermayr et al. (2015) study of physiotherapists' EBP engagement in Austria.

In this study, the researcher anchored the three constructs of the first research question onto the constructs of the TPB model to find out whether it would lead to propensity to adopt EBP (Figure 2.5). Attitudes, perception and practices was related to attitude, subjective norm and perceived behavioural control of the TPB model respectively to see whether it led to propensity (intention) to adopt EBP (behaviour). TPB turned out to be an appropriate theoretical framework to address the main purpose of the current research (and the first research question) because the constructs that was being investigated in the current study align well with the constructs in Ajzen's (1985, 2002) TPB.

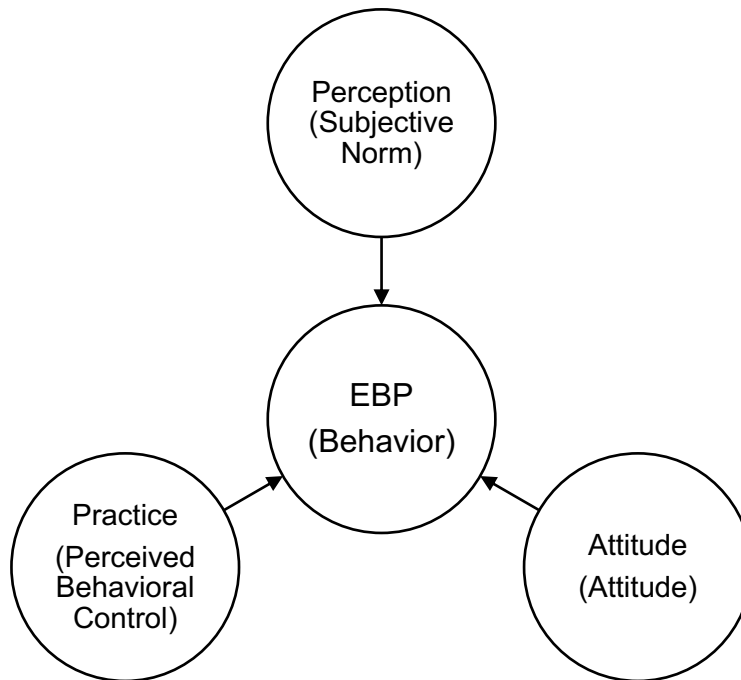


Figure 2.6 Conceptual framework of TPB and EBP constructs

Previous studies utilising TPB. The theory of planned behaviour was used in a study by Dewberry & Jackson (2018) looking at the implications of psychological constructs attitudes, perceived behavioural control and subjective norm towards students' intention of staying in college or dropping out. Findings indicate that the framework offers a promising explanation of student retention and prediction of intention to quit (Dewberry & Jackson 2018).

The framework of TPB was also used to design an 8-hour evidence-based workshop for occupational therapists. After attending the workshop, the knowledge, attitudes, perceived behavioural control, and intention to do the behaviour (utilisation of research to inform practice) were measured and findings indicate that a theory-based workshop has the potential of influencing the aforementioned constructs (Doyle & Bennett 2014).

An education program based on the TPB framework was developed with the purpose of increasing organ donor advocacy among Intensive Care Unit nurses (Lin et al. 2014). The comprehensive program was administered to a group of nurses while a control group received brochures only. The experimental group showed significant changes in attitudes and intentions

of advocating organ donation right after the program, with a re-measure 2 months after, which proves that the TPB-based education program was successful in achieving its purpose (Lin et al. 2014).

Expected outcome. Using the TPB framework in this study narrowed down the focus towards psychological constructs (attitudes = attitudes, perceived behavioural control = practice and subjective norm = perception) that are believed to directly influence the intended behaviour (evidence-based practice), as evidenced by previous studies that utilised TPB as well. Moreover, the constructs within the framework which were modified to align with the constructs investigated in the study are measurable through self-reported questionnaires.

2.3.2 Edwards and Richardson's Epistemology of Physiotherapy Practice

A physiotherapist's orientation to knowledge is what determines their approach to clinical decision-making, patient care and practice. According to Edwards and Richardson (2008), there are two types of clinical reasoning in physiotherapy practice based on three epistemologies. The first type is termed 'hypothetico-deductive' reasoning born from 'scientific/experimental/positivist' paradigm, with objective and predictable knowledge as foci. An example of this is that certain tests and measures lead to identification of specific problematic anatomical structure, which then guides an individual in choosing the appropriate set of applicable treatments. The second type of clinical reasoning is called narrative reasoning originating from either 'interpretive' and 'critical' epistemologies. Narrative reasoning born from 'interpretive epistemology' focuses on contextual factors. For example, care for patients is influenced by the patients' lifestyle and wishes. Narrative clinical reasoning based on 'critical epistemology' focuses on "the influence of historical factors and the analysis of power as

central in problem solving and planning emancipatory action(s) for better health” (Edwards & Richardson 2008, p. 189).

Edwards and Richardson’s (2008) practice epistemology or central beliefs in physiotherapy practice focus on the clinical reasoning of physiotherapists: how physiotherapists form hypothesis, assume a diagnosis and choose the patient treatment. Adopting Edwards and Richardson’s (2008) interpretive epistemology and modifying the object of focus as evidence-based practice implementation in undergraduate clinical practice helped answer the second research question of this study: “What are facilitators and barriers towards EBP within the undergraduate clinical placements?”. This model depicted how epistemological beliefs impact knowledge and skills development related to use of research to inform clinical practice among physiotherapy students based on various strategies with contextual and social influences. The model also supports multiple realities of EBP allowing context to shape its practices. Employing this model assisted in unravelling which of the different activities during undergraduate clinical practice made an impact in enhancing students’ propensity towards EBP.

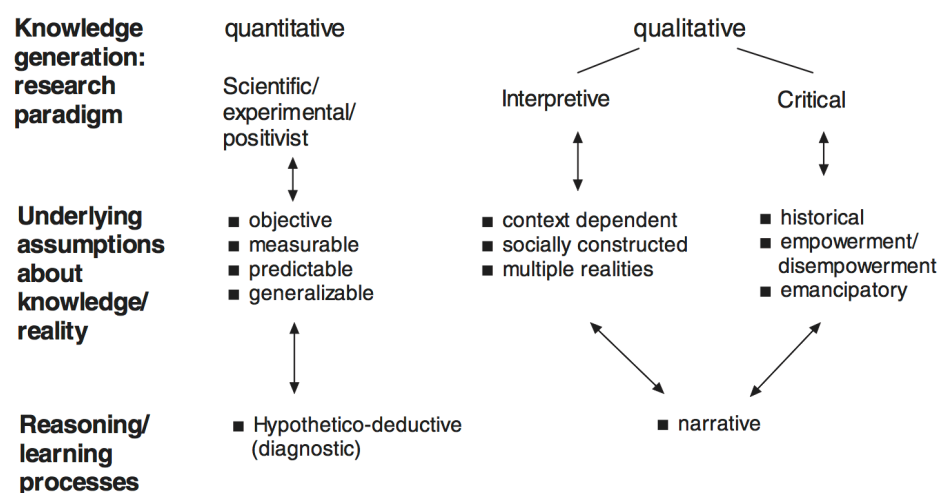


Figure 2.7 Epistemology of clinical reasoning in physiotherapy practice (Edward & Richardson 2008, p. 189)

Previous studies utilising Edward & Richardson’s framework. In Shaw and DeForge’s (2012) paper, it was theorized that physiotherapists are bricoleurs¹ who intend to use multiple sources to obtain knowledge needed for clinical reasoning. Using Edward & Richardson’s (2008) practice epistemology as a framework, Shaw and DeForge (2012) was able to describe the basis of physiotherapists’ expertise, knowledge and clinical reasoning. By looking at a bricoleur’s approach of embracing multiple methods of acquiring and applying knowledge, it deconstructed the theory that there is only one way to gain expertise and opened up the perspective of multiplicity in knowledge sources and knowledge approaches.

Expected outcome: By adopting Edward & Richardson’s (2008), the researcher widens the breadth of possible strategies and approaches of the clinical educators in bolstering EBP engagement among the physiotherapy students whom they are supervising for advanced clinical placements.

2.3.3 Schein’s embedding mechanisms

It is important to view the embedding of an evidence-based practice culture within the clinical setting from a management perspective. Thus, Schein’s primary and secondary embedding mechanisms would be appropriate to see how the proliferation of EBP culture is facilitated or hindered within the clinical education setting. This concept will help frame answers particularly for the third research question of this thesis.

There are six “primary embedding mechanism” that managers can wield as major tools to influence the perception, way of thinking, feeling and behaviour of their organisations. This theoretical framework works with the other two frameworks (i.e. Ajzen 1985, 2002 and Edwards & Richardson 2008) by looking at how the managers embed the attention, routines, resources, rewards, teachings, etc. in order to facilitate the achievement of an evidence-based

¹ Bricoleur – a French word meaning handyman or handywoman who uses any or all tools available to accomplish a task at hand.

physiotherapy practice. A manager who shows importance to achieving a practice framework reinforces the attitudes, practices and perceptions of their subordinates, hence, intertwining with the theory of planned behaviour (Ajzen 1985, 2002). Moreover, a manager who models a variety of tools or strategies to adopt an EBP behaviour also opens the mind of their subordinate to the numerous ways of engaging towards EBP. This aligns with Edwards and Richardson's (2008) openness to the concept that physiotherapy practice does not develop from a single strategy only.

The following sections concisely details each 'primary embedding mechanism' in order. It is important to take note though that while these 'embedding mechanisms' are presented in order, they are happening simultaneously in real-life application. After a brief description of each mechanism is a brief expected outcome based on the assumptions of the thesis author. This thesis does not aim to utilise the secondary embedding mechanisms of Schein (2010) to frame the institutional policies that facilitate EBP within the clinics, hence, only the 'primary embedding mechanisms' are discussed.

Table 2.3 The embedding mechanisms for influence of managers on the culture of an organisation

<i>Primary embedding mechanism</i>
<ul style="list-style-type: none"> • What managers pay attention to, measure, and control on a regular basis • How managers react to critical incidents and organisational crises • How managers allocate resources • Deliberate role modelling, teaching and coaching • How managers allocate rewards and status • How managers recruit, select, promote and excommunicate
<i>Secondary embedding mechanism</i>
<ul style="list-style-type: none"> • Organisational design and structure • Organisational systems and procedures • Rites and rituals of the organisation • Design of physical space, facades and buildings

2.3.3.1 “What managers pay attention to, measure, and control on a regular basis”

The first mechanism pertains to constructs that leaders or managers systematically look at, attend to, give remarks to and measure. It is important to note that the consistency and regularity of attention paid to important matters within the organisation is the focus of this mechanism, not the intensity of attention. The consistency of attention given to a certain construct within an organisation communicates to subordinates how important the construct is and how important to cultivate relevant behaviour leading to achievement of that construct. For example, if in clinical education, the use of research to inform practice is constantly emphasised by the clinical educator to their students through execution and evaluation, it is expected that the behaviour will be inculcated into the practice of the students.

2.3.3.2 “Manager reactions to critical incidents and organisational crises”

Crisis in this context is not always something that is dangerous or detrimental to the organisation. Crisis is perception-based, depending on what is viewed as crisis by the managers of each organisation. It could be anything that could cause anxiety. A heightened anxiety is believed to be a strong motivator for new learning. Anxiety reduction measures adopted by the manager and his or her subordinates creates opportunity to establish new norms, values and processes that will prevent or lessen future anxiety. In a clinical education setting where quality of patient care could easily rouse anxiety among practitioners, it is imperative for clinical educators to react to such “crises” with the aim of minimising compromise to patient care. An improved patient care is one of the impacts of EBP according to recent studies (e.g. Yahui & Swaminathan 2017; Ramírez-Velez et al. 2015).

2.3.3.3 “How managers allocate resources”

In an organisation, resource allocation reflects matters significant to the manager’s assumptions and beliefs. Resources could be anything between budget to specialised

manpower. In clinical education, the author expects this embedding mechanism to be reflected not specifically on the budget or financial allocation to the learning of students. As a matter of fact, it is not a norm to allocate budgets for clinical education per se. Taking this into consideration, the author assumes that if an organisation values the embedding of EBP unto their students, it is more appropriate to appoint clinical educators with adequate knowledge and skills to model EBP traits to the students, which leads us to the fourth primary embedding mechanism.

2.3.3.4 “Deliberate role modelling, teaching and coaching”

Role modelling, teaching and coaching are powerful ways on how managers communicate to subordinates a desired behaviour within the organisation. The desired behaviour is made visible to members of the organisation especially to newcomers. If a clinical educator shows enough ways to demonstrate EBP integration into everyday practice, students will view the importance of imbibing similar practice.

2.3.3.5 “How managers allocate rewards and status”

Values and behaviours deemed as rewarding and promotion-worthy are kept intact within the culture of the organisation. Performance appraisals filter the members of organisation worthy of rewards and promotion. This is a classic reward-punishment scheme wherein desirable behaviours are rewarded to demonstrate and retain values being prioritised by the organisation. Managers link rewards to desired values while punishments, if any, are linked with values they are concerned with. In a classic clinical educator-student setting, rewards are given in forms of grades or good recommendation useful upon job-seeking opportunities.

2.3.3.6 “How managers select, promote, and excommunicate”

The sixth primary embedding mechanism is considered the most potent way in embedding and perpetuating culture within the organisation. This is done through the selection and hiring process of new members whose characteristics are aligned with the manager’s values

and assumptions. Hiring new members that fit the desired culture will facilitate the propagation of culture within the organisation. Selecting the fitting clinical educator to propagate the desired propensity to adopt an evidence-based physiotherapy practice is tantamount to the creation of an EBP culture within an organisation.

Previous studies utilising Schein's framework. The framework was used to describe the embedding mechanisms of “mission command” within the US Army (Heyward 2013) through the primary embedding mechanisms of Schein (2010). More relevant to this study, the framework was also used in a study by Dannapfel and Nilsen (2016) by utilising the primary embedding mechanisms to investigate how physiotherapy leaders in Sweden create an EBP culture within physiotherapy clinics. It was found out that the leaders create a modest degree of engagement among physiotherapists towards EBP adoption (Dannapfel & Nilsen 2016).

Expected outcome. Utilising the ‘primary embedding mechanisms’ and making priority values evident through day-to-day actions of managers can facilitate and inculcate to subordinates the desired behaviour, thus dictating the organisational culture.

Conceptual framework. Putting together the three theories is necessary to explore the attitudes, practices and perceptions of students regarding the use of research to inform their undergraduate clinical practice. Ajzen's (1985, 2002) TPB concept gives a behavioural perspective, explaining how practice arises from perceptions and attitudes of an individual. Edwards and Richardson's (2008) notion provides an epistemological perspective of physiotherapy practice and is vital in describing the knowledge creation and clinical reasoning processes needed to identify basis of patient care. Knowing the knowledge bases of physiotherapy practice can assist in transitioning from a traditional practice to one that is evidence-based. Schein's (2010) primary embedding mechanism guides the inquiry of factors pertaining to how managers of workplace develop the culture of a phenomenon (in this study:

EBP) within the organisation. Putting altogether the three theories creates an anchor for the central idea of this study: to know whether undergraduate clinical practice is conducive for developing an inclination for evidence-based practice among physiotherapy students.

The three theories were handpicked by the researcher because of their relevance to the constructs being investigated in this study. Moreover, each theoretical framework provides a guiding path on how data can be collected for each research question. Another reason for choosing the said theories is their prior use in a previous study relevant to the current study. Fig. 2.8 shows how all three theories come together and how research questions are intertwined within the conceptual framework. In the framework, EBP is at the highest and center of the framework denoting that it is the studied phenomenon or behaviour. Arrows from practice, perception and attitude all point towards the desired phenomenon (i.e. EBP) showing the researcher's assumption that one's attitude, practices and perceptions towards EBP contribute towards one's EBP engagement.

Facilitators, barriers, clinical education strategies, management support and institutional policies are expected to contribute directly or indirectly towards the adoption of an evidence-based practice among undergraduate physiotherapy students, whether by influencing their attitudes, their daily practice or their perception of EBP.

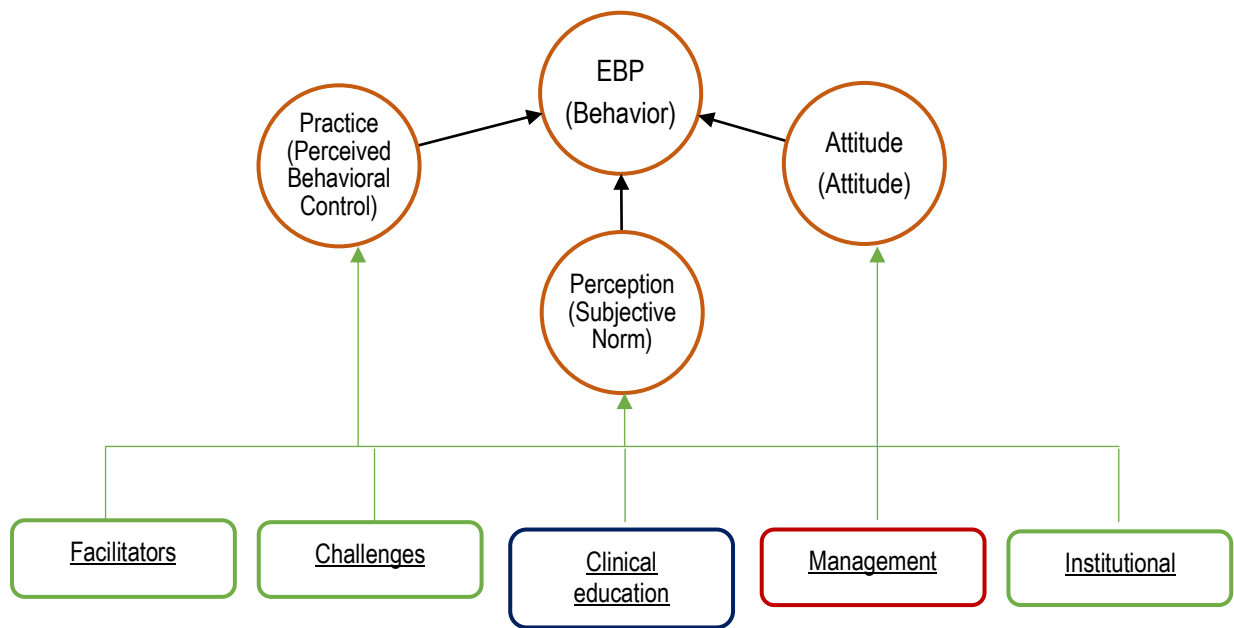


Figure 2.8 A conceptual framework based on putting together a psychological framework of TPB (Ajzen 1985, 2002), epistemological framework of physiotherapy practice (Edwards & Richardson 2008) and leadership framework (Schein 2010).

Legend:

Orange circles – based on theory of planned behaviour (Ajzen 1985, 2002); addresses research question 1

Blue box – guided by the physiotherapy practice epistemology (Edwards & Richardson 2008); addresses research question 3

Red box – probed through the 6 primary embedding mechanisms (Schein 2010); addresses research question 3

Green boxes – address research questions 2 and 3

2.4 Chapter Summary

Between the 1980s and 1990s, there was a scant literature about EBP, especially in the field of physiotherapy education and practice. Starting 1991, EBP in physiotherapy was just an emerging topic. The theme of most articles written about it covers mainly what EBP is. From the turn of the millennium to present, the evolution of physiotherapy studies became more pertinent. It shifted from asking “what is EBP?” to “how to be an EBP-practitioner” and the factors that interplay with implementing an EBP.

This chapter started by describing the origin and foundational definitions of evidence-based practice and how it got embedded into the curriculum of physiotherapy education. It was evident that with the benchmarking of physiotherapy curriculum according to recommendations of WCPT, EBP knowledge and skills are embedded well into the undergraduate curricula of the recent decade.

This chapter also showed a wide-scoped probing of physiotherapy practitioners and students’ perception on EBP in the past ten years from countries such as Ghana, India, Colombia, South Africa, Sweden, Canada, Philippines, Kuwait, USA, Norway, Brazil, Australia and UK. Lack of time and organisational support proved to be two of the most common barriers across the studies. Seeing the diversity of practices in different countries helps to pin-point where UAE’s nature of EBP currently stands.

This chapter also outlined established theories that served as the backbone of this thesis with an aim of describing the outcomes through behavioural (Ajzen 1985, 2002), epistemological (Edwards and Richardson 2008) and management perspectives (Schein 2010). This chapter also covered various literature detailing how the aforementioned theoretical frameworks were utilized in previous studies.

For most of the studies exploring the same constructs as this study, authors of previous studies used self-reported questionnaires as the primary tool to quantify the knowledge level, attitudes and practices, and to qualitatively describe EBP perception. The next chapter describes methods employed in this thesis which are emulated from the methods of the studies presented in this literature review.

CHAPTER THREE: METHODOLOGY

3.1 Introduction

In the previous chapter, a review of existing literature relevant to the research questions of this thesis was conducted. In this chapter, the author presents the chosen research approach and methods which were used to address the main research questions of this study:

Research question 1: What are the attitudes, practices and perceptions of undergraduate physiotherapy students towards evidence-based practice at the start of and after one year of advanced clinical placements?

Research question 2: What are the facilitators and barriers towards an evidence-based practice within the advanced clinical placements?

Research question 3: How do clinical education strategies, management support and institutional policies influence the students' propensity to adopt an evidence-based practice?

Due to the nature of the research questions of this thesis, a pure qualitative nor qualitative research approach would not be feasible to address in detail the questions being asked. Therefore, a mixed-methods approach is utilized in this study.

This chapter is sub-divided into seven sections: (1) chapter introduction, (2) research method or the overall research design and strategy, (3) sites and samples, (4) data collection methods, (5) data analysis, (6) ethical considerations and (7) summary. The author first presents the elected research approach and the rationale behind the choice, why it is the most appropriate approach to achieve the aims of the study and how it contributes to the culmination of the study. The research approach was carefully selected based on justification of previous studies from existing literature and its applicability and appropriateness to the current research purpose. The succeeding sections detail the research methods involved such as the site of study, samples of

participants, data collection procedures, research tools and instruments. Data analysis procedures are also presented in section five of this chapter with details on how quantitative data was statistically analysed and how qualitative data was handled.

Lastly, actions taken related to ethical considerations such as acquiring ethical approval at the institutional and state level, the timeline of approval, assurance of confidentiality of participants, consent forms and participant information sheet are discussed. Details of secure storage, retention and destruction of data gathered for this study are also mentioned.

3.2 Research Approach

The main purpose of this educational research is to investigate the attitudes, practices and perceptions towards EBP of undergraduate physiotherapy students during their advanced clinical placements. It was looked at through the perspectives of physiotherapy students and their clinical educators. While looking at the attitudes, practices and perceptions towards EBP, the researcher also identified the facilitators and barriers towards implementing EBP in undergraduate clinical practice. Lastly, the study also identified the clinical education strategies, management support and institutional policies in clinical placements that directly or indirectly affect the propensity towards EBP of undergraduate physiotherapy students.

To be able to investigate students' attitudes, practices and perceptions towards evidence-based practice, a mixed-methods approach was used. Combining the key features of qualitative and quantitative approaches together contributes to the overall quality of the study and helps attain a stronger study (Johnson & Christensen 2016). Traditionally, there were only two research paradigms (qualitative and quantitative) upon which all methodologies are anchored on. During the 1970s to the early 1990s when the 'paradigm dialogue' between the positivist paradigm of quantitative research and constructivist paradigm of qualitative research

design was flourishing, it was emphasised that the two research paradigms are distinct from one another through its ontology (the philosophy of the nature of truth and reality), epistemology (the philosophy of knowledge and the justification of knowledge), methodology (how is knowledge found), axiology (the philosophy of values and ethics), and rhetoric (the art or science pertaining to communication and argument) (Lincoln & Guba 1985, cited in Johnson & Christensen 2016). A “paradigm war” between purists against all other types of researcher has long been existing, declaring that quantitative and qualitative approaches cannot be mixed and was regarded as ‘incompatibility thesis’. At the turn of the 1990s, researchers started recognising the pragmatic approach of combining both quantitative and qualitative research paradigms, leading to the rejection of the ‘incompatibility thesis’ (Johnson & Christensen 2016). When the mixing of these two paradigms popularized among anthropologists and sociologists in the early 20th century, a third paradigm called mixed research was born (Johnson, Onwuegbuzie & Turner 2007). It was only a decade ago that the mixed methods approach has been gaining acceptance in the research field of education (Johnson & Christensen 2016).

The philosophical underpinning of the mixed methods approach is that of pragmatism. Pragmatism has been cited as early as 1900s from the works of philosophers Peirce (1931, cited in Pihlström 2011) and James (1907, cited in Pihlström 2011). Peirce made conjectures in the field of mathematics and science based on the scientific method aided with previous philosophers’ conjectures. This was his way of advancing hypotheses based on the past efforts of other observers. Rather than developing demonstrable truths, Peirce engaged in “cooperative inquiry” which emphasizes the importance of cooperative process through ongoing social inquiry. Inquiry is the primary method and ultimate foundation of a logical subject-matter. Peirce states that “truth itself is to be understood as a result of endless investigation” (Peirce 1931, cited in Pihlström 2011, p. 71) and that truth is established through the ultimate agreement

of all those who investigate. “Fallibilism”, one of Peirce’s tenets, assumes that “no questions are unanswerable, no answers are absolutely true, no formulations are final, and no level of examination is ultimate” (Pihlström 2011, p. 72). Peirce believed that philosophical formulations to develop a theory are made more precise through adequate public criterion.

In contrast to Peirce’s narrow focus of pragmatism on natural sciences, mathematics and the strong reliance on verification through public inquiry, James (1907, cited in Pihlström 2011) did a broader conceptualisation of pragmatism, with much interest in the novel and unique. James used pragmatism to address unfathomable matters of human and philosophical controversies (e.g. free will versus determinism; materialism or determinism) by tracing the practical consequences of each notion. James’s approach on pragmatism moved beyond focusing on a group of inquirers’ observations, words and ideas towards broader philosophical doctrines (James 1898, cited in Pihlström 2011). For James, truth is instrumental such that any idea that will bring us successfully from any one point of our experience to any other point is true. The pitfall of this notion, on the other hand, is that establishing truth from an initially workable truth allows the possibility of calling a false “true” without sufficient verification. James’s views in pragmatism highlights the following values: (1) that truth is connected to human values, (2) that, same as Peirce’s view, pragmatism is forward looking, and (3) that practical is more important than purely intellectual (Pihlström 2011).

Pragmatism has been further described through the works of educationalist philosopher John Dewey (1944) who rejected metaphysical absolutes such as idealism and realism. Pragmatism finds consensus between philosophical dogmas to arrive at a workable solution. It discards the notion of traditional dualisms and prefers common-sense versions of philosophical dualism for the purpose of solving problems. In pragmatism, knowledge is viewed as stemming from the reality of the world we live in and what we experience (Johnson & Christensen 2016).

“Pragmatist” is what is used to refer to researchers who utilize the mixed method approach owing to the premise that “researchers should use whatever works” (Fraenkel & Wallen 2009, p. 559). Philosophically, the pragmatists believe in “using procedures that work for a particular research problem under study” (Creswell 2012, p. 537). Pragmatists advocate using many methods to understand a research problem (Creswell 2012). According to pragmatism, “research design should be planned and conducted based on what will best help you answer your research questions” (Johnson & Christensen 2016, p. 83). The goal is to provide substantiation of epistemological standards through strong evidences. This standard is known as ‘warranted assertability’ (Johnson & Christensen 2016).

The pragmatist philosophy is to mix elements of research in an approach according to what will work for the research problem, research questions and research circumstances. The most important element in deciding which research method to undertake is the research question, not preferences towards a certain worldview or paradigm (Fraenkel, Wallen & Hyun 2012). The pragmatist philosophy allows for ‘dialectical pragmatism’ which focuses on listening to multiple paradigms and interdisciplinary perspectives (Johnson & Gray 2010, cited in Johnson & Christensen 2016). From the extended work on ‘dialectical pragmatism’ of Johnson and Stefurak (2013) emerged a fully developed metaparadigm called ‘dialectical pluralism’ which assumes that reality is multifaceted and plural, allowing various levels of reality. ‘Dialectical pluralism’ relies on learning from differences, permitting reality to be subjective, intersubjective and objective (Johnson & Christensen 2016).

The mixing of research components (i.e. methods, theories, perspectives) should always consider the fundamental principle of mixed research. The fundamental concept of a mixed-methods research lies on conducting a high-quality research through a carefully-thought mixture of ‘paradigm characteristics’ guiding the selection of methods and procedures,

magnifying the strengths and complementing the weaknesses of each method (Johnson & Christensen 2016). Therefore, the advantage of utilising a mixed methods design is to optimize the combined strengths of qualitative and quantitative methods while minimizing the probable weaknesses in a single method (Johnson & Turner 2003).

Looking at the two traditional research paradigms, each has its own strengths. Quantitative research approach operates with objectivity. Quantitative researchers obtain data in the form of numbers using standardized tests, questionnaires and quantitative outcome measures. It starts by building hypotheses with variables that can be manipulated, controlled or experimented on, hence, deductive in nature. Qualitative research on the other hand is inductive in approach. Qualitative researchers gather data in the form of words and they themselves are the tools for data collection. Through interviews, observation and other forms of qualitative form of data collection, interpretations are made and recorded. Qualitative research involves researchers to be part of the field of study in order to make observations from which they can extract insights and thoughts to come up with interpretations (Johnson & Christensen 2016).

In the premises under which quantitative research is built, a mixed research then shows avoidance of bias through its objectivity while at the same time explores the perspectives of people through the lens of qualitative research. Depending on the research problem, quantitative and qualitative methods can be deemed complementary to each other. With the nature of the constructs involved in the main purpose of this study (investigating attitudes, practices and perceptions), a pure qualitative will not be able to provide a statistically significant proof of change in perception, attitude or practices towards EBP after exposure to undergraduate clinical practice. Neither will a pure quantitative approach be sufficient to answer the changes (if any) in an in-depth manner. For example, attitudes, practices and perceptions can be measured by a survey questionnaire with close-ended questions and can also be investigated further using

interviews to better explain the result. Facilitators and barriers can be simply listed by participants in an open-ended survey but might not have enough depth as compared to semi-structured interviews wherein probing can be done. Same is true with the third research question about clinical education strategies, management support and policies within clinical placements that facilitate EBP implementation. Moreover, when little is known about the phenomenon being studied (i.e. attitudes, practices and perceptions toward EBP among physiotherapy students in a health science education institute in Abu Dhabi), qualitative research is appropriate to discover more about the phenomenon under study based on the perspective of people (i.e. physiotherapy students and clinical educators) who experienced the phenomenon. Therefore, it is justifiable and logical that a mixed method approach be utilized. Furthermore, as the study progresses, the researcher might encounter the possibility of new research questions arising from the existing research questions or from the data gathered for a certain research question. Opting for a mixed methods approach offers the flexibility of being able to address new problems that might arise during the implementation of the study in either qualitative or quantitative approach. This feature of flexibility is clearly a disadvantage if the researcher opts for a pure qualitative or quantitative approach (Creswell 2012).

The study ran an explanatory sequential mixed method design wherein quantitative and qualitative data collection happened in succession. A mixed research could either be an explanatory sequential or exploratory sequential design. In explanatory mixed methods design, quantitative data collection precedes qualitative data collection (Creswell 2012; Fraenkel & Wallen 2009). On the other hand, exploratory mixed methods design conducts qualitative data collection first, followed by the quantitative data gathering. Exploratory mixed methods design is typically used in creating rating scales, outcome measures or standardised questionnaires in a new area of study. In exploratory mixed methods design, qualitative study is done first to

know the underlying variables of a phenomenon being studied, followed by a quantitative study to know the relationship of the underlying variables with each other (Creswell 2012; Fraenkel & Wallen 2009). In this study, an explanatory mixed methods design was utilized. The results of the standardised survey questionnaire provided a good base for the qualitative data gathering through focus group and one-to-one interviews which investigated in an in-depth manner the atypical cases or outliers resulting from the survey (Creswell 2012). In short, the qualitative part of the study expanded on the results of the quantitative study and created a fuller picture than what numbers alone could offer. In the present study, the researcher had already established the variables (attitudes, practices and perceptions) that need to be investigated prior to the conduct of data collection. This is completely opposite with that of exploratory mixed methods design. Moreover, the primary objective is to investigate the attitudes, practices and perceptions towards EBP in a quantitative → qualitative sequence which further places this study as an explanatory research rather than an exploratory research (Creswell 2012).

The quantitative research part of this study was a longitudinal panel study as the researcher followed the same group of students for one year into undergraduate clinical practice. Quantitative data collection was done in a repeated-measures design. Results of the quantitative research were further supported by explanations stemming from the qualitative research, hence the explanatory sequential mixed methods design of the study. By mixing these two research approaches, the qualitative data provided a fuller picture of the evidence-based practices, attitudes and perception of the physiotherapy students, coming from the perspectives of both the students and their clinical educators.

In the research continuum, a study can be (1) ‘fully qualitative’, (2) ‘fully quantitative’, (3) ‘mixed with emphasis on qualitative’, (4) ‘mixed with emphasis on quantitative’, or (5)

‘mixed with equal emphasis on qualitative and quantitative’ (Johnson & Christensen 2016). This study falls on the ‘mixed with emphasis on qualitative’ point of the research continuum.

3.2.1 Triangulation

Originally, triangulation is a measurement technique used in naval military science with application in military tactics and maritime navigation. Literally, triangulation is the act of pin-pointing a specific location by using several reference markers (Jick 1979, cited in Creswell 2012; Cohen, Manion & Morrison 2011). In social sciences and in the field of research, “triangulation may be defined as the use of two or more methods of data collection in the study of some aspect of human behaviour” (Cohen, Manion & Morrison 2011, p. 141). It allows investigators to improve their research inquiries by integrating different kinds or sources of data and methods of collection while keeping a streamlined focus on one phenomenon. The three points in the triangle represent the phenomenon being studied and the two data sources. Triangulation allows complementing the strengths and weaknesses of each kind of data collection method.

This thesis study employs triangulation for the purpose of obtaining rich and comprehensive data. According to Wilson (2012), there are four types of triangulation: (1) data triangulation, (2) investigator triangulation, (3) theory triangulation, and (4) methodological triangulation. Cohen, Manion and Morrison (2011) adds (5) time triangulation, (6) space triangulation, and (7) combined levels of triangulation to the aforementioned types of triangulation. Briefly explained, ‘data triangulation’ uses different kind of data sources. ‘Investigator triangulation’ uses more than one researcher to gather and analyse data. ‘Theory triangulation’ utilizes multiple theories as framework in understanding the data. ‘Methodological triangulation’ uses more than one data collection method (Wilson 2014). ‘Time triangulation’ attempts to factor in the changes and processes by employing cross-

sectional or longitudinal study designs. ‘Space triangulation’ makes use of cross-cultural techniques to avoid limiting the study in one local area, subculture or country. ‘Combined levels’ of triangulation covers more than one principal level of social sciences (i.e. individual, interactive, and organizational/cultural/societal) (Cohen, Manion and Morrison 2011).

For this thesis, the author applies data, theory, methodological and time triangulations. Data triangulation is evident in the use of students and clinical educators as sources of data for investigating the students’ attitudes, practices & perceptions toward EBP. This process eliminates the possibility of a one-sided bias if the source of data is coming from the students only. This way, the perspective of the clinical educators regarding their students’ EBP capacity can be consolidated with how the students see their own EBP capacity.

Theory triangulation in this study is exhibited through the use of Ajzen’s (1985) theory of planned behaviour, Edwards and Richardson’s (2008) epistemology of clinical reasoning in physiotherapy practice, and Schein’s primary embedding mechanism (2010). These theories triangulate the phenomenon under study which is evidence-based practice by looking at different personal (i.e. perception and attitude of students), pedagogical (i.e. clinical education) and social (management) aspects that may facilitate or hinder the implementation of the said phenomenon.

Methodological triangulation has two subtypes: (1) within-method triangulation which involves using a variety of the same research method to investigate a phenomenon (e.g. interview and focussed group discussion within the qualitative approach or the use of two contrasting questionnaires within the quantitative approach), and (2) between-method triangulation which describes the use of ‘contrasting research methods’ such as the use of questionnaire (quantitative) and interview (qualitative) (Denzin 1970, cited in Wilson 2014). This study utilizes the between-method triangulation through the use of a validated

questionnaire to collect data on perceptions of students regarding EBP. Data from the questionnaire are represented by numbers from the Likert scale ticked by each respondent for each question. The other methods are focus-group interviews of students and key-informant interviews of clinical educators. A semi-structured questionnaire based on the results of the quantitative questionnaire is prepared with the aim of explaining the quantitative results through the narrative of the students and clinical educators.

Lastly, time triangulation is exhibited in the conduct of a survey research that is longitudinal in design where time as a possible factor of change is considered. A possible change in attitudes, practices and perceptions is investigated by looking at the student participants' one-year advanced clinical placement experience. The relevance of EBP into practice, the frequency of implementing EBP into clinical practice and the change in level of understanding EBP-related terminology after the yearlong undergraduate clinical practice experience are some of the variables that were looked at in this study, with description of possible changes over a period of time. The clinical educators' perspectives in change of students' attitudes, practices and perceptions of EBP over time were also consulted.

3.3 Sites and Samples

As a mixed-methods research aiming to study in-depth the propensity of physiotherapy students toward EBP, the study focused on two campuses of a health science education institution in Abu Dhabi implementing a physiotherapy program accredited by the Commission on Academic Accreditation of Ministry of Higher Education and Scientific Research. Across the entire Bachelor of Physiotherapy (BPT) program, convenience sampling was done to target the graduating student cohort registered for academic year (AY) 2018-19 who were taking advanced clinical placements during the 2 semesters of the final year of the BPT program. All

Year 5 students of AY 2018-19 (N1=32) finished the taught modules of the curriculum including integrated EBP modules and were eligible to participate in the study. Because of the small size of the population, the researcher opted for a census study to include all the students into the study to allow conclusion to be drawn from the entire population (Creswell 2012).

The study also involved the clinical partners of the health science education institution in Abu Dhabi. Clinical educators of consenting hospitals who supervised the undergraduate clinical practice of physiotherapy students were recruited to participate in a one-on-one key informant interview.

3.3.1 Context

The physiotherapy curriculum of the student participants in this study is built on a five-year long program that starts with one academic year or two regular semesters and one summer term of general requirement courses (Fig. 3.1). After the first academic year, students proceed to take core modules on physiotherapy practice in the following order: musculoskeletal physiotherapy for second academic year, neurology, paediatrics and cardiorespiratory for third academic year, advanced physiotherapy practice for first semester of the fourth academic year, and clinical placements from second semester of the fourth academic year until end of fifth academic year.

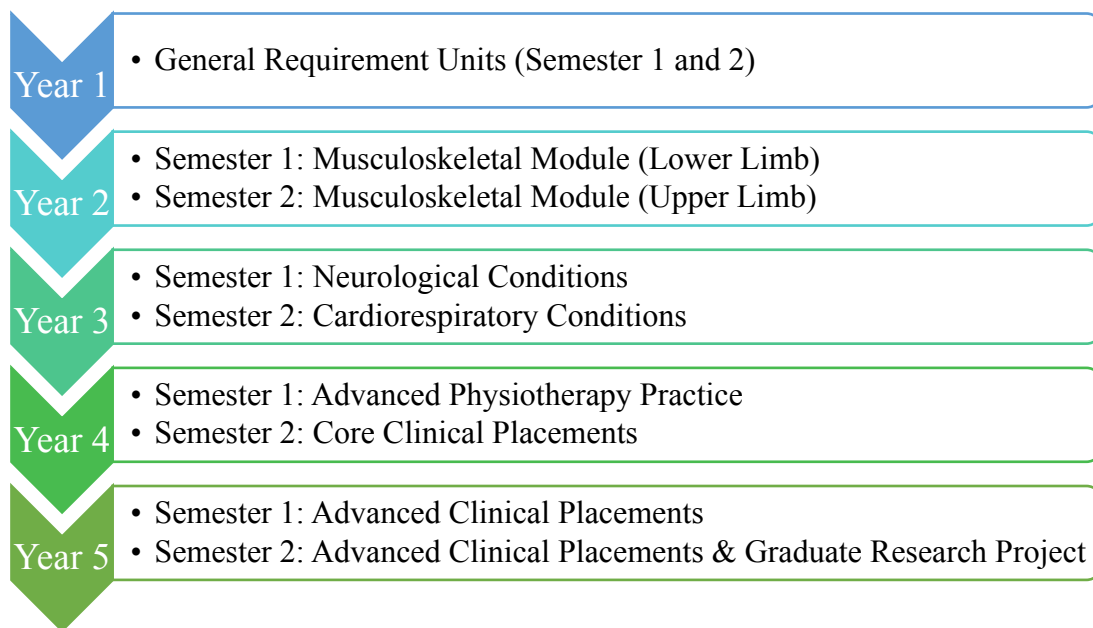


Figure 3.1 General Overview of the Bachelor of Physiotherapy (BPT) Program in a Health Science Education Institute in Abu Dhabi

Student participants undertook five evidence-based practice modules strategically placed and spread across the five semesters of core modules before they proceed to clinical education. The EBP modules are delivered using two teaching strategies: lecture and case-based learning. The one-hour weekly lecture sessions are mainly comprised of content pertaining to research methods, measures of central tendencies, statistical analyses (i.e. t-test, z-score, effect size index), the use of MS Excel in creating graphs and data analyses. Emphasis is given to developing research literacy and skills such as creating focused research questions, searching the database, and critical appraisal of randomized controlled trials which satisfy the first three aspects are (ask, acquire, appraise) out of the 5 As of EBP.

Two two-hour weekly case-based learning sessions were used to integrate and apply the research literacy taught in the lecture sessions. Student participants were given a hypothetical patient case to trigger their investigative skills to find answers on how best to assess and treat the patient using various resources (i.e. books, journals) from the available literature. An EBP

facilitator guides the students during case-based learning sessions towards the EBP process in order to complete the hypothetical patient's case assessment and treatment, and to finally close the case. Through this, the students learn how to utilize research to inform how they would handle patients.

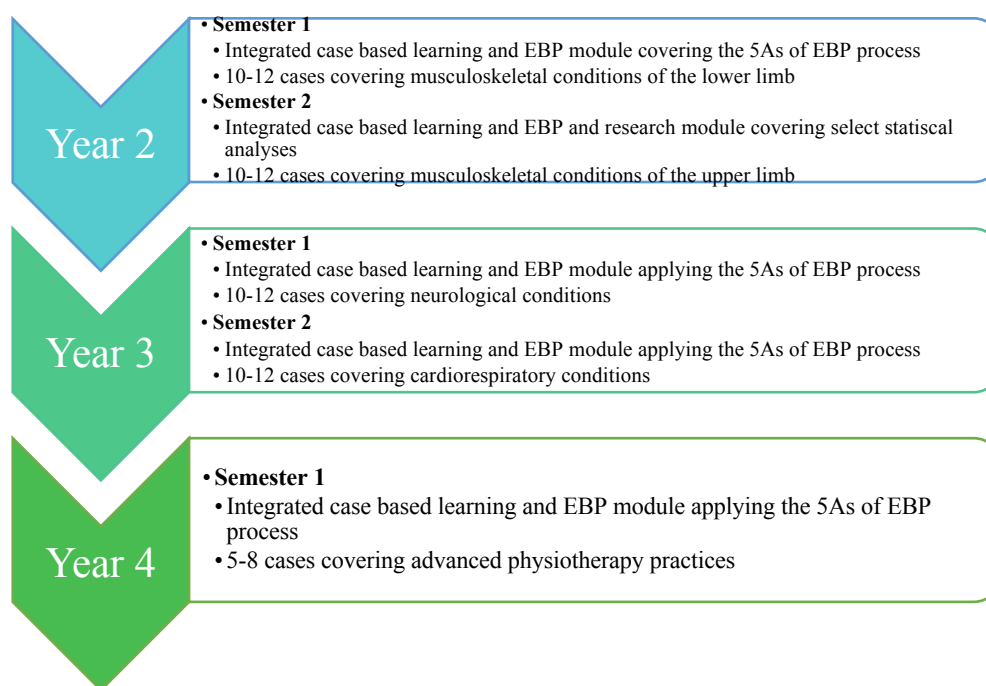


Figure 3.2 Five Integrated EBP courses within the 5-year BPT program

Undergraduate clinical placements commence on the semester succeeding the last taught module and covers the last 3 semesters of the students' undergraduate studies or Semester 2 of Year 4, Semester 1 of Year 5 and Semester 2 of Year 5. During the first three clinical placements happening on Semester 2 of Year 4, also known as core clinical placements, students are under full supervision of the clinical educators. Clinical educators are encouraged to allow students hands-on practice after learning-through-observation has been saturated, which mostly happens during the first to second week of each month's clinical placement. Students rotate from one clinical or hospital setting after every 4 weeks of core clinical placement.

Advanced clinical placements happen on the last year of the undergraduate program during Semester 1 and Semester 2 of Year 5 (final year). Semester 1 of Year 5 is composed of 3 advanced clinical placements while Semester 2 of Year 5 is composed of 2 elective clinical placements and 1 graduate research project course. During advanced and elective clinical placements, students are semi-supervised by clinical educators. Clinical practice is not limited to observations and students are trained to manage patients to cultivate the sense of autonomy. As students do not possess professional license to practice, full autonomy to patient assessment and treatment is not expected hence, the semi-supervision of licensed clinical educators at all times.

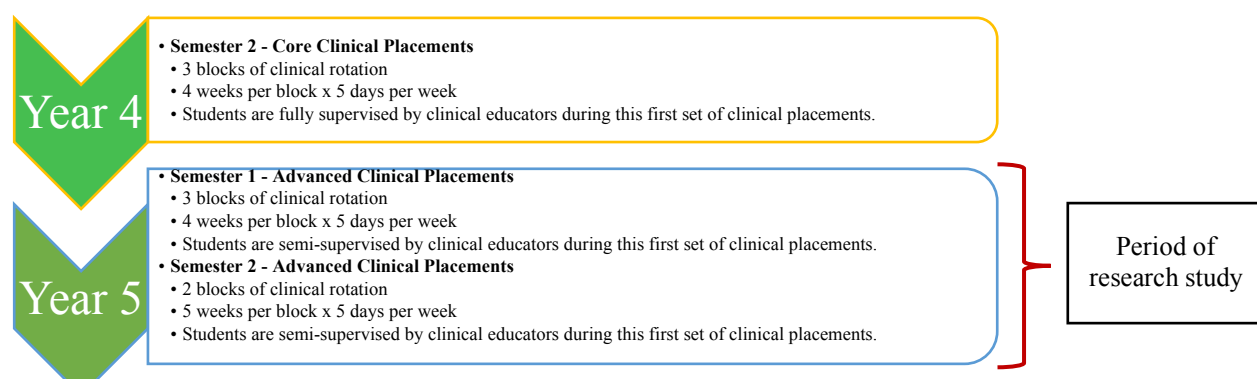


Figure 3.3 Clinical Placements within the BPT Program

This study recruited physiotherapy student cohort of academic year 2018-19 who finished the first 4 years of the undergraduate physiotherapy program and who underwent advanced clinical placements during the entire academic year. Students undertaking the core clinical placements were excluded as observations and limited hands-on practice to actual patients limit the full capacity of adopting an evidence-based practice.

This study also recruited the clinical educators of the participating students to gain the perspectives of the educators on how they see their students' attitudes, practices and perceptions towards EBP, to substantiate the factors that facilitate or hinder EBP implementation, and to describe the clinical education strategies they utilise to inculcate EBP among their students.

3.4 Data Collection Methods

The six most common data collection methods used in educational research are: (1) tests, (2) questionnaires, (3) interviews, (4) focus groups, (5) observation, and (6) constructed and secondary data (Johnson & Christensen 2016). In this study, three data collection methods were utilised namely: questionnaires, focus groups and interviews.

This section describes in detail the chosen physical methods and stages of collecting data by the researcher. This section also details the mechanics of the three tools to be used in the data collection of this study: (1) the Evidence-based Practice Profile (EBP²) Questionnaire by McEvoy, Williams and Olds 2010, (2) focus group interview protocol for the physiotherapy students, and (3) semi-structured interview questionnaire for clinical educators.

Data collection was divided into three stages occurring at three different time periods within a span of one academic year. The first two stages involved quantitative data collection. First stage started upon the commencement of semester 1, year 5 of the curriculum, during the start of advanced clinical placements which are implemented on the last year of the curriculum leading to graduation. This stage will be referred to as the **baseline survey** from here onwards. Second stage took place after one academic year of advanced clinical placements. The second stage will also be referred to as **post-advanced clinical placement (post-ACP) survey**. Third stage was done after data results from the first two stages had been analysed. This involved focus group interviews of physiotherapy students and key informant interviews of clinical educators.

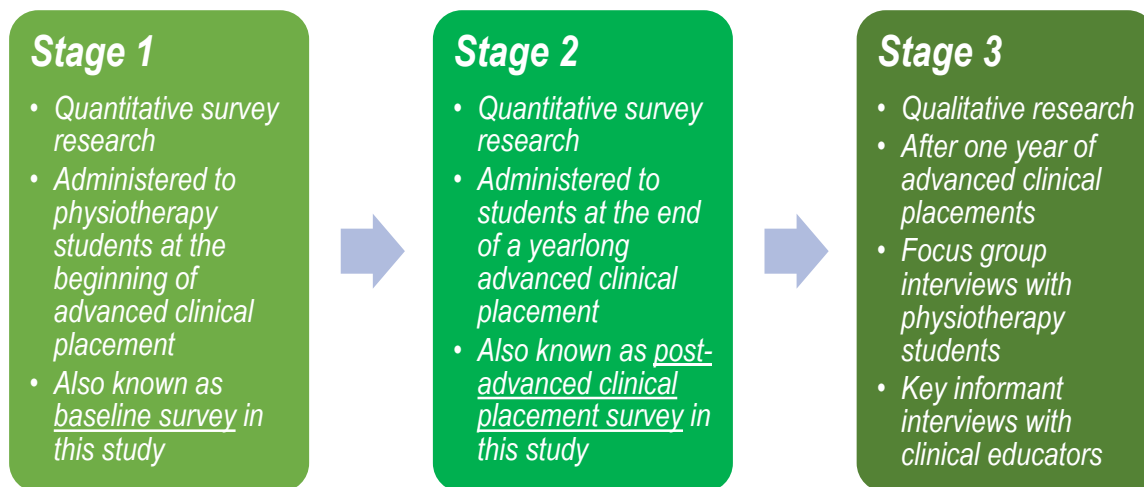


Figure 3.4 Stages of accomplishing data collection of this study.

3.4.1 Quantitative Data Collection Methods

For the quantitative part of the study, a survey research was conducted. The main purpose of surveys is to aggregate and describe the characteristics of carefully selected respondents based on how they relate themselves to variables (Fraenkel, Wallen & Hyun 2012). It is administered to a sample or the entire population to capture a description of the attitudes, opinions and behaviours of the population. It has been a popular design in the field of education since the early 1800s (Creswell 2012).

Surveys can either be cross-sectional or longitudinal. Cross-sectional surveys are applied to examine attitudes and practices, to compare two or more educational groups, to conduct community needs assessment, to evaluate a program and to conduct a nationwide study with the emphasis that data collection happens only at one point in time. On the other hand, longitudinal surveys are done to collect data at different points in time to see if any changes in characteristics of sample become evident from one time period to another. For the purpose of measuring the physiotherapy students' one-year undergraduate clinical experience shaped their

perception, attitude and evidence-based practices, this study implemented a longitudinal survey with data collection implemented at the start and end of one academic year of advanced clinical placements of the same cohort of physiotherapy students.

There are three longitudinal study designs depending on the samples involved in data collection: (1) trend study, (2) cohort study or (3) panel study (Creswell 2012; Fraenkel, Wallen & Hyun 2012; Johnson & Christensen 2016). A trend study involves surveying different samples from a changing population at different points of time. ‘Cohort study’ retains the selection of samples from a specific population or “cohort” throughout the duration of study. Though the sample differs each time a survey is implemented, the cohort where the sample is extracted does not change. On the other hand, ‘panel study’ keeps the same sample across different times the surveys are administered, meaning the same individuals who answered the survey during its first implementation will be the same respondents of the survey on its succeeding implementation. Because this study focused only on one cohort of students registered as clinical students during academic year 2018-19, and because all members of this cohort were invited to take part in the study from beginning to end, a longitudinal panel study was deemed the most appropriate approach for the quantitative part of the study. Studying the same people over time ensures the homogeneity of the sample. Changes, if any, are considered actual changes in specific individuals within the sample followed over time, as compared to changes that might be due to the difference in characteristics of one sample group to another.

Flexibility is one of the strongest features of a survey research design. Data collection can be done with the use of a questionnaire or be conducted through an interview administered in various forms such as face-to-face, through telephone, by mail of paper-based questionnaires, or with technological means such as e-mail forms and web-based survey platforms. In this

thesis, the researcher utilised a questionnaire as survey instrument. According to Johnson & Christensen (2016):

... “questionnaires are self-report data collection instrument that each participant completes as part of a research study. Researchers use questionnaires to obtain information about the thoughts, feelings, attitudes, beliefs, values, perceptions, personality, and behavioural intentions of research participants (p. 317)”.

Instrumentation. With the breadth of inquiry that a questionnaire can make, it is evident that researchers can attempt to measure an array of characteristics using this survey method. For this study, the author adopted a standardised questionnaire and was deployed as an internet questionnaire. The author created a website using the WordPress.com platform to create a page where the questionnaire was embedded using Google Forms. The website (www.ebppprofile.com) also contains a short introductory note from the author, a separate page containing the Participant Information Page (Appendix A), and another page for the actual survey. A back-up paper-based questionnaire was prepared in case needed (i.e. on-campus WiFi connection is faulty during a classroom-based data gathering).

True to the characteristic of a longitudinal panel survey study, the quantitative research part of this study comprises of two stages happening at the beginning of the students’ advanced clinical placements and one year after. Both stages involved the use of a standardised tool: the Evidence-Based Practice Profile (EBP²) Questionnaire created by McEvoy, Williams and Olds (2010). Student participants of Campus A were approached after an on-campus session and were briefed regarding the study and were asked to sign the consent forms to signify their agreement to be part of the study. Student participants of Campus B were briefed online through the website (www.ebppprofile.com). Their consent to participate was sought by ticking “Yes” in the web-based questionnaire declaring their understanding of the content of the Participant Information Sheet and their agreement to join in the study.

Administering the “Evidence-Based Practice Profile Questionnaire” at this point in time (during the early stage of advanced undergraduate clinical placement) served as the ‘baseline survey’ yielding the baseline measure of students’ attitudes, practices and perceptions towards evidence-based practice (McEvoy, Williams & Olds 2010). The second stage happened after students finished one academic year of semi-supervised clinical practice which is equivalent to 5 rounds of a 4 to 5-week clinical rotation of 5 days each week, 8 hours each day. Data collection involved using the same instrument used in stage 1 of the study. This stage was labelled as ‘post-ACP survey’ with the aim of identifying changes (if any) in students’ perception, attitudes and practices after exposure to advanced clinical practice for one academic year. Three follow-up emails were sent to all eligible participants (1) at the end of the first week of deployment of the internet questionnaire, (2) at the end of second week, and (3) after one month from deployment date.

Evidence-based Practice Profile Questionnaire by McEvoy, Williams and Olds (2010)

Johnson and Christensen (2016) suggested the use of an already developed research instrument if it is available and if it applies to one’s research question/s, mainly because of the availability of its reliability and validity measures. Taking into consideration that finding a good instrument that aligns well with the variables under study is a challenge, Creswell (2012) suggested strategies on how to locate an already existing instrument. Looking through journal publications can yield research articles that cite specific instruments used within the study. With the limitation of space in published journal articles, authors usually give sample items of the instrument thus giving readers an idea of the basic content of the instrument. Another strategy is by running an ERIC search. Lastly, existing instruments can also be found by looking through guides containing extensive information on tests and measures that are available for educational

use. Moreover, Creswell (2012) listed a set of criteria for choosing a good instrument. Table 3.1 lists the criteria and the justification for satisfying each criterion.

Table 3.1 Evidence-Based Practice Profile Questionnaire (McEvoy, Williams & Olds 2010) satisfying the criteria for choosing a good instrument.

Criteria for Choosing a Good Instrument	Satisfied
1. Have authors developed the instrument recently?	Yes
2. Is the instrument widely cited by other authors?	Yes
3. Are reviews available for the instruments?	N/A
4. Is there information about the reliability and validity of scores from past uses of the instrument?	Yes
5. Does the procedure for recording data fit the research questions/hypotheses in your study?	Yes
6. Does the instrument contain accepted scales of measurement?	Yes

In this thesis, the researcher searched for the most relevant developed questionnaire according to the following criteria: (1) includes domains particular to this study, (2) underwent a thorough and rigorous development and (3) has established psychometric measures. Hence, the decision to use ‘EBP Profile Questionnaire’ (EBP²) for this study (McEvoy, Williams & Olds 2010). The EBP² questionnaire is a 74-item questionnaire (Appendix E) answerable by a 5-point Likert scale. It takes 10-12 minutes to answer the questionnaire. Out of the 74 items, the first 58 questions gather information about the five domains emphasized in the instrument: (1) Relevance, (2) Terminology, (3) Sympathy, (4) Practice, and (5) Confidence; the remaining 16 items are non-domain items. Alignment of these domains with the constructs of this study are summarized in Table 3.2. A demographic section is included at the last part of the questionnaire. Though the tool was created in 2010, the most recent version provided by the primary author is still the same as the original version and was used as it is among several studies (e.g. Lewis et al. 2016; Long et al. 2011; McEvoy, Lewis & Luker 2018). The recency of use in other studies proves that the tool is still current and not yet outdated.

The questionnaire was developed for professionals across allied health and covers domains that are likely to change because of differing educational background and training.

The questionnaire was validated on 526 participants consisting of practitioners, academics and students. It underwent expert panel review, pilot testing, reliability testing (test-retest and internal) and validity testing (convergent and discriminative). The questionnaire has an internal consistency of Cronbach's alpha 0.96 and test-retest reliability with an intra-class correlation coefficient range of 0.77-0.94 (McEvoy, Williams & Olds 2010).

Some of the studies that utilised the EBP² Questionnaire applied the instrument on determining the effect size of repeated exposure to EBP training among entry-level health professional students (Lewis et al. 2016); on determining change in knowledge, attitudes and behaviours in a longitudinal study involving physiotherapy students who underwent entry-level EBP training (Long et al. 2011); on determining changes in knowledge, attitudes and beliefs towards EBP of physiotherapy students after attending research courses and completing clinical internship (Hill et al. 2015); and on measuring changes in knowledge and perceptions of EBP from first year to graduation among physiotherapy students (McEvoy, Lewis & Luker 2018). The questionnaire has also been translated to a Polish version that was validated on 1,362 people (Panczyk et al. 2017) and a Norwegian version validated on 149 people (Titlestad et al. 2017).

Prior to use of the questionnaire, permission was sought from the primary corresponding author of the study that developed the questionnaire. An email was sent to the primary corresponding author and permission was given by the primary corresponding author along with three files sent via email: (1) the published research study on the development of the questionnaire, (2) the editable version of EBP² questionnaire in Microsoft Word format, and (3) the scoring guide.

In the current study, the questionnaire was pilot tested in its online form to n=7 physiotherapy students of the prior academic year. The results of the pilot group were excluded

from analysis of the main data. With the established psychometric properties of the instrument, the focus of pilot testing was toward judging the ease of access, online questionnaire compatibility to different devices (i.e. desktop, tablet, phone), length of time it took to finish the questionnaire, ease of understanding the questions and face validity of the demographic questions. Demographic questions were tweaked to make them more applicable to undergraduate students. The question about gender was removed as the study site only admits female students which predetermined the answer to this question. All domain and non-domain questions were kept as they are. In the validation study conducted by the authors of the instrument, answering the questionnaire is suggested to be finished within 10-12 minutes. Considering the student participants in this study are non-native English speakers, the pilot testing verified the clarity of questions.

Table 3.2 Alignment of constructs investigated in this study to domains addressed in the EBP2 questionnaire.

Constructs being investigated in this study	Domains addressed in the EBP² questionnaire	Description of each domain in the EBP² questionnaire
Attitude	Relevance (Items 1-14; 14 items)	Includes questions regarding values, emphasis and importance placed upon EBP by an individual
	Sympathy (Items 15-21; 7 items)	Includes questions regarding individual's sense of compatibility with professional work and EBP
Practice	Terminology (Items 22-38; 17 items)	Includes questions about an individual's understanding of common research terms
	Practice (Items 39-47; 9 items)	Includes questions about an individual's use of EBP
Perception	Confidence (Items 45-58; 11 items)	Includes questions regarding individual's perception of use of EBP

3.4.2 Qualitative Data Collection Methods

To further explain the results of the quantitative study (i.e. survey research) and gather an in-depth analysis of the undergraduate physiotherapy students' attitudes, practices and perception regarding EBP, qualitative interviews were conducted. In this study, the researcher

opted for two data collection methods to gather qualitative data. These are (1) focus group interview of physiotherapy students and (2) key informant interview of clinical educators. Utilising two data collection methods under the same methodological paradigm exhibits a ‘within-method triangulation’. Moreover, having physiotherapy students and clinical educators as sources of data allows for ‘data triangulation’ (Wilson 2014).

3.4.2.1 Focus group interview of students

Group interview has grown widely popular as a data collection method in educational research (Cohen, Manion & Morrison 2011). One advantage of group interview is that it creates a potential for discussion to arise among the participants hence generating a wider range of responses (Watts and Ebbutt 1987, cited in Cohen, Manion & Morrison 2011). A focus group is a moderator-led discussion or interview of a small group of individuals allowing a detailed examination of thoughts and feeling about a particular topic (Merton & Kendall 1946, cited in Johnson & Christensen 2016). The moderator leading the group interview keeps the group participants focused on the topic being discussed, hence the term “focus” group. Discussion is generated from a series of open-ended questions within the focus group interview protocol. Each open-ended question is uncovered by the moderator as he or she facilitates the discussion that could last anywhere between 1 to 3 hours and is audio-recorded to allow for an in-depth data analysis later.

Deciding the number of focus group interviews to be conducted is crucial (Cohen, Manion & Morrison 2011). One focus group is not sufficient to allow for thematic analysis (Johnson & Christensen 2016). In an empirical study conducted by Guest, Namey and McKenna (2016) aiming to determine the number of focus groups needed in conducting a research study, 40 focus groups were created to inquire about the health-seeking behaviours of African-American men in a North Carolina county. It was concluded that only 2 to 3 focus

groups are needed to discover 80% of all possible themes regarding one particular topic. Moreover, only 3 to 6 focus groups allowed for 90% of discoverable themes to emerge. In this thesis, the researcher created 3 focus groups considering the possibility of discovering 80-90% of discoverable themes regarding physiotherapy students' perception, attitude, behaviour and practices toward EBP.

After deciding the number of focus groups needed for this study, the focus group size (i.e. number of people within each focus group) was decided. Upon the recommendation of various methodological literature in education, a minimum of 4 (Morgan 1988, cited in Cohen, Manion & Morrison 2011) or 6 participants (Johnson & Christensen 2016) and a maximum of 8 or 12 participants (Morgan 1988, cited in Cohen, Manion & Morrison 2011; Johnson & Christensen 2016) per focus group should be arranged. A buffer of 20% of the target participants should be invited for each focus group session to account for possible "no show" of confirmed participants (Morgan 1988, cited in Cohen, Manion & Morrison 2011). For the focus group interviews of this thesis, the researcher aimed at 4 to 7 participants per focus group. Invites were sent to 5 randomly selected physiotherapy students who gave their consent to participate in the survey research and also consented to be part of further data collection. An over-recruit of 2 students (i.e. total of 7 students were invited per occasion) was done per focus group session to serve as buffer in the event that some of the participants who confirmed do not turn up on the day of focus group interview.

Depending on the research purpose, participants of a focus group may either be homogenous or heterogenous (Johnson & Christensen 2016). For this study, the research questions are best addressed by people with similar exposure to undergraduate education and clinical practice. Therefore, it is vital to ensure that participants of each focus group are homogenous or is composed of people with similar characteristics. Homogeneity is one of the

strong features of the sample of this thesis considering that it is a case study and that student participants all came from the same health sciences education institution; they undertook the same undergraduate program and experienced the same undergraduate clinical practice.

The main purpose of this focus group is to “interpret previously obtained quantitative results” (Johnson & Christensen 2016, p. 326). In this study, the focus group interviews aimed to describe the attitudes, practices and perceptions of physiotherapy students towards EBP through their own words. The focus group interviews also enquired about the facilitators and barriers that the students experienced while attempting to implement EBP within the year-long advanced clinical placements. Focus groups are indeed very useful in generating in-depth information within a short period of time.

Interview Protocol for Focus Group Interview of Physiotherapy Students

An interview protocol is a self-designed data collection tool used by qualitative researchers to guide the flow of interviews. It contains the instructions for the interview process, a section with all the questions, and enough space for field notes taking. It provides structure to the interview and also serves as a data recording instrument for brief notes of the interviewees’ responses (Creswell 2012). Types of interview questions can be classified as (1) background or demographic questions which are routine questions about the respondents’ characteristics, (2) knowledge questions which are for inquiring factual information, (3) experience or behaviour questions which are used for eliciting descriptions of past or present activities, (4) opinion or values questions which call for the respondents’ attitudes, beliefs, and goals, (5) feelings questions which are directed at the respondents’ emotional attribute toward a certain experience, and (6) sensory questions which focus on what can be perceived through the five basic senses of touch, hearing, sight, smell and taste (Fraenkel, Wallen & Hyun 2012). After

analysing the baseline survey and post-ACP results from the EBP² tool, questions were drafted and were included to complete the questionnaire part of the focus group interview protocol. Table 3.3 showcases some of the main questions included in the focus group interview protocol of the physiotherapy students. Consent was taken for audio-recording of the interview. Each focus group participant was given a codename (e.g. student 1, student 2, etc.) and was asked to briefly introduce themselves using the codename to serve as vocal identifier as reference for the succeeding audio-to-text transcription. Pseudonyms were provided when presenting quotes from interviews. The interview started with non-threatening questions mostly coming from the background or demographic section of the protocol to set the baseline mood of the interview and allow participants to feel at ease throughout the session. Appendix F shows a copy of the interview protocol used for the focus group interviews with the students.

Table 3.3 Sample questions for the focus group interview protocol.

Type of Interview Question	Sample Questions
Background/Demographic	How many clinical sites have you been to? How many clinical placement courses have you finished?
Knowledge	What lessons in your Integrated Evidence-Based Practice modules do you remember that taught you the 5As of EBP process?
Experience/Behaviour	What facilitated or enabled your application of EBP in the clinical setting? What factors served as barriers toward your evidence-based practice?
Opinion/Values	Do you think you were prepared well enough for adopting EBP in your college modules prior to clinical placement?
Feelings	How did you feel about your self-reported improvement in EBP skills and application?
Sensory	Not applicable to the research questions of the study

3.4.2.2 Key informant interview of clinical educators

Interviewing is a useful way to verify the accuracy or refute the impressions that emerged from a previously conducted data collection method (Fraenkel, Wallen & Hyun 2012). Qualitative interviews can be classified as (1) informal conversational, (2) interview guide

approach, or (3) standardized open-ended interview (Patton 2008). Informal conversational interview is conducted in a spontaneous and loosely structured manner. In interview guide approach, topics are outlined in advance using a guide question or prompt, but the interviewer decides the sequencing and wording of questions. In this study, one-on-one interview of physiotherapy clinicians were conducted to understand the results of the quantitative survey research which was aimed at describing students' own perception, attitudes and practices of EBP in undergraduate clinical setting. One-on-one interviews are best employed for participants who are articulate with ideas and can share information about a phenomenon through verbal expression without hesitation to speak. With varying roles within an organisation, some people may be more informed about a certain aspect of the organisation's day-to-day events. These people are known as key informants attributing to the premise that they possess useful resources and offer invaluable knowledge and insights to the researcher (Fraenkel, Wallen & Hyun 2012). In this study, the key informants targeted where physiotherapy clinicians with an additional role of being clinical educators who supervised physiotherapy students during their undergraduate clinical placements.

For the interview of clinical educators, the researcher applied an interview guide approach with a prepared semi-structured interview protocol as guide in facilitating the interview. Questions were asked in a non-rigid sequential manner and follow-up questions were created depending on the response of the interviewee.

Interview Protocol for Key-Informant Interview of Clinical Educators

Based on the results of the survey research, questions were drafted (Appendix G) to probe on data considered as outliers, atypical or the same. Interviewing the clinical educators gave a supervisor's perspective regarding changes, if any, in attitudes, practices and perceptions of students toward EBP after one year of advanced clinical placement, including facilitators,

barriers, clinical education strategies used, management support and institutional policies involved. This served to triangulate data from students' interview. Consent was taken for audio-recording of the interview and interviewees were handed out the consent form for signature before commencing the interview. The first three interviews allowed the researcher to make improvements in the interview protocol especially on questions pertaining to how managers in the organisation extend their support on evidence-based practice among staff. Though the need for pilot testing of qualitative interviews is not absolutely required, Harding (2013) stated that interview protocols improve as interviews progress.

3.4.3 Rejected data collection methods

Initially, qualitative data collection was supposed to be done by (1) conducting “non-participant” observations in the clinical sites where physiotherapy students will be executing their undergraduate clinical practice and (2) students' record of instances of use of research to inform their practice by keeping an electronic journal. However, after further discourse with field experts regarding the applicability and practicality of the procedure, it was decided that EBP practice cannot be overtly observed. Data on practices are best gathered through the retrospective accounts of a person. Observation of a few days, as originally planned, within each clinical placement is not comprehensive enough to see the practices of the participants towards EBP. Moreover, the process of EBP is not confined within the clinical placement only. It has been noted in many studies that ‘time constraint’ is the most significant barrier to its practice (Sacket et al. 2000; Jette et al. 2003; Iles & Davidson 2006; Nilsagard & Lohse 2010). Participants may conduct their access to evidences at home (Condon et al. 2016; Yahui & Swaminathan 2017) which requires an ethnographic data gathering to cover the entirety of practice. In this case, observation nor ethnography is applicable and practical to use as methods of data collection for this study.

Students tend to not pay attention or put any effort on tasks that are not part of their graded assessments. Hence, keeping an e-journal as participant of this study to record their EBP accounts may most likely be overlooked since it is a task that has no bearing in their clinical grades.

3.4.4 Summary of Data Collection Methods

Considering all the above factors, the final set of data collection methods involve a (1) survey research administered in two stages as longitudinal panel design, (2) focus group interview of students and (3) key informant interview of clinical educators. Baseline survey (stage 1) and post-ACP survey (stage 2) results from the quantitative data collection in this study informed the qualitative data collection stage (stage 3), employing an ‘explanatory sequential design’ (Creswell 2012). Stage 3 of data collection aimed at refining and probing the key results of the participants’ attitudes, practices and perceptions after obtaining a general picture from the quantitative tool. By interviewing the students, possible atypical or extreme cases can be explained further. By interviewing the clinical educators and having a second source of information, data triangulation was implemented.

Table 3.4 Summary of stages of data collection, participants and suggested analyses.

Stages & processes	Research questions being addressed	Participants (Sample Size)	Data Collection Instruments	Data Analyses
<u>Pilot testing</u>	--	BPT graduates of AY (n=7)	Survey: EBP ² Questionnaire	Content validity
<u>Stage 1: QN</u> (Baseline survey)	RQ 1 What are the attitudes, practices and perceptions of undergraduate physiotherapy students towards evidence-based practice at the start of and after one year of advanced clinical placements?	Convenience sampling of Year 5 physiotherapy students of AY 2018-19 (census of N1=34 with n1 ₁ =28 participated)	Survey: EBP ² Questionnaire	Descriptive statistics
<u>Stage 2: QN</u> (Post-ACP survey)		Same sample from Survey 1 wherein 6 declined participation on survey 1; 2 drop-out on survey 2 (n1 ₂ =26)	Survey: EBP ² Questionnaire	Descriptive statistics Wilcoxon signed-rank test Paired samples t-test Effect size
<u>Stage 3: QL</u> (Interviews)		Selected physiotherapy students, 3 groups of at least 4 students each (n2=14)	Focus group interview protocol	Thematic analysis
	RQ 2 What are the facilitators and barriers towards an evidence-based practice within the advanced clinical placements? RQ 3 How do clinical education strategies, management support and institutional policies influence the students' propensity to adopt an evidence-based practice?	Clinical educators (n3=12)	Semi-structured interview protocol	

QN = quantitative; QL = qualitative; AY = academic year; RQ = research question

3.5 Data Analysis

3.5.1 Quantitative Data Analysis

The researcher used descriptive and inferential statistics to aggregate the data collected in the survey research. Data collected using the EBP² questionnaire (online and paper-based) were entered in MS Excel for ease of management in one place. The data were then input onto IBM Statistical Package for Social Sciences (SPSS) ver. 20 for MacOS (Statistical Package for Social Sciences 2018). Only cases (students) with results from both baseline and post-ACP surveys were included in the analysis. All missing data within each case were imputed by first diagnosing if the missing value is random through Little's MCAR test with expectation maximisation set. If the missing values are proven to be missing in random, then Little's MCAR test is rerun to provide predicted values based on the existing values within the data set.

After imputation was completed and all missing values were replaced with predicted values, the data set underwent a Wilcoxon signed-rank test analysis. This analysis is a non-parametric test appropriate for two related samples (Cohen, Manion & Morrison 2011) with ordinal data. Wilcoxon signed-rank test of the two data sets (baseline and post-ACP surveys) were executed individually for each domain question of the instrument (58 questions). The scores for each domain were then added up for each respondent based on the scoring procedure indicated for the tool (McEvoy, Williams & Olds 2010). Adding up the domain scores generated continuous outcome from which a point estimate (mean) and measure of variance (standard deviation) were derived. The mean and standard deviation per domain were used to calculate Cohen's *d* and was interpreted as having a small effect size index ($ES=0.2$), medium ($ES=0.5$) or large ($ES=0.8$). Lastly, the continuous outcomes were also used to conduct a paired samples *t*-test to determine if there is any significant difference in the domain scores for baseline and post-ACP.

Set at 0.05 level of significance, the results of Wilcoxon signed-rank test and paired samples t-test determined whether undergraduate clinical practice of one academic year showed any statistically significant difference in students' attitudes, practices and perceptions toward EBP, addressing research question 1.

For demographic data, descriptive statistics such as percentages and frequencies was applied for categorical variables of the questionnaire (Olsen et al. 2014).

3.5.2 Qualitative Data Analysis

In qualitative research, data analysis commences at an early stage. Data analysis is interspersed with data collection such that an alternating process of collecting raw data, analysing data, going back to the field to collect more data, and analysing data are repeated in a cyclical manner. This process is known as 'interim analysis' (Miles & Huberman 1994, cited in Johnson & Christensen 2016). Interim analysis allows researchers to learn more about his or her research topic and to gather more data to develop a deeper understanding of the phenomenon under study. As the researcher returns to the field after each interim analysis, each round of data collection becomes deeper than the previous until the researcher's understanding of the phenomenon or research topic reaches to a point wherein no further data is needed, commonly known as 'theoretical saturation' (Johnson & Christensen 2016). In the qualitative research part of this thesis, the researcher conducted interim analysis after every 3 key-informant interviews with the clinical educators and after each focus group interview with the students. Once data saturation was achieved, data collection was deemed completed and data analysis commenced.

The six-phase approach to thematic analysis according to the works of Braun and Clarke (2012) were applied in this study. Thematic analysis was the chosen approach to analysing the

qualitative data due to its “accessibility and flexibility” (Braun & Clarke 2012, p. 58). The audio-recorded interviews with the students and clinical educators underwent orthographic transcription which included pauses, hesitations, guggles (e.g. uhm), reported speech (i.e. indicated by quotes), and continuing intonation (i.e. indicated by comma). After transcription, the first phase commences by the researcher’s immersion into the data to obtain familiarisation of the content. This researcher fulfilled this phase by listening to the audio-recorded interviews twice and reading the transcript once, done with notes taking. Phase 2 involved generating the initial codes at the semantic level to stay close to the participants’ expressed meanings, and at the latent level to apply interpretation of the data. Codes generated at the semantic level were words or phrases directly lifted from the participants’ words. Codes generated at the latent level were based on the theoretical frameworks as applied onto the data.

The third phase focused on shaping the analysis by constructing themes based on the patterned responses from the data set. Themes capture the essential data that can answer the research questions and they are constructed based on areas of similarities among codes generated in phase 2. The fourth phase involved reviewing the potential themes to answer key questions: (1) is a theme an actual theme or just a code, (2) is a theme considered a quality theme, (3) is a theme exhibit clear boundaries, (4) is a theme meaningful and , (5) is a theme coherent with other themes. Based on the answers to these guide questions, the initially constructed themes were merged or split accordingly, making them more specific while keeping the coherence. Subthemes were also created by the researcher to show overarching patterns answering the same research question (Braun & Clarke 2012).

The fifth phase focused on defining and naming the themes based on three guidelines: themes should be (1) informative, (2) concise and (3) catchy (Braun & Clarke 2012). The last phase involved writing the analysis with extracts quoted from the content of the data to support

the researcher's interpretation of the data. Extracts were cleaned up to remove hesitations and correct grammatical errors. Phase 6 was considered overlapping with the other phases as memos and notes were written even in the earlier phases of thematic analysis to generate initial ideas of data interpretation, which were revised and improved through each phase of the analysis.

The NVivo software version 12 served as repository of transcribed data where organisation of information, segmenting, coding, development of category systems and mind maps (Johnson & Christensen 2016) to analyse for emerging categories and themes were carried out. Inductive thematic analysis was applied to the interview data to generate a theory in a bottom-up approach, with an experiential orientation and an essentialist framework (Braun & Clarke 2012). Results from this analysis serves as extension to explain data results of the EBP² tool.

3.6 Ethical Consideration

A low-risk research ethics form was submitted to The British University in Dubai for ethical approval and was returned affirmative (Appendix H). Ethical approval was also sought from the Ethics Committee of the academic site (governing the student participants) (Appendix I). The researcher also contacted gatekeepers of all partner hospitals and clinics where clinical educators who supervised Year 5 physiotherapy students of AY 2018-19 are working. Contacting the gatekeepers ensured that they are aware of the nature of the research and what is required of them. Disclosing all necessary information to gatekeepers prior to data collection also allowed ample time for managers to nominate clinical educators for interview. This also ensured that the interview sessions were booked strategically to avoid conflict with patient schedule.

A consent form (Appendix C for students; Appendix D for clinical educators) was provided to the participants with the following information regarding the study: purpose, risks,

benefits, and contact details of the researcher. It also informed the participants that their identity will be kept confidential throughout the duration of the study and thereafter, that participation to the study is voluntary and that they can withdraw anytime during the conduct of the study.

Participants were kept anonymous during the entire study and presentation of results in this thesis. By using unique codes to tag each data collected, the data being analysed and presented were de-identified which helped the researcher maintain objectivity and keep all participants' identity confidential. In analysing the results of the survey, each student was coded as AD1, AD2, AD3 and so on, representing the student respondents from one campus, and AA1, AA2, AA3 and so on denoting student responses from the other campus. In analysing the interviews, the three focus groups were coded as Group 1, Group 2 and Group 3. Each clinical educator was given a unique identifier as Clinical Educator 1 (CE1), CE2, CE3 and so on. In presentation of quotations from interviews, the clinical educators and students were given pseudonyms. No naming of institutions where the clinical educators work for was done during presentation data in the results section of this study.

For the qualitative data gathering, the researcher did all the interviews. In any research that involves interview, the relationship between the interviewer and interviewee should be taken into consideration to avoid certain methodological and ethical implications. Responses of students who participated in the study to discuss about their perceptions, attitude and practices to adopt EBP may likely have been affected by the interviewer because "the presence of the researcher may affect how the interviewee responds" (Creswell 2012, p. 218). Moreover, in a setting wherein the interviewer is in the same field of professional role (physiotherapy academician) as that of the interviewee (physiotherapy clinical practitioner or educator or student), the latter might feel that the interview is a test of his or her level of knowledge and competence regarding the subject matter, despite being assured otherwise (Coar & Sim 2006).

If a researcher approaches the interviewees as an interviewer devoid of professional titles and prior relationship, the perception of “the interview as an examination” will be eliminated (Coar & Sim 2006). This altogether avoids the possible biases and increases objectivity of the interview sessions.

Together with taking down brief notes, audio-recording of each interview session was done upon the permission of the participant (Creswell 2012). Recordings was transcribed fully by the researcher.

All collected data were stored in an encrypted password-protected folder of the researcher’s laptop hard drive. To add a layer of protection to the online database of survey data collected through Google Forms embedded on a WordPress website (www.ebpprofile.com), two-factor authentication and single sign-on features were activated. To decrease the risk of possible misconduct in data handling (Johnson & Christensen 2016) all data analyses were done by the researcher alone.

3.7 Researcher Role

In this study, the researcher is also an insider to the College where the physiotherapy students were recruited, a concept known as insider-researcher (Costley, Elliot & Gibbs 2010). The researcher is known to the students but is not involved in the clinical placement modules (i.e. evaluation & marking) that the students were undertaking during data collection period. Despite having a previous instructor-student relationship with the student participants, the researcher emphasized to the participants that the data collection is for the fulfilment of her role as a PhD scholar. The researcher can assure that the students voluntarily participated in this study without imposing to the students the feeling that they do not have any option. This assured no feeling of coercion to participate on the part of students.

Work-based research projects involve workers who intend to conduct research within their own working environment (Costley, Elliot & Gibbs 2010). In the context of work-based research, the researcher is considered an insider-researcher. As an insider (employee) within the higher education institution under study, the researcher is in a unique position to study attitudes, practices and perceptions of students towards EBP with more depth and with insider knowledge about the students' academic preparation prior to undertaking advanced clinical placements. Examples of the insider knowledge that the researcher has are: (1) information on the Bachelor of Physiotherapy curriculum of the College and (2) the preparation towards EBP that the students undertook through the teaching-learning-assessment strategies that the students received during their EBP taught modules. Apart from the insider knowledge, the researcher also has easier access to people, in this case, to physiotherapy students and their clinical educators, to accumulate information that can further enhance the researcher's knowledge about EBP and address the research questions.

Power is a salient issue when it comes to the political relationship between the researcher (in this context, a former lecturer of the student participants) and the researched (i.e. physiotherapy students of the College where the researcher is working) (Costley, Elliot & Gibbs 2010). As mentioned earlier, the researcher assured that the power relationship between her and the student participants did not affect the data collection process; that the research is undertaken by the researcher as a PhD scholar with the intention of contributing to the stakeholders internal and external to the College; and that the participation, non-participation, or contribution of each student to the focus group interviews did not impact their marks in any way. The full declaration of the research agenda to the student participants and clinical educators, including possible risks and benefits, and voluntary participation with withdrawal rights allow for complete transparency. By doing so, the insider-researcher lessens the distress that the research process

could impose on the student participants and clinical educators (Davison 2004) and completely eradicate the feeling of coercion among the intended participants to partake in the research in the first place.

With regard to the data collection method employed in this study, interview is considered a powerful tool in qualitative research but is not devoid of power issues (Costley, Elliot & Gibbs 2010). In an interview, the insider-researcher is in control over what is said, recorded and presented as knowledge (Briggs 2002, cited in Costley, Elliot & Gibbs 2010). The key power dynamics in research interview take place when the interview (1) is ruled by the interviewer, (2) becomes a one-way dialogue, (3) becomes an instrumental dialogue, (4) is manipulated by the researcher, (5) is rooted in a hidden agenda, and (6) is interpreted differently from what the interviewee really meant. In the aforementioned key power dynamics, the power is one-sided in favour of the interviewer. Power asymmetry is not exclusively one-sided like in some instances wherein the interviewees (1) exhibit counter-control by opting not to answer select questions or deflecting them or (2) decline any latent interpretation of their statements due to, but is not limited to, the interviewee's lack of awareness or understanding that may arose from theoretical issues (Kvale 2006). Table 3.5 summarizes how the researcher addressed and/or prevented the key power dynamics during the interviews with the students and clinical educators.

Table 3.5 Summary of the researcher's approach to minimizing, preventing or maintaining power dynamic/s during the interviews.

Key power dynamics	Researcher's approach
<i>"The interviewer rules the interview"</i>	The researcher prevented one-directional questioning and one-way dialogue by allowing and assuring interviewees to feel free to discuss their perspective and ask questions that would arise before, during and after the interview. Among the interviewees, only 1 student and 1 clinical educator used this privilege.
<i>"The interview is a one-way dialogue"</i>	
<i>"The interview is an instrumental dialogue"</i>	The researcher informed the participants that the aggregated research findings will be made available to them if they wish so.
<i>"The interview may be a manipulative dialogue"</i>	

Key power dynamics	Researcher's approach
<i>"The research interview may follow a more or less hidden agenda"</i>	The researcher declared with utmost transparency the purpose of the research, possible risks and benefits to the participants through the Participant Information Page/Sheets and Consent Forms.
<i>"The interview as monopoly on interpretation"</i>	This power dynamic was viewed more as a researcher's privilege than a threat to the integrity, credibility and dignity of the research. According to Kvale (2006), "[the researchers] are the ones who assign to the research what the interviewee really meant and frame it in their own theoretical scheme."

Lastly, as an insider, the researcher is in a prime position not only to investigate but also to make practical changes within the workplace based on the recommendations stemming from this study. This act was mentioned by Costley, Elliot and Gibbs (2010) as challenging the status quo based on an informed perspective.

3.8 Chapter Summary

To address the research questions of the study, this chapter presented in detail the research approach and research methodology utilised, including sites and samples, data collection method, research tools, data handling, data analysis, ethical considerations and the role of the researcher. This chapter establishes the specific procedures and steps that the researcher had to undergo in order to gather the necessary data from which the results of the study were derived. These results and their analysis are presented in the next chapter.

CHAPTER FOUR: DATA ANALYSIS AND RESULTS

4.1 Introduction

This chapter details the implementation of data collection, analyses of quantitative and qualitative data gathered from participants, and interpretation of results based on information presented in the previous chapter (Table 4.1).

Table 4.1 Summary of stages of data collection linked to research questions, participants, methods, instruments and data analyses.

Stages & processes	Research questions being addressed	Participants (Sample Size)	Data Collection Instruments	Data Analyses
<u>Pilot testing</u>	--	BPT graduates of AY (n=7)	Survey: EBP ² Questionnaire	Content validity
<u>Stage 1: QN</u> (Baseline survey)	RQ 1 What are the attitudes, practices and perceptions of undergraduate physiotherapy students towards evidence-based practice at the start of and after one year of advanced clinical placements?	Convenience sampling of Year 5 physiotherapy students of AY 2018-19 (census of N1=34 with n1 ₁ =28 participated)	Survey: EBP ² Questionnaire	Descriptive statistics
<u>Stage 2: QN</u> (Post-advanced clinical placement or post-ACP survey)		Same sample from Survey 1 wherein 6 declined participation on survey 1; 2 drop-out on survey 2 (n1 ₂ =26)	Survey: EBP ² Questionnaire	Descriptive statistics Wilcoxon signed-rank test Paired samples t-test Effect size
<u>Stage 3: QL</u> (Interviews)		Selected physiotherapy students, 3 groups of at least 4 students each (n2=14)	Focus group interview protocol	Thematic analysis
	RQ 2 What are the facilitators and barriers towards an evidence-based practice within the advanced clinical placements?	Clinical educators (n3=12)	Semi-structured interview protocol	

	RQ 3 How do clinical education strategies, management support and institutional policies influence the students' propensity to adopt an evidence-based practice?			
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4.1.1 Summary of the results of data analyses

The results of stages 1 and 2 were analysed and interpreted as part of a longitudinal panel survey of physiotherapy students yielded from two surveys [baseline and post-advanced clinical placement (post-ACP) surveys] of the same questionnaire administered at the beginning of and end of a yearlong undergraduate advanced clinical placements. Demographic data and descriptive statistics of the baseline characteristics of the students as gathered in the first survey is presented in the third section of this chapter followed by the analysis of the baseline survey and post-ACP survey together. Baseline and post-ACP surveys underwent statistical analysis per question using the non-parametric Wilcoxon signed-rank test considering that each question used an ordinal data to capture the responses of the students. Statistical analysis per domain (Relevance, Sympathy, Terminology, Practice and Confidence) was also conducted using the parametric paired t-test on the average of all students' responses per domain to determine any significant change in students' EBP perception, attitudes and practice from baseline measurement to one-year post advanced clinical placements. The construct 'attitudes' by the Relevance and Sympathy domains, 'practice' by the Terminology and Practice domains, and 'perception' was represented by the Confidence domain of the EBP² questionnaire. Lastly, the effect sizes for each domain were also calculated to see the effect of a yearlong advanced clinical placement to students' EBP attitude, practices and perception.

In stage 3, the focus group interview was an opportunity to clarify and further explain the results of the quantitative data wherein students answered close-ended questions about their

attitudes, practices and perception towards EBP. The face-to-face interviews were done in three separate occasions for three student groups. One student in the third focus group joined via phone call due to conflict in schedule. All students consented in audio-recording the discussion. In the first focus group interview, 7 students were invited and made attendance. During the interview, only 4 students were actively participating in and dominating the discussion despite encouraging everyone to speak and add their inputs. After the first focus group interview, the researcher decided to decrease the number of invited students to 4 with a buffer of 1 in case there is a no show. Table 4.2 below shows details of the actual focus group discussion sessions. The demographic data of the student participants are presented in Table 4.7 later in the chapter.

Table 4.2 Summary of attendees and duration of interview sessions.

Focus Group Interview	Number of students invited and confirmed	Number of students in attendance	Duration of interviews
Session 1	7	7	42 mins 11 secs
Session 2	5	3	41 mins 45 secs
Session 3	5	4	54 mins 26 secs

As an insider within the higher education institution under study, the researcher possessed familiarity and an in-depth knowledge of the Bachelor of Physiotherapy curriculum that the students took including the preparation towards EBP through the teaching-learning-assessment strategies that the students received during their EBP taught modules. This insider knowledge helped in drafting the some of the questions that became part of the semi-structured interview protocol prepared by the author for the student participants which included questions about the EBP in the curriculum and EBP within the clinical placement: (1) *“What do you think about your EBP modules back in the College?”*; (2) *“Do you think you were prepared well enough for adopting EBP in your college modules prior to clinical placement? Why or why not?”*; (3) *“What factors during your advanced clinical placement did enhance your attitudes, practice and perception of EBP?”*; and (4) *What challenges did arise during your clinical*

placement that made EBP implementation difficult?”. Probing questions such “*Could you please expound on that?*” or “*Could you tell me more about?*” were interjected in the interview whenever necessary. All interviews, data handling, transcription and analysis were done by the researcher alone.

The themes that arose from the interview of the students include (1) the facilitative factors in applying EBP within clinical placements based on the clinical educators, available facilities and how the College prepared them towards EBP, (2) the challenges against attaining better EBP application and skills, and (3) the specific clinical education strategies that enhanced the students’ EBP skills while they were in clinical placements. Figure 4.1 shows the subthemes and codes contributing to the formation of the main themes.

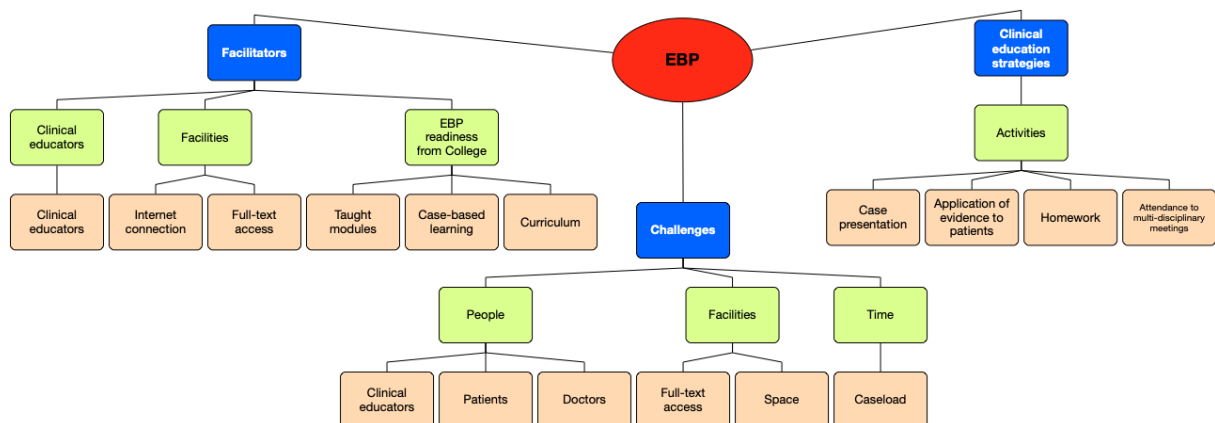


Figure 4.1 The researcher’s mind map of the codes (orange), subthemes (green) and themes (blue) generated from the thematic analysis of students’ focus group interviews.

Also, in stage 3 was the key informant interviews with clinical educators. All interviews were conducted, transcribed and thematically analysed by the author alone. The clinical educators were asked the following questions that was prepared in the semi-structured interview guide that the author prepared: (1) “*How long have you been practicing as a clinician and what is your background in clinical practice and clinical education?*”; (2) “*What are your sources of evidence and how does evidence inform your practice as a clinician?*”; (3) “*What are your strategies to integrate EBP in the students’ undergraduate clinical practice and how do you*

positively enhance this in your students?"; (4) "Were there any challenges for integrating EBP into the students' clinical experience? If yes, what are those?"; (5) How do managers of your institution pay attention to, measure, and control the implementation of evidence-based practice on a regular basis?"; and (6) What word or phrase would you use to describe a student emanating a propensity towards EBP?". Probing questions such "Could you please expound on that?" or "Could you tell me more about?" were interjected in the interview whenever necessary.

The researcher tried to keep the interview duration under 30 minutes to abide by the agreed timeslot during which the clinical educator did not expect a patient. The needed data were gathered well within under 30 minutes (except for one participant) by facilitating responses of participants to avoid drifting off-topic. Table 4.3 shows relevant information regarding the clinical educators such as the pseudonym used to present interview quotes, length of interview for each key informant and key demographic data relevant to understanding the findings of the study. Gender was not specified because it has been noted in an earlier study that it did not have any significant association to EBP knowledge, skills or perception (Silva, Costa & Costa 2015). The country of origin was made part of the demographic data to show the diversity of clinical educators and the possible multiplicity of physiotherapy practice and clinical education strategies that they bring in hospitals and clinics within Abu Dhabi.

Table 4.3 Clinical educators' unique code used in data analysis, pseudonym, duration of interview and relevant demographic information.

Unique Code	Pseudonym	Duration of Interview	Age	Years of experience	Prior CE experience	Country of Origin
CE 1	<i>Emilia</i>	17 mins 58 secs	31 y/o	10	Yes	England
CE 2	<i>Luther</i>	20 mins 40 secs	31 y/o	10	Yes	Ireland
CE 3	<i>Rhada</i>	17 mins 35 secs	31 y/o	10	Yes	England
CE 4	<i>Bridgette</i>	21 mins 16 secs	30 y/o	10	Yes	India
CE 5	<i>Gretha</i>	18 mins 18 secs	35 y/o	14.5	Yes	Philippines
CE 6	<i>Cassandra</i>	47 mins 26 secs	32 y/o	11	No	Philippines
CE 7	<i>Alona</i>	29 mins 54 secs	34 y/o	113	Yes	England
CE 8	<i>Fely</i>	23 mins 48 secs	35 y/o	24	Yes	England

Unique Code	Pseudonym	Duration of Interview	Age	Years of experience	Prior CE experience	Country of Origin
CE 9	<i>Mateo</i>	18 mins 16 secs	33 y/o	12	Yes	USA
CE 10	<i>Greg</i>	25 mins 34 secs	35 y/o	14	Yes	England
CE 11	<i>Filomena</i>	19 mins 28 secs	29 y/o	9	Yes	India
CE 12	<i>Fay</i>	17 mins (not recorded)	46 y/o	26	Yes	Jordan

Audio-recorded interviews underwent transcription by listening to recordings and translating them to typed text in Microsoft Word. All audio and transcribed texts were then entered and stored in NVivo where it underwent the six phases of thematic analysis (Braun & Clarke 2012): (1) data familiarisation, (2) coding, (3) constructing themes, (4) revising themes, (5) defining and naming themes, and (6) writing the analysis (overlapping with other phases). Memos were written during the entire process of thematic analysis to keep note of assumptions (early into the analysis) and conclusive points (later in the analysis) that guided the final themes. As an insider-researcher, the knowledge of the researcher regarding the structure of the BPT curriculum helped in the latent analysis of the clinical education strategies that facilitated EBP implementation among students by connecting the learning objectives and outcome measures with the activities done by the clinical educator-student tandem.

All data handling and analyses for both quantitative and qualitative data were conducted by the researcher using the following software: Microsoft® Office Excel for Mac version 16 for data handling, storage and descriptive statistical analyses, IBM Statistical Package for Social Sciences (SPSS) ver. 20 for MacOS for quantitative data storage and statistical analyses, and NVivo software version 12 for qualitative data storage and thematic analyses.

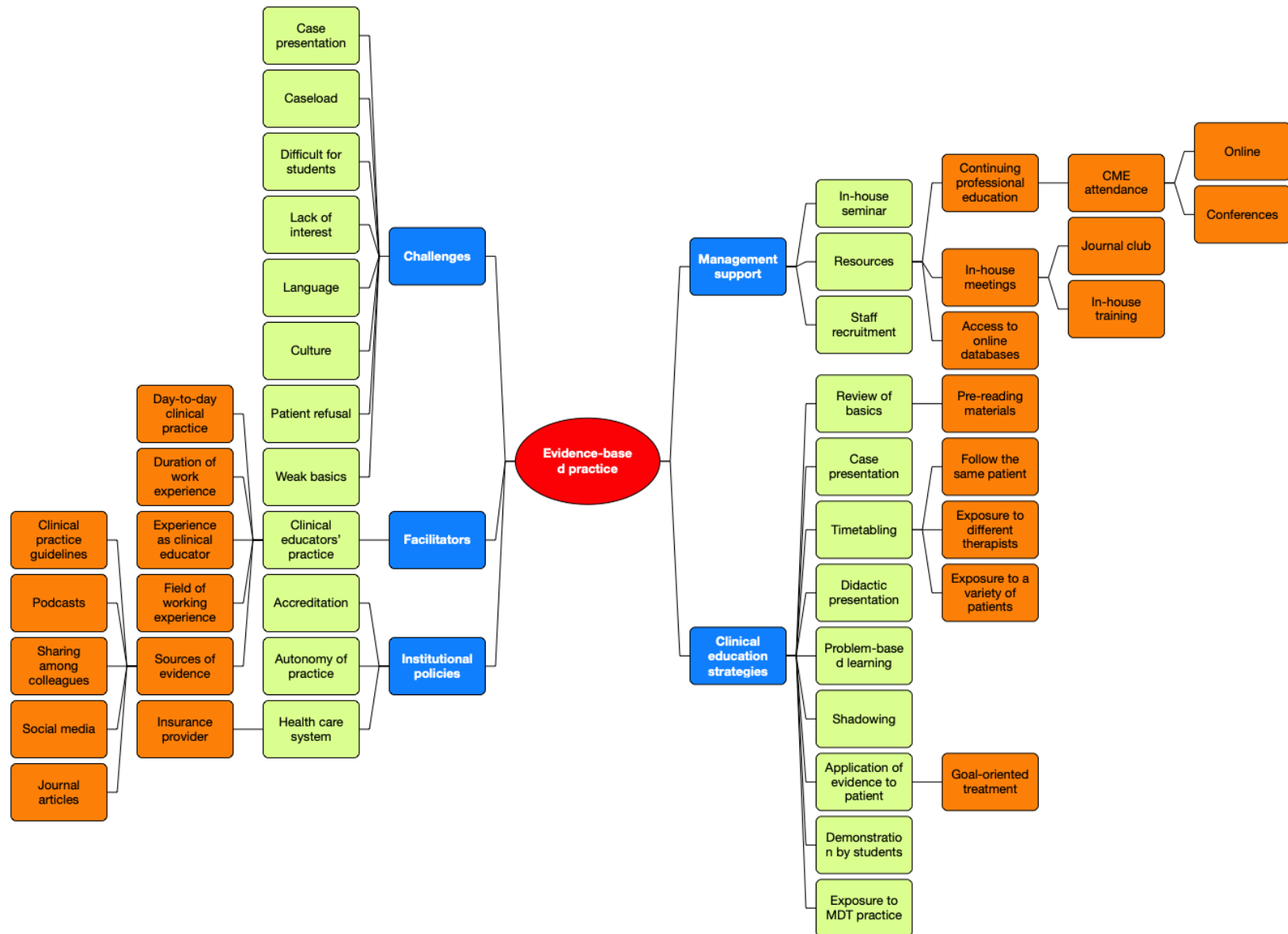


Figure 4.2 Researcher's mind map on the evolution of codes and nodes leading to generation of subthemes and themes from interviews of the clinical educators.

4.1.2 Chapter outline

This chapter is divided into five main sections starting with this introductory section revising the methods conducted to gather data; the second section shows a brief analysis of the pilot testing of the Evidence-Based Practice Profile (EBP²) Questionnaire (McEvoy, Williams & Olds 2010) used in the survey research. The third section focuses on the findings from the quantitative data answering the first research question: “What are the attitudes, practices and perceptions of undergraduate physiotherapy students towards evidence-based practice at the start of and after one year of undergraduate clinical placement?”. Ajzen’s (1985, 2002) theory of planned behaviour which looks at how attitude, subjective norms, perceived behavioural control leads to intention which in turn leads to behaviour, is the theoretical framework that guides in answering the first research question.

The fourth section is dedicated to presenting answers to the second research question: “What are the facilitators and barriers towards an evidence-based practice within the undergraduate clinical placements?” based on the qualitative data from perspectives of both physiotherapy student participants and clinical educators. Results are from themes that arose from the focus group interviews (physiotherapy students) and key informant interviews (clinical educators) conducted. Direct quotes were lifted from the transcribed texts. Where grammatical errors existed, the researcher corrected these prior to presenting the quotes as evidences in section 3 of this chapter. Corrections within direct quotes are presented as words in solid brackets. The findings presented in this section was geared towards achieving the purpose of identifying the enablers and challenges faced in undergraduate clinical practice when implementing EBP. Edwards & Richardson’s (2008) interpretive epistemology of physiotherapy practice and Schein’s (2010) primary embedding mechanisms were the guiding frameworks in answering and presenting results to the second research question.

The fifth section of this chapter presents data answering the third research question: “How do institutional policies and clinical practice influence the students’ propensity to adopt an evidence-based practice?”. Clinical educators and physiotherapy students cited specific strategies that influenced the students’ EBP implementation during the yearlong advanced clinical placements. Clinical educators also elaborated on how certain policies within the hospitals and clinics impacted the students’ and their own EBP adoption. Results relevant to this research question were presented using Schein’s (2010) primary embedding mechanism to describe specific strategies on how clinical education in the placements influence undergraduate physiotherapy students’ propensity to EBP. Edward and Richardson’s (2008) practice epistemology were also noted while describing the different strategies that clinical educators use to inculcate the mindset and habit of using evidence to back up physiotherapy practice among physiotherapy students.

4.2 Pilot of EBP² questionnaire

Piloting of the online version of the questionnaire was conducted prior to actual data collection. Seven physiotherapy students from the previous academic year who just finished their clinical placement modules at that time were used in piloting the online questionnaire in the ebpprofile.com website created by the researcher. Students were sent an invitation via email and were directed to the information page of the website where the Participant Information Sheet is located. Students were asked to comment on the accessibility of the website, the clarity of the questions and compatibility to devices. No comments were made regarding accessibility, clarity and device compatibility.

Reliability analysis showed that all 74 questions yielded a high internal consistency with Cronbach’s alpha of .92. Table 4.4 also shows high internal consistency in each domain of the questionnaire.

Table 4.4 Results of reliability analysis for each domain of the EBP2 questionnaire.

Domain	Cronbach's alpha	N of Items
Relevance	.93	14
Sympathy	.89	7
Terminology	.86	17
Practice	.92	9
Confidence	.96	11
Non-domain questions	.81	16
Full questionnaire including non-domain questions	.92	74

4.3 What are the attitudes, practices and perceptions of undergraduate physiotherapy students towards evidence-based practice at the start of and after one year of undergraduate clinical placement?

The first research question is answered by the results of the baseline survey and the post-ACP survey conducted during stages 1 and 2 of the study and is supported by findings from the focus group interview with students conducted in stage 3. The survey used a standardised instrumentation created by McEvoy, Williams and Olds (2010) to capture the perceived confidence, relevance, sympathy, understanding of terminology and practice towards an EBP of the student participants. Table 4.5 shows the alignment of the constructs of this study (i.e. perception, attitude and practice) to the domains of the research instrument (i.e. Confidence, Relevance, Sympathy, Terminology and Practice).

Table 4.5 Alignment of constructs investigated in this study to domains addressed in the EBP2 questionnaire.

Constructs being investigated in this study	Domains addressed in the EBP ² questionnaire	Description of each domain in the EBP ² questionnaire
Attitude	Relevance (Items 1-14; 14 items)	Includes questions regarding values, emphasis and importance placed upon EBP by an individual
	Sympathy (Items 15-21; 7 items)	Includes questions regarding individual's sense of compatibility with professional work and EBP
Practice	Terminology (Items 22-38; 17 items)	Includes questions about an individual's understanding of common research terms
	Practice (Items 39-47; 9 items)	Includes questions about an individual's use of EBP
Perception	Confidence (Items 45-58; 11 items)	Includes questions regarding individual's perception of use of EBP

The quantitative data from EBP² questionnaire were generated from answers of respondents using a 5-point Likert scale. Frequencies and percentages for each question item (total of 74 question items) are presented in the following subsections. Moreover, each question from the 26 data sets were analysed using the non-parametric Wilcoxon-signed rank test to show if there is any significant difference between the baseline and post-ACP of the students' EBP attitude, practices and perception using the mean ranks of each question item.

Descriptive statistics such as mean, standard deviation and confidence interval are presented for the 5 domain scores: (1) Relevance, (2) Sympathy, (3) Terminology, (4) Practice and (5) Confidence. Effect size is also shown for the mean difference of each domain during early advanced clinical placement to one year after advanced clinical placement. The following subsections present the analysed EBP² questionnaire per question item within each domain. The baseline and post-ACP survey results of each domain underwent a paired samples t-test to see if there is any significant difference in the attitude, practice and perception of students toward EBP between their early advanced clinical placement and one year after.

Table 4.6 Method of scoring each domain of the EBP2 questionnaire.

Constructs being investigated in this study	Domains in the EBP ² questionnaire	Items; Total number of items	Scoring (minimum-maximum)
Attitude	Relevance	<i>Items 1-14; 14 items</i>	14-70
	Sympathy	<i>Items 15-21; 7 items</i>	7-35
Practice	Terminology	<i>Items 22-38; 17 items</i>	17-85
	Practice	<i>Items 39-47; 9 items</i>	9-45
Perception	Confidence	<i>Items 45-58; 11 items</i>	11-55

4.3.1 Demographic characteristics of student participants

The EBP² questionnaire was disseminated to all registered Year 5 students of Bachelor of Physiotherapy in two health science campuses in the Emirate of Abu Dhabi during the academic year 2018-19. All students were eligible based on the following criteria: (1) registered

to advanced clinical placement courses for semesters 1 and 2 of academic year 2018-19 and (2) underwent and passed all Integrated Evidence-Based Practice modules during Year 2 to Year 4. Due to the small population size, all students were recruited (N1=34), a census survey was opted to participate in the study. Twenty-eight students gave their consent and participated during the stage 1 (baseline survey) of the study which was during the first month of their Advanced Clinical Placement module. During stage 2 [post-advanced clinical placement (post-ACP) survey], all n1=28 students who participated in stage 1 were prompted to undertake the same questionnaire after they finished their last Advanced Clinical Placement module. Two students did not participate in the post-test which makes a total of n1=26 complete data sets for analysis. The average age of the participants was 23 years (min: 22, max: 27). On baseline survey, 4 out of 26 students (15%) answered no to the question '*Have you formally undertaken any training in EBP?*' while 6 (25%) answered no to the same question on post-test, suggesting that not all students remember undertaking and passing 5 taught modules of Integrated Evidence Based Practice during their year 2 to year 4 in the program. Table 4.7 summarises the characteristics of the student participants.

Table 4.7 Summary of students' demographics.

Characteristics	Participants (n=26)
Gender	All females
Age (in years)	Average: 23; Min: 22; Max: 27
Year level in BPT	All in Year 5
Number of students with awareness of prior EBP training	Baseline: 22 Post-ACP: 20

4.3.2 Students possess positive attitudes towards EBP

Undergraduate physiotherapy students' attitudes towards EBP are captured in 2 out of the 5 domains in the EBP² questionnaire: Relevance and Sympathy.

4.3.2.1 Students find EBP relevant to physiotherapy practice

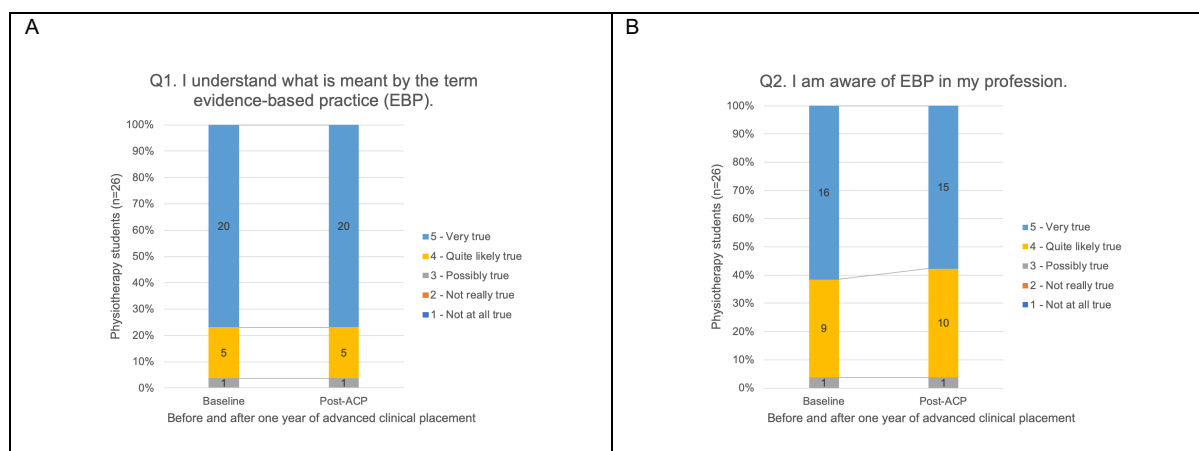
In the Relevance domain of the EBP² questionnaire, there are 14 items that dissect how relevant EBP is to students' physiotherapy practice.

When asked about how truly they understood the meaning of the term 'evidence-based practice' at the beginning of their advanced clinical placement, 96.15% of the responses were between 'very true' and 'quite likely true'. The same percentage of responses were reflected in the post-ACP survey (Fig. 4.3A).

For 25 students or 96.15% of the respondents, it was 'quite likely true' and 'very true' that they are aware of EBP in physiotherapy at the beginning of advanced clinical placement. Post-ACP survey returned the same results (Fig. 4.3B).

Twenty-five or 96.15% of the students were aware of EBP as a professional framework within the field of physiotherapy. On the post-ACP survey, only 24 or 92.31% of the students held the same perception (Fig. 4.3C).

Majority of the students were aware of current development in evidence-based physiotherapy practice with 23 or 88.46% of the responses between 'quite likely true' and 'very true'. Post-ACP survey showed a lower frequency with only 22 or 84.62% of the students responding 'quite likely true' and 'very true' (Fig. 4.3D).



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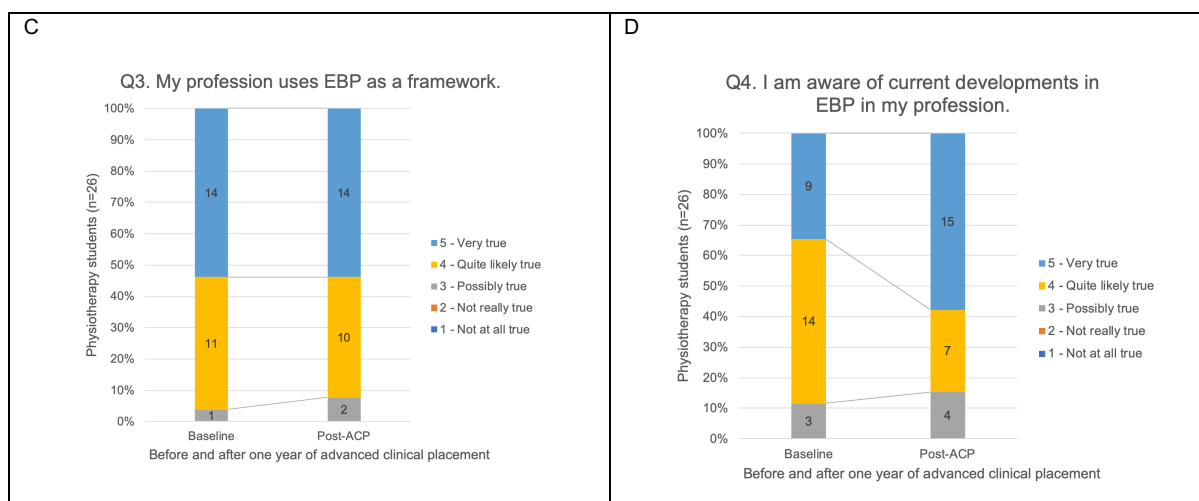


Figure 4.3 Baseline and post-ACP results of questions 1-4 under the Relevance domain.

When asked about their intention to develop knowledge in EBP, 24 or 92.31% of the students expressed their positive affirmation as ‘highly likely to consider doing it’ and ‘absolutely intend to do it/keep doing it’. During post-ACP survey, all of the students (100%) answered between ‘highly likely to consider doing it’ and ‘absolutely intend to do it/keep doing it’ (Fig. 4.4A).

Regarding developing skills in accessing, acquiring and appraising research evidence relevant to physiotherapy practice, only 22 or 84.62% of responses in the baseline survey were between ‘highly likely to consider doing it’ and ‘absolutely intend to do it/keep doing it’. Upon post-ACP survey, the affirmative responses increased to 24 or 92.31% (Fig. 4.4B).

The intention to read relevant literature as a means of upgrading their knowledge is ‘highly likely’ and ‘absolute’ among 23 or 88.46% of the students. After one-year of advanced clinical placement, 100% of the students ‘highly-likely’ and ‘absolutely’ intend to continue the behaviour (Fig. 4.4C).

Twenty-five or 96.15% of the students indicated that they are ‘highly-likely’ and ‘absolutely’ intend to incorporate best available research findings to improve their physiotherapy practice. By the end of the students’ advanced clinical placements, 100% of the students responded ‘highly-likely’ and ‘absolutely intend to do/keep doing it’ (Fig. 4.4D).

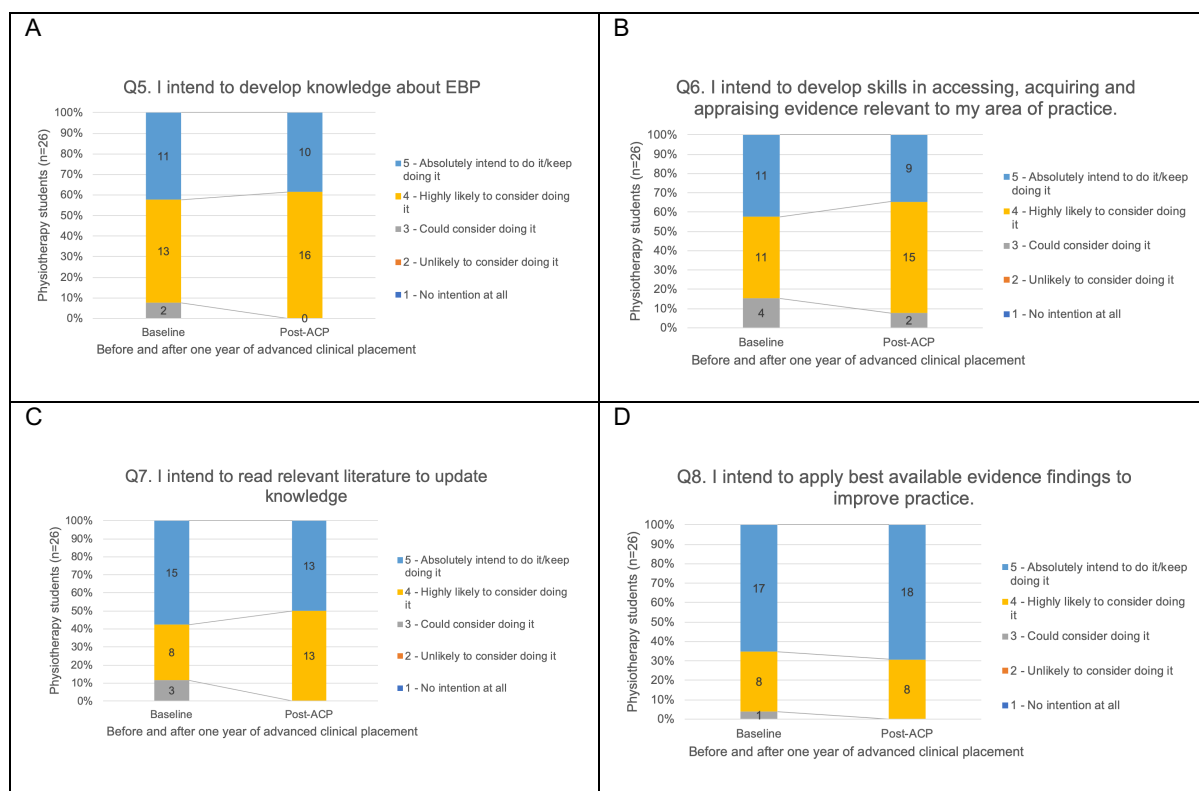


Figure 4.4 Frequency of responses to questions 5 to 8 of the baseline and post-ACP of the Relevance domain.

In the following questions, still under the domain of Relevance, students were asked to choose one of the following responses based on their degree of agreement to the statement: (1) strongly disagree, (2) disagree, (3) neutral, (4) agree, and (5) strongly agree.

Baseline results showed that 24 or 92.31% of the responses were between ‘agree’ and ‘strongly agree’ regarding the necessity of applying EBP during their clinical placement. The same number of responses were reflected during the post-ACP survey (Fig. 4.5A).

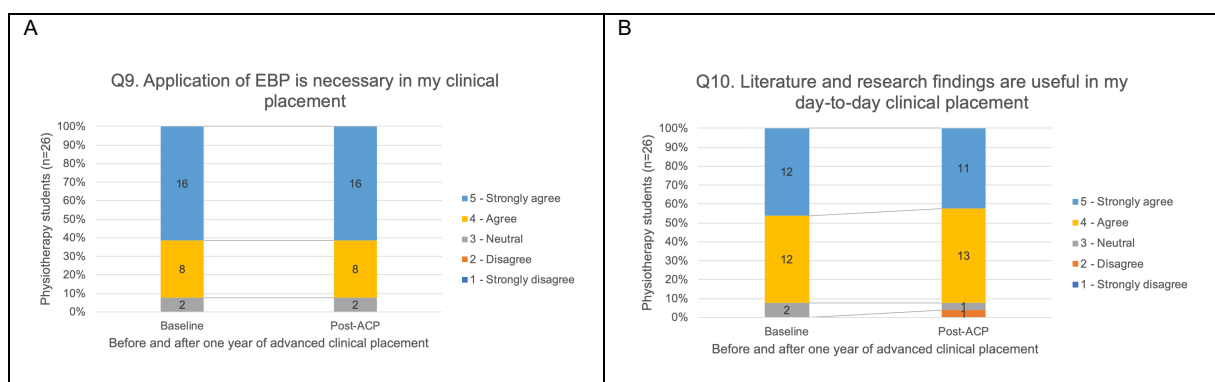
With regard to the usefulness of literature and research findings in the students’ day-to-day clinical placement, 24 students or 92.31% ‘agreed’ and ‘strongly agreed’. Though the same number of students answered similarly in post-ACP survey, 1 student or 3.85% disagreed to this statement (Fig. 4.5B). No explanation was provided regarding this response, but this was probed during the focus group interview with the students.

When asked whether there is a need to increase the utilization of research evidence in daily physiotherapy practice during clinical placement, 25 out of 26 or 96.15% of the responses were between ‘agree’ and ‘strongly agree’. Post-ACP results showed that all students (100%) ‘agreed’ and ‘strongly agreed’ to the notion of increasing the use of evidence in daily clinical practice (Fig. 4.5C).

On baseline survey, only 23 or 88.46% of the students expressed agreement and strong agreement in learning or improving required skills to better incorporate EBP into their clinical practice. Upon finishing the advanced clinical placement after one-year, post-ACP results showed that 100% of the students agreed and strongly agreed to the idea of improving their EBP skills (Fig. 4.5D).

On both baseline and post-ACP survey results, the students’ affirmation as to whether quality of clinical practice is improved with EBP was unchanged with 25 out of 26 students or 96.15% responding between ‘agree’ and ‘strongly agree’ (Fig. 4.5E).

Twenty-three or 88.46% responses were between ‘agree’ and ‘strongly agree’ when students were asked about their opinion if EBP helps in clinical decision making. On post-ACP, at the end of one-year advanced clinical placement, the number of students who responded ‘agree’ and ‘strongly agree’ increased to 25 or 96.15% (Fig. 4.5F).



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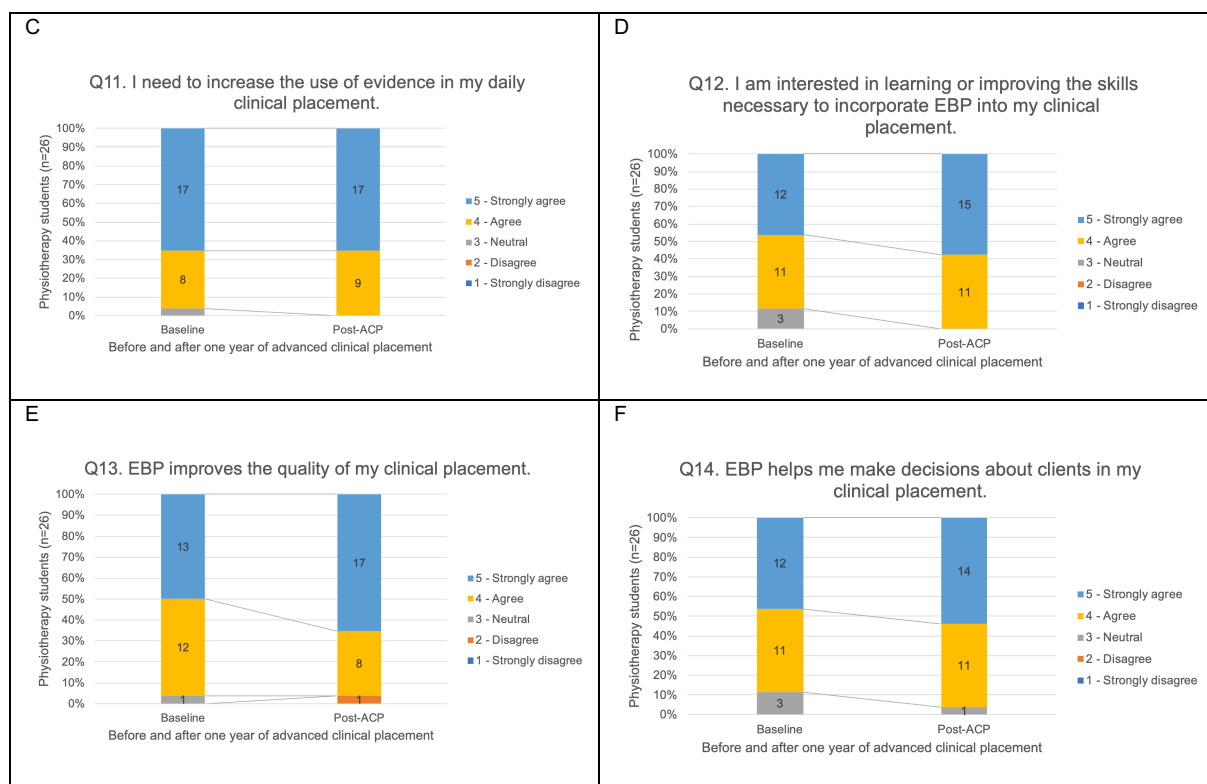


Figure 4.5 Frequency of responses to questions 9 to 14 of the baseline and post-ACP of the Relevance domain.

Wilcoxon signed-rank analysis indicate that there is no significant change in any of the responses to questions of the Relevance domain (Table 4.8), representing undergraduate physiotherapy students' attitude towards EBP from early in the advanced clinical placement to one-year post-clinical placement.

Table 4.8 Summary of Wilcoxon signed-rank test for questions 1 to 14 of the EBP2 questionnaire representing Attitudes towards EBP.

Domain: Relevance (Attitude)			
Question item	Z	Asymptomatic significance (2-tailed)	Interpretation*
1. I understand what is meant by the term evidence-based practice (EBP)	.00	1.000	Not significant
2. I am aware of EBP in my profession	-.24	.813	Not significant
3. My profession uses EBP as a framework	-.26	.793	Not significant
4. I am aware of current developments in EBP in my profession	-1.03	.302	Not significant
5. I intend to develop knowledge about EBP	-.26	.796	Not significant

Domain: Relevance (Attitude)			
Question item	Z	Asymptomatic significance (2-tailed)	Interpretation*
6. I intend to develop skills in accessing, acquiring and appraising evidence relevant to my area of practice	.00	1.000	Not significant
7. I intend to read relevant literature to update knowledge	-.26	.796	Not significant
8. I intend to apply best available evidence findings to improve practice	-.58	.564	Not significant
9. Application of EBP is necessary in my work	-.04	.967	Not significant
10. Literature and research findings are useful in my day-to-day work	-.25	.806	Not significant
11. I need to increase the use of evidence in my daily work	-.33	.739	Not significant
12. I am interested in learning or improving the skills necessary to incorporate EBP into my work	-1.73	.083	Not significant
13. EBP improves the quality of my work	-1.00	.317	Not significant
14. EBP helps me make decisions about clients in my work	-1.00	.317	Not significant

* Whether baseline and post-ACP results have significant or no significant difference.

Paired samples t-test showed that the results of the baseline domain of practice (62.4 ± 4.9) was found to have no significant difference with the post-ACP result (63.2 ± 4.1) based on the mean difference of -0.7 at 95% confidence interval, $t(26) = -0.719$, $p = 0.48$ ($p > 0.05$).

Table 4.9 Results of the paired samples t-test between baseline and post-ACP results of the Relevance domain.

Baseline and post-ACP of Relevance	Paired differences					t	df	Sig. (2-tailed)
	Mean difference	Std. Deviation	Std. Error Mean	95%Confidence Interval of the Difference				
				Lower	Upper			
	-.73	5.18	1.02	-2.82	-1.36	-.72	25	.479

4.3.2.2 Students have divided opinion on the compatibility of EBP and physiotherapy practice

Within the domain of sympathy which queries about the respondents' attitude and sense of compatibility with EBP and clinical practice, there are 7 questions answerable by a 5-point

Likert scale with 1 denoting strong agreement to the statement and 5 denoting strong disagreement. Questions in this domain are stated in negative sentences.

When asked if EBP does not consider the limitations of day-to-day clinical placement, 12 students or 46.15% responses were 'neutral', while another 12 students or 46.15% responded between 'agree' to 'strongly agree'. After one-year of advanced clinical placement, most of the students (13 or 50%) still felt 'neutral' to this statement while 9 or 34.62% of the responses remained between 'agree' to 'strongly agree' (Fig. 4.6A).

With regard to seeing no point in adopting an evidence-based practice as most of the cases handled by students' lack support from strong research evidences, 10 or 34.62% of the responses were between 'disagree' and 'strongly disagree' and 7 or 26.92% expressed neutrality. On post-ACP survey administered after one-year of clinical placement, the number of students who disagreed and strongly disagreed went up to 14 or 53.85%. Those with neutral opinion went down to 4 or 15.38% (Fig. 4.6B).

For 12 or 46.15% of the students, they do not agree nor disagree that EBP does not consider clients' preferences in physiotherapy management. On the other hand, 7 or 26.92% and another 7 or 26.92% expressed their disagreement and agreement to the statement, respectively. When asked about the same thing one-year after their advanced clinical placement, 10 or 38.46% students remained neutral while the disagreeing students rose to 12 or 46.15% reflecting responses between 'disagree' and 'strongly disagree' (Fig. 4.6C).

In the beginning of students' advanced clinical placement, 11 or 42.31% were neutral as to whether they value field experience more than research evidences when making clinical decisions. Thirteen or 50% of the responses indicate that students 'agree' and 'strongly agree' on basing their clinical decision making on field experience more than research evidences. The

post-ACP survey yielded 12 or 46.15% neutral responses, with 12 or 46.15% students basing their clinical decision making on clinical or field experience more than evidence (Fig. 4.6D).

When asked if field experience is the most reliable way to know what applies best for patient management, 20 or 76.92% responses were between 'agree' and 'strongly agree'. By end of advanced clinical placement, post-ACP survey showed that only 18 or 69.23% kept their responses between 'agree' and 'strongly agree' (Fig. 4.6E).

With regard to the relevance of critical appraisal of evidence to patient care and its practicality in the field of physiotherapy practice, students' responses were evidently divided among 'disagree-strongly disagree' (9 or 34.62%), 'neutral' (9 or 34.62%) and 'agree-strongly agree' (8 or 30.77%). Upon post-ACP survey, results still showed a clear divide with 9 (34.62%) in disagreement to the statement, 7 with neutral opinion, and 10 agreeing (Fig. 4.6F).

The last question within the sympathy domain is about the practicality of seeking relevant evidence from scientific studies. Thirteen students or 50% of the responses were between 'disagree' and 'strongly disagree' regarding the non-practicality of seeking evidences in clinical practice. On post-test, 14 or 53.85% of the responses remained between 'disagree' and 'strongly disagree' (Fig. 4.6G).

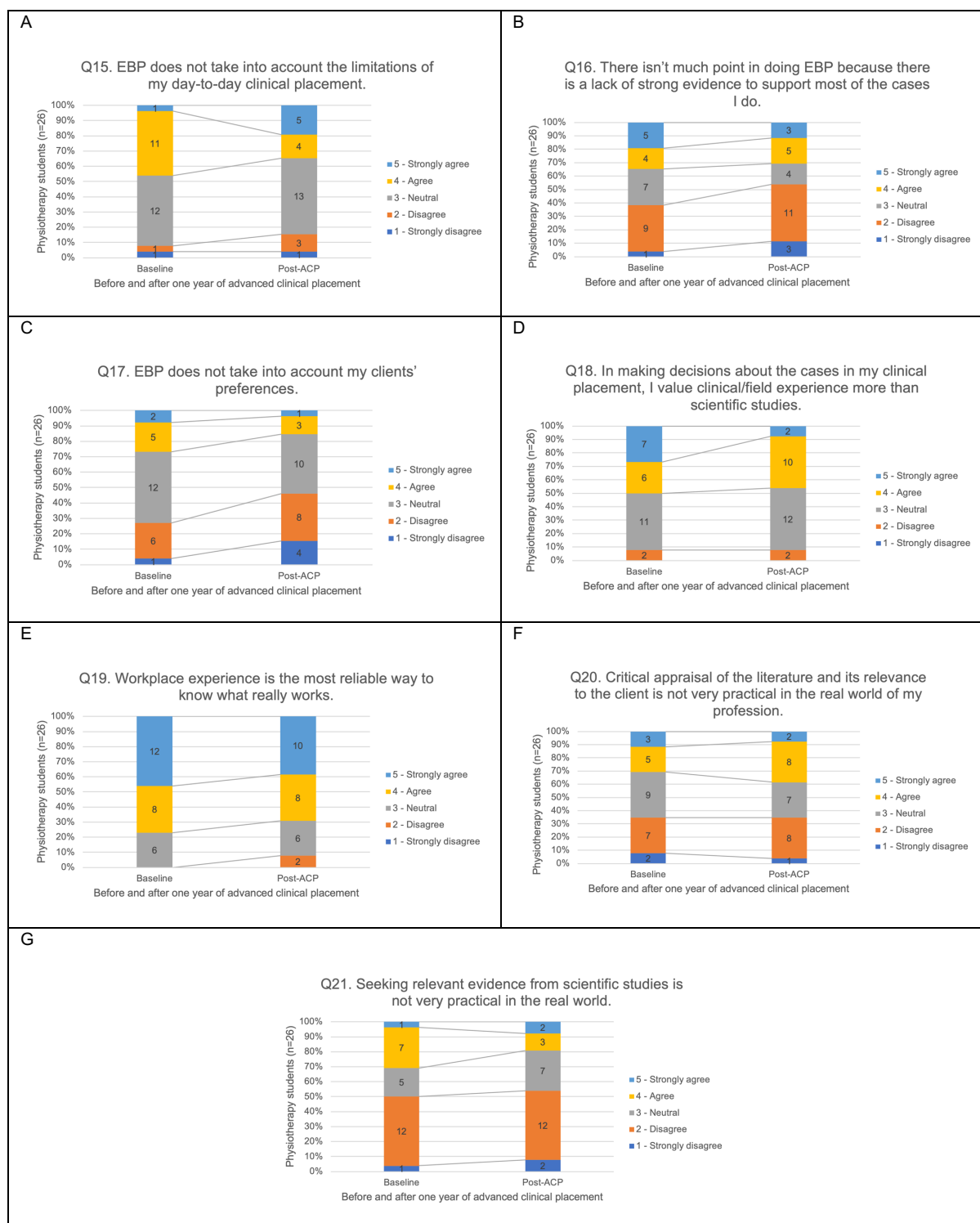


Figure 4.6 Frequency of responses to questions 15 to 21 during baseline and post-ACP of the Sympathy domain.

Wilcoxon signed-rank analysis indicate that there is no significant change in any of the responses to questions of the Sympathy domain, representing undergraduate physiotherapy

students' attitude towards EBP from early in the advanced clinical placement to one-year post-clinical placement.

Table 4.10 Summary of Wilcoxon signed-rank test for questions 15 to 21 of the EBP2 questionnaire representing Attitudes towards EBP.

Domain: Sympathy (Attitude)			
Question item	Z	Asymptomatic significance (2-tailed)	Interpretation*
15. EBP does not take into account the limitations of my day-to-day clinical placement	-.10	.922	Not significant
16. There isn't much point in doing EBP because there is a lack of strong evidence to support most of the cases I do	-1.56	.120	Not significant
17. EBP does not take into account my clients' preferences	-1.57	.116	Not significant
18. In making decisions about the cases in my clinical placement, I value clinical/field experience more than scientific studies	-.88	.379	Not significant
19. Workplace experience is the most reliable way to know what really works	-1.14	.253	Not significant
20. Critical appraisal of the literature and its relevance to the client is not very practical in the real world of my profession	-.21	.836	Not significant
21. Seeking relevant evidence from scientific studies is not very practical in the real world	-.60	.552	Not significant

* Whether baseline and post-ACP results have significant or no significant difference.

Paired samples t-test showed that the results of the baseline domain of sympathy (18.7 ± 4.7) or the individual's sense of compatibility between EBP and day-to-day practice was found to be equal to the post-ACP result (20.1 ± 5.4) with no significant difference based on the mean difference of 1.4 at 95% confidence interval, $t(26) = -1.334$, $p = 0.19$ ($p > 0.05$).

Table 4.11 Results of paired samples t-test for the Sympathy domain.

Baseline and post-ACP of Sympathy	Paired differences					t	df	Sig. (2-tailed)
	Mean difference	Std. Deviation	Std. Error Mean	95%Confidence Interval of the Difference				
				Lower	Upper			
		1.38	5.29	1.04	-.75	3.52	1.33	25

4.3.3 Students practice EBP in undergraduate clinical practice

In this study, students' practice of EBP was summarised using the Terminology and Practice domains of the EBP² questionnaire (McEvoy, Williams & Olds 2010). The Terminology domain quantified the degree of students' understanding of select EBP-related terms while the Practice domain shows the frequency of students' EBP implementation in their clinical placements.

4.3.3.1 Students understand few EBP-related terminology

In this domain, the EBP² questionnaire presented a series of 17 words relevant to understanding research literature. By indicating their responses between 'understand and could explain to others' and 'understand quite well', among the terms that were highly recognized by the students on both baseline and post-ACP survey were: systematic review (26 or 100%) and randomized controlled trial (26 or 100%).

Based on the numbers of responses to 'understand quite well' and 'understand and could explain to others', students showed an improved understanding of the following words from baseline to post-ACP survey: absolute risk (50% → 65.38%), odds ratio (38.46% → 50%), meta-analysis (69.23% → 73.08%), number needed to treat (53.85% → 76.92%), publication bias (61.54% → 65.38%), forest plot (34.62% → 57.69%), intention to treat (42.31% → 46.15%), statistical significance (69.23% → 76.92%), minimum clinically worthwhile effect (26.92% → 38.46%), dichotomous outcome (34.62% → 57.69%), continuous outcome (46.15% → 73.08%), and treatment effect size (61.54% → 80.77%).

On the other hand, terms with retained or decreased level of understanding from the beginning of advanced clinical placement to one-year after were: relative risk (57.69% → 50%), confidence interval (50% = 50%), and clinical importance (69.23% → 65.38%).

Wilcoxon signed-rank analysis indicate that there is no significant change in any of the responses to questions of the Terminology domain, representing undergraduate physiotherapy students' practice of EBP from early in the advanced clinical placement to one-year post-clinical placement. The significance level is set at .05.

Table 4.12 Summary of Wilcoxon signed-rank test for questions 22 to 37 of the EBP2 questionnaire representing Practice towards EBP.

Domain: Terminology (Practice)			
Question item	Z	Asymptomatic significance (2-tailed)	Interpretation
22. Relative risk	-.79	.428	Not significant
23. Absolute risk	-.22	.824	Not significant
24. Systematic review	-.63	.527	Not significant
25. Odds ratio	-.60	.548	Not significant
26. Meta-analysis	-.36	.718	Not significant
27. Number needed to treat	-1.31	.189	Not significant
28. Confidence interval	-.26	.791	Not significant
29. Publication bias	-.16	.872	Not significant
30. Forest plot	-.81	.419	Not significant
31. Intention to treat	-.46	.646	Not significant
32. Statistical significance	-.54	.591	Not significant
33. Minimum clinically worthwhile effect	-.96	.335	Not significant
34. Clinical importance	-.55	.582	Not significant
35. Randomised controlled trial	-1.15	.248	Not significant
36. Dichotomous outcomes	-.96	.339	Not significant
37. Continuous outcomes	-1.26	.208	Not significant
38. Treatment effect size	-1.28	.200	Not significant

* Whether baseline and post-ACP results have significant or no significant difference.

Paired samples t-test of the domain of terminology or the individual's understanding of common terms used in research showed a mean difference of -1.8 at 95% confidence interval based on the baseline (62.9 ± 8.8) and post-ACP (64.7 ± 10.0) scores, which has no significant difference, $t(26) = -0.740$, $p = 0.466$ ($p > 0.05$). The significance level is set at .05.

Table 4.13 Results of paired samples t-test for the Terminology domain.

Baseline and post-ACP of Terminology	Paired differences					t	df	Sig. (2-tailed)
	Mean difference	Std. Deviation	Std. Error Mean	95%Confidence Interval of the Difference				
				Lower	Upper			
				-1.77	12.19			

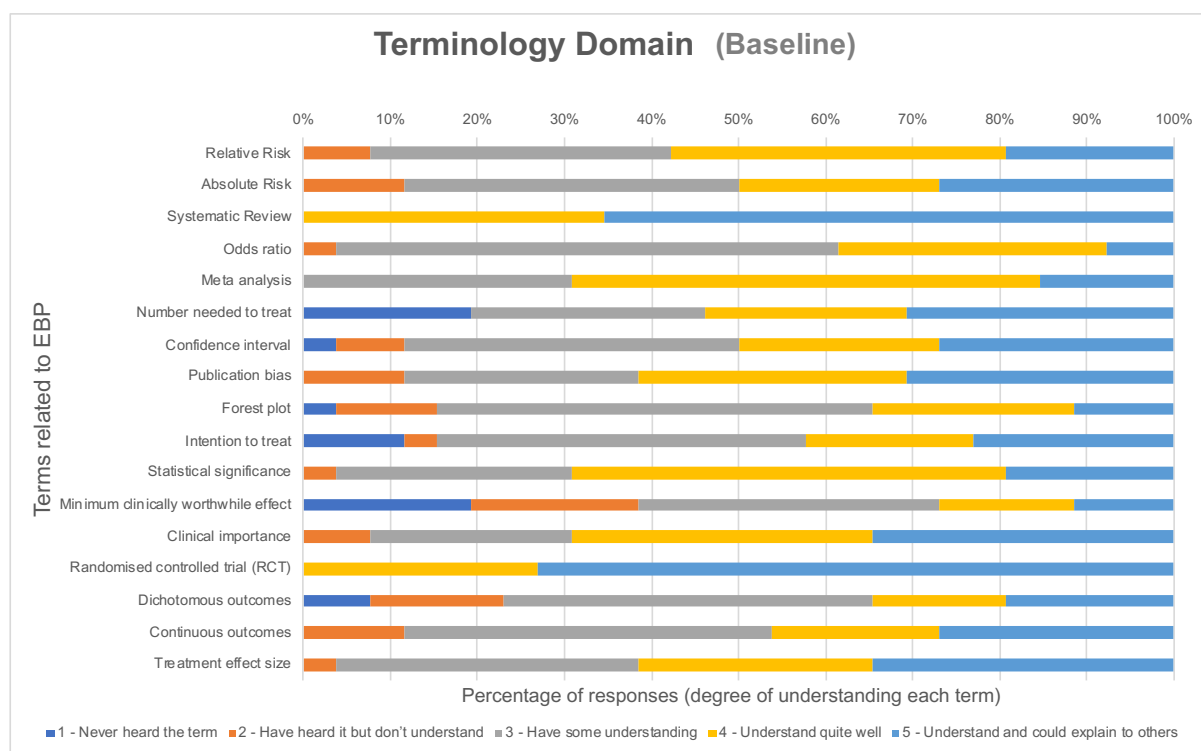


Figure 4.7 Baseline frequency of responses regarding the degree of understanding of terms related to EBP.

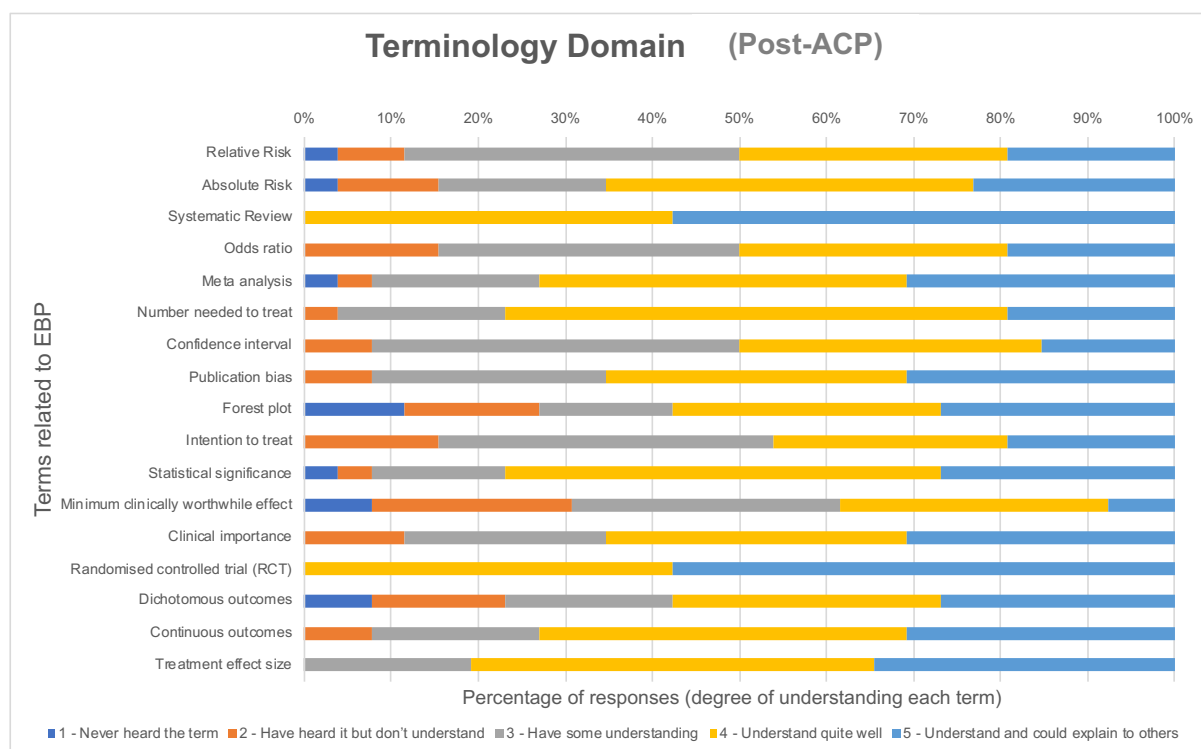


Figure 4.8 Post-ACP frequency of responses regarding the degree of understanding of terms related to EBP.

4.3.3.2 Students implement EBP in their advanced clinical placements

Physiotherapy students' evidence-based practice was quantitatively measured through the Practice domain of the EBP² questionnaire which had 9 questions pertaining to frequency of 1 – never, 2 – monthly or less, 3 – fortnightly, 4 – weekly or 5 – daily.

When asked how frequently they do the Ask part of the EBP process of formulating a question using the Problem-Intervention-Comparison-Outcome (PICO) framework, less than half (12 or 46.15%) answered weekly to daily. The post-ACP result yielded a number that is not far from that of the baseline: 14 or 53.85% (Fig. 4.9A).

In relation to Acquire, only 50% or 13 students tracked down evidence relevant to the formulated question on a weekly or daily basis (Fig. 4.9B). Seventeen or 65.38% students searched electronic databases on a weekly or daily basis (Fig. 4.9C). After one year in advanced clinical placement, the number of students who tracked down evidence after formulating a question went down to 11 or 42.31% while the ones who searched electronic databases went up to 19 or 73.08%, all on a weekly or daily basis.

With regard to the Appraise step of EBP, only two students or 7.69% critically appraised the evidence that they acquire during the earlier parts of their advanced clinical placement on a weekly basis. None did it on a daily basis. This somehow increased to 8 or 30.77% of respondents on the post-ACP survey critically appraising evidences on a daily to weekly basis (Fig. 4.9D).

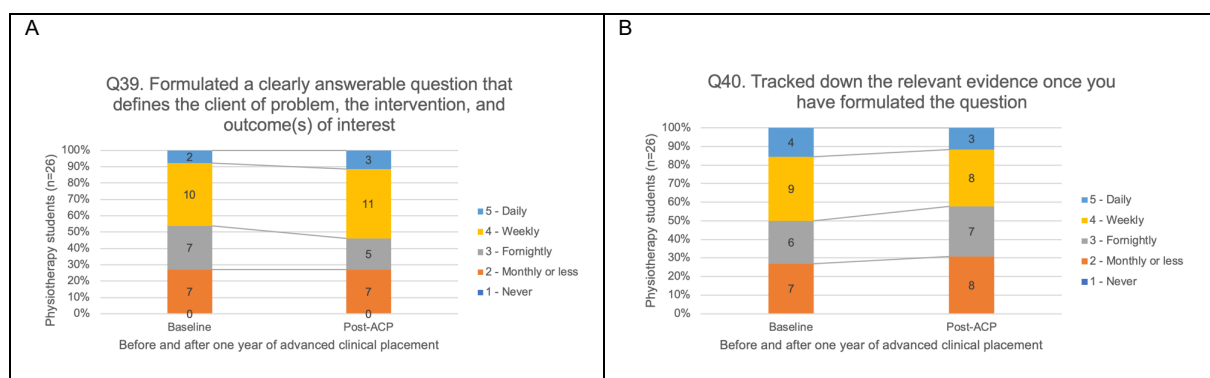
The Apply step of the EBP process involved two questions within this domain of the EBP² questionnaire. It asked the student how frequent they integrated the findings in research to their work in the clinical placement. Seventeen or 65.38% answered weekly to daily and this count did not change after one year of advanced clinical placement (Fig. 4.9E). When asked how frequent they consider their patient's preference when it comes to clinical decision-

making, the beginning of advanced clinical placement showed few students (11 or 42.31%) who did it weekly or daily. This increased to 19 or 73.08% in the same frequency at the end of clinical placements (Fig. 4.9F).

The number of students reading published research reports on a weekly to daily basis improved from 11 (42.31%) to 17 (65.38%) in one year's time (Fig. 4.9G).

A question about informal discussion or sharing within the clinical placement of what they have read from research findings yielded only 11 (42.31%) students who do this on a weekly to daily basis. The number was up with 17 (65.38%) students sharing through informal discussion what they have read from the literature, on a weekly to daily basis (Fig. 4.9H).

With formal discussion or sharing, the number was lesser than informal. Only 6 students or 23.07% of respondents do formal weekly to daily discussion of literature and research findings within their clinical placement during the first month. This number increased to half of the respondents or 13 students at the end of the whole advanced clinical placement (Fig. 4.9I).



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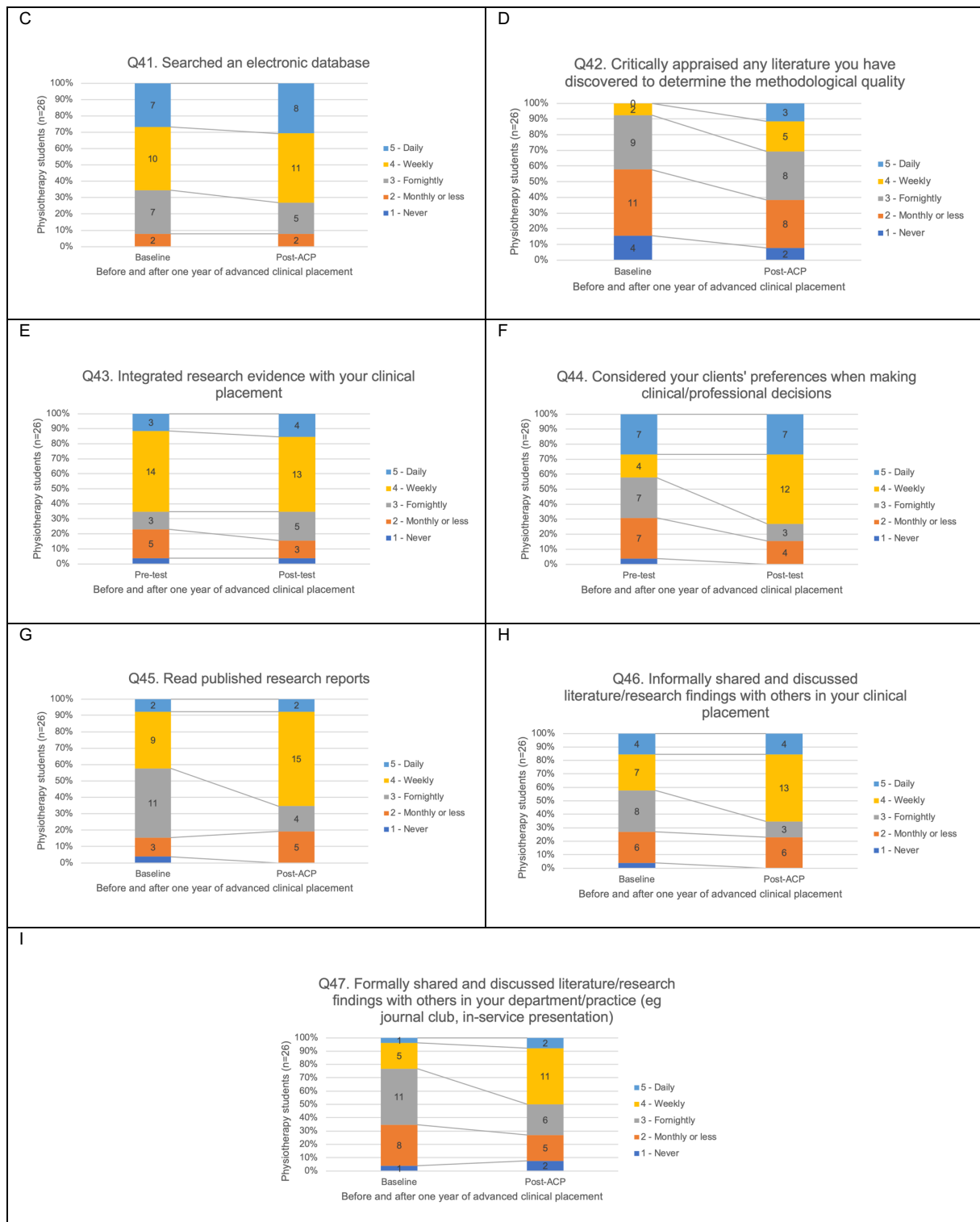


Figure 4.9 Frequency of responses to questions 39 to 47 during baseline and post-ACP of the Practice domain.

Wilcoxon signed-rank analysis indicate that there is no significant change in most of the responses to questions of the Practice domain, representing undergraduate physiotherapy students' practice of EBP from early in the advanced clinical placement to one-year post-

clinical placement. The only exception was the question pertaining to critical appraisal which means there was an increase in frequency in critically appraising research articles by the end of advanced clinical placements. The significance level is set at .05.

Table 4.14 Summary of Wilcoxon signed-rank test for questions 39 to 47 of the EBP2 questionnaire representing Practice towards EBP.

Domain: Practice (Practice)			
Question item	Z	Asymptomatic significance (2-tailed)	Interpretation*
39. Formulated a clearly answerable question that defines the client or problem, the intervention and outcome(s) of interest	-.37	.711	Not significant
40. Tracked down the relevant evidence once you have formulated the question	-.66	.512	Not significant
41. Searched an electronic database	-.63	.531	Not significant
42. Critically appraised any literature you have discovered to determine the methodological quality	-2.43	.015	Significant
43. Integrated research evidence with your clinical placement	-.36	.339	Not significant
44. Considered your clients' preferences when making clinical/professional decisions	-1.55	.121	Not significant
45. Read published research reports	-.88	.379	Not significant
46. Informally shared and discussed literature/research findings with others in your clinical placement	-1.09	.275	Not significant
47. Formally shared and discussed literature/research findings with others in your department/practice (e.g. journal club, in-service presentation)	-1.24	.215	Not significant

* Whether baseline and post-ACP results have significant or no significant difference.

Despite having some increase in frequency of applying the different EBP steps within their clinical placement, still there was no significant change seen from the earlier days of advanced clinical placement to one year after. Paired samples t-test showed that the results of the baseline domain of Practice (29.2 ± 6.0) was found to be equal to the post-ACP result (31.3 ± 6.8) with no significant difference based on the mean difference of -2.2 at 95% confidence interval, $t(26) = -1.357$, $p = 0.19$ ($p > 0.05$).

Table 4.15 Results of paired samples t-test for the Practice domain.

Baseline and post-ACP of Practice	Paired differences					t	df	Sig. (2-tailed)
	Mean difference	Std. Deviation	Std. Error Mean	95%Confidence Interval of the Difference				
				Lower	Upper			
		-2.19	8.24	1.62	-5.52	1.13	-1.36	25

4.3.4 Students are confident in implementing EBP

The domain Confidence in the EBP² questionnaire covers the individual's perception on their use of EBP. It has 11 items covering perceptions on respondent's perceived confidence in her research skills, computer skills, and self-reported awareness and abilities directly linked to the EBP process. Students were asked to respond to each question according to their level of confidence (1 – not at all confident, 2 – a little confidence, 3 – reasonably confident, 4 – quite confident, 5 – very confident) in doing each EBP-related and pre-requisite skills.

At the beginning of the advanced clinical placement, 17 or 65.83% of the students reported that they are 'quite confident' and 'very confident' with their research skills. This increased to 21 or 80.77% at the end of the academic year (Fig. 4.10A).

With regard to computer skills, 19 students or 73.08% reported being 'quite and very confident' during baseline survey. Post-ACP survey reveals 4 more students, or 23 students in total (88.46%) being 'quite and very confident' with their computer skills (Fig. 4.10B).

Baseline survey yielded 19 students (73.08%) being 'quite and very confident' in identifying their gaps in knowledge, increasing to 22 (84.62%) post-ACP survey (Fig. 4.10C).

When asked about their ability to convert information into a focused answerable query, 19 or 73.08% of the students were 'quite confident and very confident' at the start of their advanced clinical placement. One year after, responses of 'quite and very confident' increased to 22 or 84.62% respondents (Fig. 4.10D).

Twenty students or (76.92%) had the awareness of major sources and types of information right at the beginning of their advanced clinical placement. Two more students added to the number of 'quite and very confident' students one year after their advanced clinical placements bringing the total to 22 or 84.62% (Fig. 4.10E).

There were 24 or 92.31% of students during baseline survey that were 'quite and very confident' in searching electronic databases. Post-ACP statistics showed all 26 or 100% of the respondents being 'quite and very confident' in this skill after one year of advanced clinical placement (Fig. 4.10F).

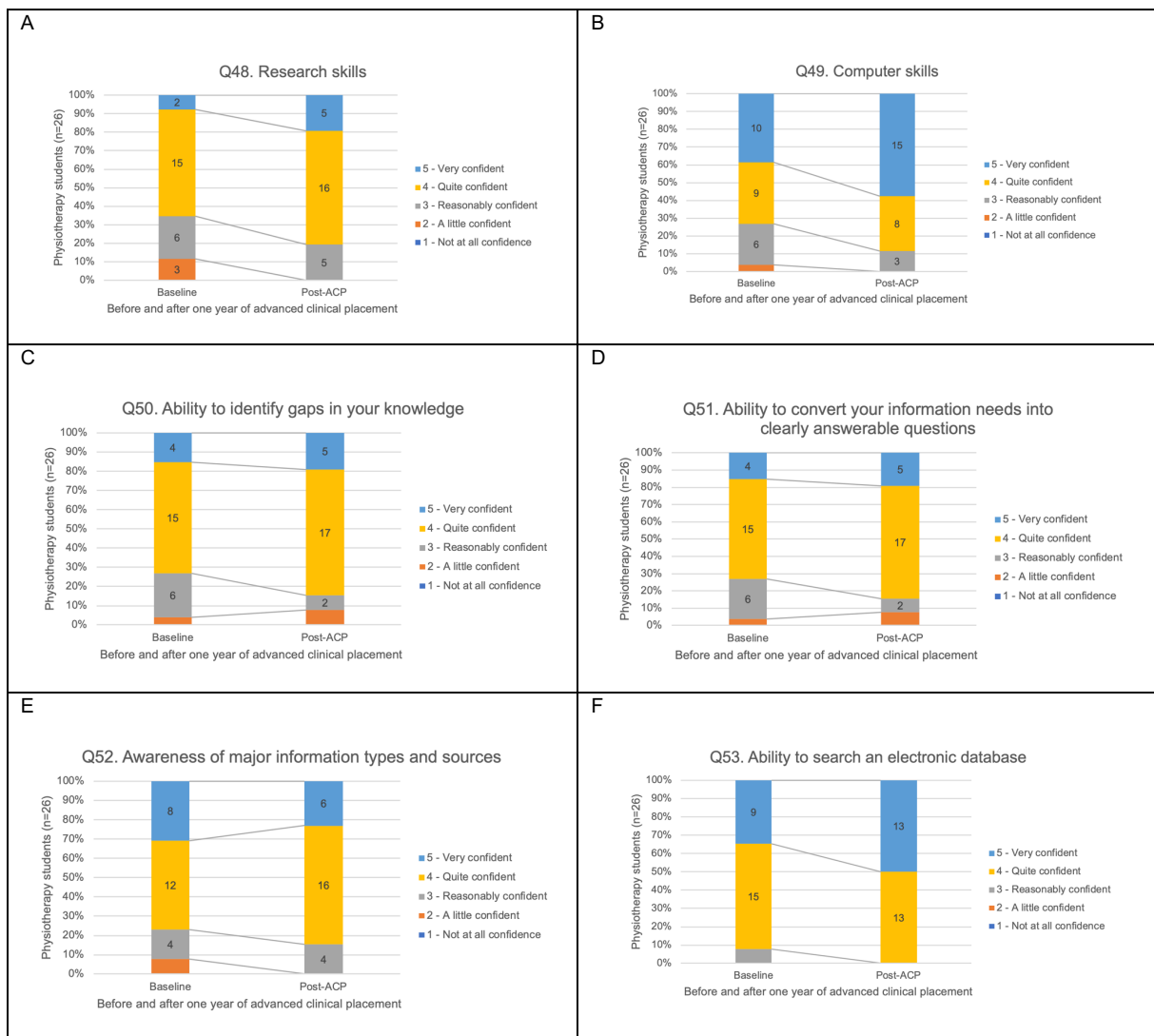
In regard to ability to acquire copies of research articles or reports, 22 or 84.62% claimed being 'quite and very confident' with the skill during the start of their advanced clinical placements. Only one additional student felt the same at the end of one-year advanced clinical placement (23 or 88.46%) (Fig. 4.10G).

The item of critical appraisal of evidence using set standards showed comparably lower number of 'quite and very confident' students as compared to other items in this domain. Only 13 or 50% of the respondents felt that they can do this skill on baseline survey. This number of 'quite or very confident' students increased to 19 or 73.08% of respondents at the end of the advanced clinical placements (Fig. 4.10H).

Students also felt not so confident in their ability to determine the validity of the research evidence when only 14 or 53.85% of the respondents claimed being 'quite or very confident' in doing so. Post-ACP reveals an addition of only 2 students making the total 16 or 61.54% after one year from the baseline measure (Fig. 4.10I).

As for clinical applicability or the ability to determine the usefulness of the evidence, 17 or 65.38% responded 'quite or very confident' in being able to do so. During post-ACP survey, the items shows a total of 19 or 73.08% confident students (Fig. 4.10J).

The last item on this domain asks about the respondents' ability to apply the information to real cases. This yielded a low number of students with only 16 or 61.54% being 'quite or very confident' during baseline survey and 17 or 65.38% during post-ACP survey (Fig. 4.10K).



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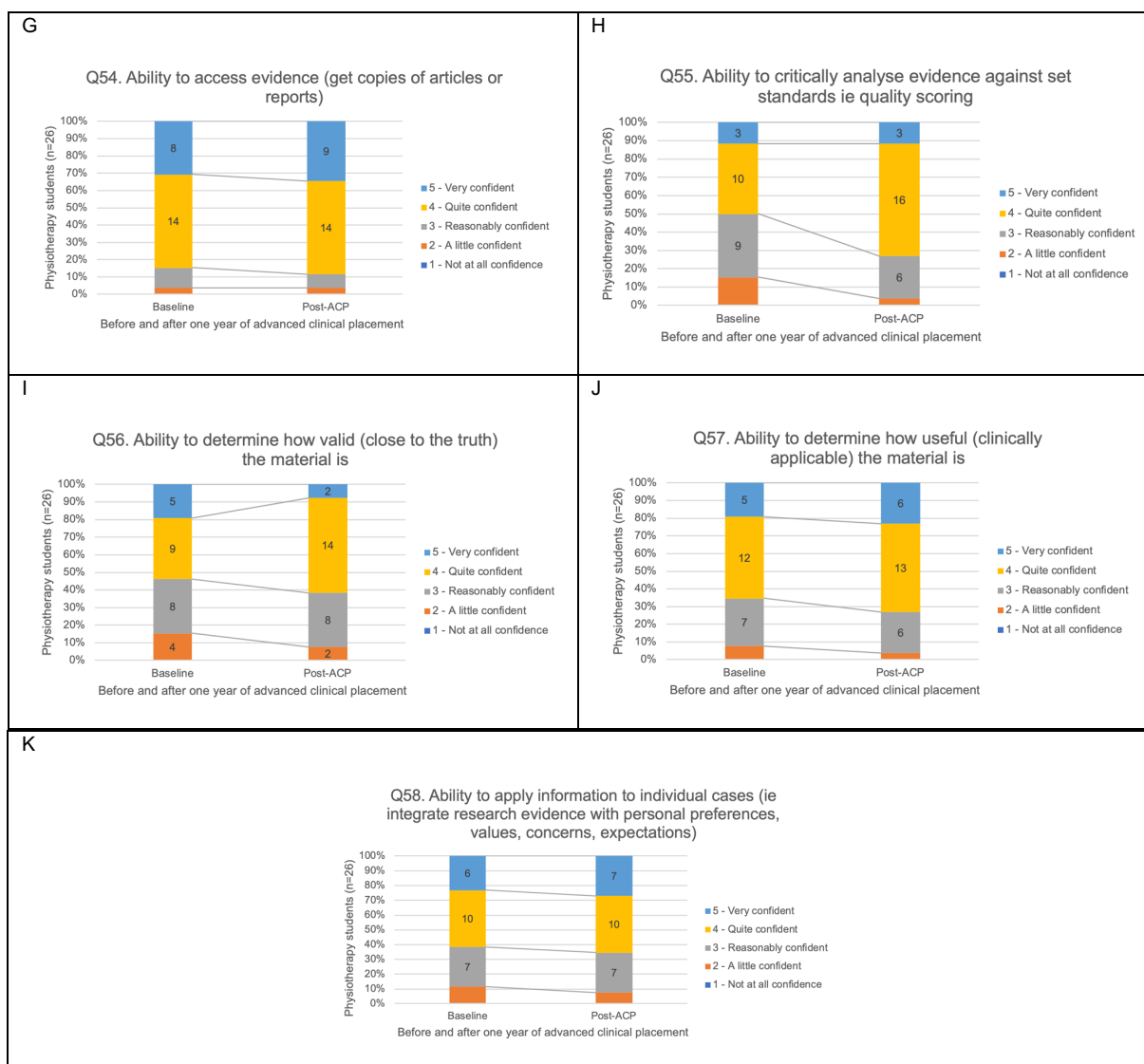


Figure 4.10 Frequency of responses to questions 48 to 58 during baseline and post-ACP of the Confidence domain.

Wilcoxon signed-rank analysis indicate that there is no significant change in most of the responses to questions of the Confidence domain, representing undergraduate physiotherapy students' practice of EBP from early in the advanced clinical placement to one-year post-clinical placement. The only exceptions were questions pertaining to research skills and computer skills which means there was an increase in self-perceived uptake of research and use of computer by the end of advanced clinical placements. The significance level is set at .05.

Table 4.16 Summary of Wilcoxon signed-rank test for questions 48 to 58 of the EBP2 questionnaire representing perception towards EBP.

Domain: Confidence (Perception)			
Question item	Z	Asymptomatic significance (2-tailed)	Interpretation*
48. Research skills	-2.18	.029	Significant
49. Computer skills	-2.35	.019	Significant
50. Ability to identify gaps in your knowledge	-.66	.509	Not significant
51. Ability to convert your information needs into clearly answerable questions	-1.07	.284	Not significant
52. Awareness of major information types and sources	-.24	.812	Not significant
53. Ability to search an electronic database	-1.60	.109	Not significant
54. Ability to access evidence (get copies of articles or reports)	-.44	.660	Not significant
55. Ability to critically analyse evidence against set standards ie quality scoring	-1.28	.201	Not significant
56. Ability to determine how valid (close to the truth) the material is	-.16	.876	Not significant
57. Ability to determine how useful (clinically applicable) the material is	-.69	.489	Not significant
58. Ability to apply information to individual cases (ie integrate research evidence with personal preferences, values, concerns, expectations)	-.54	.590	Not significant

* Whether baseline and post-ACP results have significant or no significant difference.

Despite seeing some individual respondents reporting an increase in confidence in most areas of the EBP process when comparing their perceived use of EBP at the beginning of their advanced clinical placements and one year thereafter, paired samples t-test showed results of baseline measure of the Confidence domain (42.4 ± 5.8) being statistically equal to the post-ACP result (44.5 ± 4.9) with no significant difference based on the mean difference of -2.1 at 95% confidence interval, $t(26) = -1.598$, $p = 0.12$ ($p > 0.05$).

Table 4.17 Results of paired samples t-test for the Confidence domain.

Baseline and post-ACP of Confidence	Paired differences					t	df	Sig. (2-tailed)
	Mean difference	Std. Deviation	Std. Error Mean	95%Confidence Interval of the Difference				
				Lower	Upper			
	-2.12	6.75	1.32	-4.84	.61	-1.60	25	.123

Table 4.18 shows the baseline and post-ACP mean and standard deviation with 95% confidence interval for each domain scores. The effect sizes have been computed based on the pooled standard deviation of the baseline and post-ACP results for each domain. After one year of advanced clinical placement, Relevance ($62.4 \pm 4.9 \rightarrow 63.2 \pm 4.1$) and Sympathy ($18.7 \pm 4.7 \rightarrow 20.1 \pm 5.4$) domains showed small effect sizes ($ES=0.18$ and $ES=0.28$ respectively) in the students' attitude toward EBP even after one year of advanced clinical placement. Results also exhibited small effect size on students' evidence-based practices based on the results of the Terminology ($62.9 \pm 8.8 \rightarrow 64.7 \pm 10$, $ES=0.19$) and the domain of Practice ($29.2 \pm 6 \rightarrow 31.3 \pm 6.8$, $ES=0.33$). A small effect size (0.39) was noted in the students' perception of EBP based on the Confidence domain with a mean baseline score of 42.4 ± 5.8 compared to the mean post-ACP score of 44.5 ± 4.9

Table 4.18 Summary of effect size results per domain of EBP2 questionnaire.

Domain (Score Range)	Baseline survey Mean (SD) 95% CI	Post-ACP survey Mean (SD) 95% CI	Early advanced CP → 1 year after advanced CP Effect Size 95% CI
Relevance (14-70)	62.4 (4.9) 60.4 to 64.4	63.2 (4.1) 61.5 to 64.9	0.18 -0.37 to 0.72
Sympathy (7-35)	18.7 (4.7) 16.7 to 20.7	20.1 (5.4) 18.1 to 22.1	0.28 -0.27 to 0.82
Terminology (17-85)	62.9 (8.8) 60.9 to 64.9	64.7 (10) 60.7 to 68.7	0.19 -0.36 to 0.73
Practice (9-45)	29.2 (6) 27.2 to 31.2	31.3 (6.8) 28.6 to 34.0	0.33 -0.22 to 0.87
Confidence (11-55)	42.4 (5.8) 40.4 to 44.4	44.5 (4.9) 42.5 to 46.5	0.39 -0.16 to 0.93

4.3.5 Students have good management skills, enjoy studying and thinks that the cost of information resources limits their use of EBP in clinical placements

Among the non-domain questions and based on Wilcoxon signed-rank test, students exhibited significant change from baseline to post-ACP on their management skills, on how much they enjoy studying, and their level of agreement on how much the cost of information resources limits their use of EBP. Twenty-five (76.92%) of the students ‘agreed and strongly agreed’ that they have good management skills at the beginning of their advanced clinical placements. This increased to 25 or 96.15% of respondents by the end of one-year advanced clinical placements. With regard to studying, 19 (73.08%) respondents have positive attitude towards it. On post-test, the number of students who enjoy studying rose to 23 (88.46%). Lastly, when asked on whether the cost of sources of evidence limits their use of it, only 10 (38.46%) initially ‘agreed and strongly agreed’ to it. At the end of one-year advanced clinical placement, this number increased to 18 (69.23%). Table 4.19 shows a summary of the students’ responses to questions 59 to 74 which are questions that are equally relevant to EBP but do not fall into any of the domains Relevance, Sympathy, Terminology, Practice and Confidence.

Table 4.19 Results of non-domain questions from EBP2 questionnaire.

Question item	Baseline		Post-ACP		Z	Asymptomatic significance (2-tailed)	Interpretation*
	Agree	Strongly agree	Agree	Strongly agree			
59. I want to learn new information	30.77%	69.23%	11.54%	88.46%	-1.89	.059	Not significant
60. I critically evaluate new ideas	61.54%	15.38%	53.85%	30.77%	-1.29	.197	Not significant
61. I have good management skills	61.54%	15.38%	57.69%	38.46%	-2.40	.016	Significant
62. I solve problems using a plan	42.31%	34.62%	38.46%	42.31%	-.81	.415	Not significant
63. I enjoy studying	57.69%	15.38%	50.00%	38.46%	-2.89	.004	Significant
64. In my organisation, leaders continually look for opportunities to learn	57.69%	30.77%	50.00%	38.46%	-.50	.617	Not significant
65. I make time to read research	46.15%	23.08%	42.31%	19.23%	-.65	.518	Not significant
66. Insufficient time is one of the greatest barriers to the use of EBP in my clinical placement	46.15%	19.23%	38.46%	34.62%	-1.29	.196	Not significant
67. My workload is too great for me to keep up to date with all the new evidence	46.15%	15.38%	42.31%	15.38%	.00	1.000	Not significant
68. The cost of information resources limits my use of EBP in my clinical placement	23.08%	15.38%	30.77%	38.46%	-2.47	.014	Significant
69. Easy access to computers dictates whether or not I practise EBP	38.46%	15.38%	34.62%	19.32%	-.40	.686	Not significant
70. The resources available to me are adequate to undertake EBP	57.69%	19.23%	34.62%	15.38%	-1.78	.075	Not significant
71. Collective support amongst my colleagues and clinical educators is one of the greatest facilitators to my use of EBP in clinical placement	46.15%	26.92%	50.00%	19.23%	-.77	.439	Not significant
72. Support from management is one of the greatest facilitators to my use of EBP in clinical placement	50.00%	34.62%	65.38%	15.38%	-1.73	.083	Not significant
73. My clinical educator requires me to use EBP	42.31%	42.31%	23.08%	42.31%	-.68	.498	Not significant
74. I've just had a gutful of EBP	46.15%	11.54%	46.15%	3.85%	-.53	.593	Not significant

* Whether baseline and post-ACP results have significant or no significant difference.

4.3.6 Perceived changes after one year of advanced clinical placements

From the results of the focus group interview, students stated positive improvement within themselves regarding EBP knowledge and skills. At the end of one year of advanced clinical placements, students claimed that their clinical experience enhanced their EBP skills in one way or the other, one of which is through an increase in their confidence:

Harroof: “We feel more confident when we have a strong background. We know how to apply the evidence.”

Alaa: “We have something to support our treatment, our assessment. We can convince everyone that we are doing this because of the evidence.”

Students were more than happy enough to have improved in their search time.

Heba: “It’s like for me, at first, when I started in case-based learning courses, it took me 30 to 45 minutes back then. But now, 15, 10 minutes.”

Aysha: “Actually, now it is much easier. We know where the category is to find the right answer, how to search, and the place representing the information in the article.”

Students see EBP as a strong tool to fill the theory-practice gap that they have as novice practitioners:

Halima: “That will fill the gap of experience because we’re still students, so at least we have something strong to rely on.”

4.3.7 Qualities of an evidence-based inclined student

Clinical educators were asked about the qualities they look for in a student that reflect their EBP propensity. When asked how they would describe in a few words a student that is emanating the inclination towards evidence-based practice, clinical educators cited the following qualities: (1) awareness of quality guidelines, (2) depth in searching, (3) confidence in applying evidence to treatment, (4) ability to critique evidence, (5) forthcoming, (6)

motivated, (7) open-minded, (8) organised, (9) reflective, (10) willing to learn and (11) being a self-directed learner.

4.4 What are the facilitators and barriers towards an EBP during undergraduate clinical placement?

The second research question was answered by data from the interviews conducted at stage 3 of the study. It involved focus group interviews of select physiotherapy students (n=14) who participated in the first two stages of the study and key informant interviews (n=12) of clinical educators who supervised the said student participants during their yearlong advanced clinical placements. Insights of the students are presented first in this section, followed by those of the clinical educators.

4.4.1 Facilitative factors in implementing EBP in clinical placements

According to students, the three main enabling factors towards implementing EBP during undergraduate clinical placements are: (1) the clinical educators' profile and EBP inclination, (2) the students' readiness in applying EBP in clinical placements based on how the College prepared them, and (3) full-text access.

Clinical educators' profile and EBP inclination. Clinical educators were considered as huge influencers in the evidence-based practice of the physiotherapy students. Clinical educators can organise a very conducive learning environment for physiotherapy students.

Halima: "The clinical educator that I was with, she divided the whole month into parts. Like the first week, she was focusing only in subjective assessment and she tried to let me do everything related to selective assessment alone, after she told that whatever she want to, she want me to know. And then the second week was mainly objective assessment. And then the third one was physical examination. And the fourth week, as [my classmate] said, it was like, I've held the patient alone starting from subjective until

the treatment. So, that really enhanced my performance because she did not judge me based on the clinical placement or the knowledge I've already had. No, she started with me step by step and that was a really good thing. It was well-organized."

For some students, clinical educators can be an EBP facilitator depending on their time, personality, knowledge, encouragement to students, and how they see students in clinical placements. Students elaborated by sharing personal experiences of both possibilities of clinical educators being EBP-facilitative or not.

Alaa: "[It depends on] how they treat us. Whether they see us as a student or a physiotherapist."

Haneen: "I think, it depends on the educator himself, like if I come to him with something, sometimes we go through that (the research article) and he'd be convinced. Some of them, okay they see it, they just wouldn't listen to you. There is also that. Like, some of them, 'Okay you search, it is good. It was recent, try it. You can try it, one, two sessions with the patient and we'll see if he's improving with your method or mine'. Because maybe he's a previous patient of his, it's not a new evaluation or something. And sometimes, they wouldn't listen."

Students' readiness in applying EBP in clinical placements. Results of the baseline and post-ACP survey showed that there were some students (n1=6) who were not aware that they undertook formal EBP education as part of their Bachelor of Physiotherapy (BPT) curriculum. On the contrary, during the focus group interviews, most of the students easily recollected the taught modules associated with their foundations in EBP such as the five Integrated Evidence-Based Practice courses which were administered per semester for the first 2.5 years in the College. When asked directly whether they felt well-prepared for implementing EBP in their clinical placements, majority of the students said yes.

Amna: "I remember all of them, it was divided actually. Like, one year, if you want to know how to go search for evidence-based practice, this is the first thing, how to search for any evidence. And then, you choose the topic and do a focused question. Yes, and if you want to take an evidence-based about that condition. So, we started dividing the idea of taking a whole, how to do a research using evidence-based dividing it to two semesters. Actually, it is interlinked in every course. It is not only one course."

Some students were more familiar with the three Investigative Methods courses which focused on writing their own review protocol and systematic review and were administered closer to their clinical placement semesters, hence, the much easier recollection.

Amna: "There is a course that is called investigative methods. This will teach us how to do the right way the research, but the other, it's helping us to take the evidence-based for the treatment. If you're studying anything, what's the type of treatment, investigative methods help us to search for it."

Despite some of them (n1=6) having not remembered their foundation courses in EBP according to the result of the survey, students who were part of the focus groups were very appreciative of the teaching strategy used to inculcate the EBP steps into their taught modules. The students liked the simulation through case-based learning earlier in the curriculum.

Maryam: "We were given... that's my personal opinion, I think that we were given, even for a beginner student, we were given so many tasks that would prepare us very well. I think we had enough practice and if we receive one more CBL, we will throw up from how much we had on the past years. So, we practiced very well."

Moreover, the students had a better understanding and appreciation of how the types of research studies were taught in logical sequence, with a focus on understanding randomised

controlled trials together with other level 4 and 5 evidences during year 2, systematic reviews on year 3 and clinical practice guidelines on year 4 and 5.

Sabah: "In the beginning, it gave us the whole basis of how to form a PICOT question, how to develop questions and based on that, how to search thoroughly, so that was perfect."

Introducing the students to types of researches starting from randomized controlled trials (RCTs) during year 2 to systematic reviews on year 3 and clinical practice guidelines (CPGs) on year 4 was deemed logically sequenced by the students.

Sabah: "Because I think if we have started the other way around, it would have been confusing for us. Because CPGs are like the highest evidence, so maybe it would have been harder for us in research. So, yeah, I think that way, it is the best."

The student also shared suggestions on how to further enhance the readiness of future students towards EBP before they set foot on clinical placements. One suggested strategy is to send students early into clinical placements closer to their taught modules.

Haneen: "New students should be out in clinicals because, like, also for us, we, like I don't know for others, for me also, like my technique, my manual therapy, everything. We did try it in college. It just was on people who were healthy, active, young, everything. Even if we try to make us, like we're sick or anything, it does not resemble."

Sabah: "When you're faced with real patients, it develops your skills and it changes your perception. Like, when you're just practicing on a model or a healthy person, there are certain things you miss out, you don't know how serious they are or how dangerous they might get. Like, are you doing it the correct way, are you handling the patients right or wrong? So, all of those stuff, like you just feel them when you're in clinical placement. So, yeah. So, it's reinforced since the beginning."

Other students to whom EBP seemed a bit vague, their suggestions for improving students' readiness is more on clarifying what the case-based learning sessions are for. A student recalls her experience in the Integrated Evidence-Based Practice modules:

Maryam: "We were the ones who were doing the work. But I think if there's something to add would be the professor explaining the purpose of it in the first place. We were given cases and we know that okay, let's say this case is about tennis elbow, we would know that the next lecture would speak about this pathology, anatomy, pathophysiology and everything but as a big image, we were not quite aware of that until we reached the clinical placement. We were given just a task and we thought it was just an assignment to check on, as an activity. But then when I reached to the clinical placements, I was asked the same questions that we were given. So, I think that the students should be told that you're doing this because it will help you later on."

One student suggested for the College instructors to provide examples to guide them on how to conduct the EBP process on hypothetical cases especially during their first semester of the Integrated Evidence-Based Practice module.

Aysha: "While teaching the steps on why we're doing research, I think we need an example of a condition and then an article as an example and lead the students where to find the information because when I started, I am getting the information from one different, my group doesn't know how to do it. So, it was varying, at the end, with lots of work, hard work, before I came to this point. But, there should be a lecture given with an example of a condition and how to search for the information on the articles."

Heba: "More instructions would help us with our EBP skills and perform it correctly. It took lots of time to reach the right way."

All in all, students felt ready in implementing EBP during their advanced clinical placements. Still, it did not stop them from providing recommendations on how to improve the learning process for future students.

Full-text access. Some clinical placements have their own full-text access and some even have a collection of articles readily available in their office computers.

Alreem: “There’s some hospital, they have their own database and evidence on their desktop. So, if we have a free time and no patient, we sit and we can search anything, any type of condition. The most common condition, they have an evidence-based [article collection]. So, we read and some of them give us brochures. And they always allowed us to access the internet in the hospital.”

For clinical placements that do not provide institutional full-text access to research databases, students use their College access. However, this still has limited full-text access to some journals and requires the librarian to be notified.

Shefa: “For me, once a month I will go to see if there’s anything up to date in the interventions and the treatment part of anything new in research. So, once a month I will read. For me, one barrier that I had to face is to have an access for some of the databases to read. Some of the articles are not free. Yeah, full-text. And you have to pay to have access.”

Other students agreed to limited full-text access as a barrier and shared ways on how to circumvent this issue without having their literature search affected.

Haneen: “Some facilities provided us with our own name and password so it was easier for us to go, to connect to the internet. Others, if you try and connect it more than once with the same username, it will lag, and it will cut off one user. So, one of the facilities did provide us with our own username and password, that was easier. And they had

their own resources. You'd go into PubMed and whatever article comes through that, you can access it through their connection and also. Even if we couldn't access it, one of the educators was open about the "send me an email with this article and I'll give it to you by the end of the day or tomorrow maximum". Other facilities, they couldn't do that, they didn't have, as I said, we didn't have our own username and password. So, they just tell us, just come back tomorrow with what you have come up with. We could access our own resources from the college. If we couldn't get that, we'd contact our [college] librarian, if she could provide us with the information. Usually she does. Yeah, there's that also. But it's a longer process."

Sabah: "So, like what [my classmate] said, it's just a matter of time and access. If we don't have our own access, then we can't do anything. Whenever we're in a hospital where we don't have access, we basically do all the work at home, the research. But once we're in a place where we can have our own access, we work in the same place. And we have a room, actually."

Findings from the interviews with clinical educators showed that the clinical educators' professional career says a lot about their EBP inclination. Thus, clinical educators are seen as facilitative of EBP among students in undergraduate clinical practice based on the (1) years of working experience as a clinician, (2) their background in clinical education, and the (3) sources of evidence that they use to inform their practice.

Years of working experience as a clinician. Among the 12 clinical educators who participated in the study, the average clinical working experience was 13.6 years ranging from 9 years to 26 years of practice. All of them started their careers as clinicians rotating in different fields such as core clinical practices like musculoskeletal, neurological and cardiorespiratory until they

specialised in their own respective fields of practice. All of the clinical educators had trained physiotherapy students involved in this study within the field of their specialisation (e.g. women's health, paediatric, spinal, musculoskeletal, etc.).

Emilia: "So I've worked at, two years I was a rotational physiotherapist, so I've worked in all of the rotations: [musculoskeletal], neuro outpatients, neuro inpatients, paediatrics, care for the elderly, all that. And then I did four years paediatrics with disabilities. Now, I am mixed between adults and [paediatrics], neuro rehab, and long-term ventilators. But my background is mainly neuro."

Greg: "I started working off in the UK, in National Health Service. I did rotations as a junior physiotherapist. And then rotations as a senior physiotherapist. But I would say, since, 2009, so 4 years after qualifying, I kind of been in musculoskeletal outpatient care. Now, I'm actually in, I have an administrative job. I direct the physio department so I'm managing people and staff and, as well as treating clinically, but my clinical area is [musculoskeletal]."

Filomena: "Yeah, so, I am more concentrated towards musculoskeletal and women's health. So, since this hospital is mainly about women and children, my caseload in particular is 90% women's health. But when I started, it was 70% MSK, 30% women's health. But now, over the years, it has increased."

Luther: "So I've been working in rotational basis. When in Ireland, in the acute hospital section and also in long-term care. But I have also experienced working with MSK, private practice and with sporting teams. It's quite broad so within the acute hospital sector, I would have rotations in neurology and gerontology. And we would have patients in from home and receive treatment in a day hospital or interdisciplinary care in a day hospital setting. And then with the aim of keeping those patients at home, with

their families. That's in the day hospital. And then also, in Ireland, we would have respiratory care so you would do treatment of patients with respiratory, ICU and follow-up onto wards."

Rhada: "I have only worked in [neurological rehabilitation] so I qualified in the UK. I went to work in a private neuro hospital, and I worked there for around 3 years. And then I moved to the NHS, so the government hospital. I worked there and then I moved to be a senior specialist in neuro. And then I worked there for another several years. And then I moved here. I moved here 2013, and I have been with [my current workplace] since then. So, I helped set up the rehabilitation unit."

Bridgette: "We are handling all MSK, neuro and ortho cases and paediatric. Now we start maternity also."

Gretha: "Yes, yes. Different cases. I have been seeing a lot of different kind of cases: general musculoskeletal, neurological, even paed, geriatrics, I have handled. And, post-op cases and acute cases of, neurologic and also, ICU cases."

Alona: "Basically, it was med-spine and like spinal issues and rheumatology cases for outpatient setting."

Fely: "I am [musculoskeletal (MSK)]. So, for my first two years, I did rotations but then I specialized from there so I have always been MSK after that."

Mateo: "I have different areas. I would say my expertise in the students I received were neuro but sometimes, we do rotations in other areas. In here including, we do it in general medical surgical patients and also cardiac patients."

Background as clinical educator. When asked about their background in handling physiotherapy students as clinical educators, all had at least three years of experience in clinical education of physiotherapy students except for one.

Filomena: "Actually, since I graduated because I trained in the UK. And in the UK, once you graduate, you work in the NHS. And you straight away take students. But they would have been mainly under my senior, but they would have been with the junior staff every day. It's good because we have a fresh memory of what it's like obviously. I was learning more from the senior at that point."

Greg: "Yeah, it's not been, continuous all those 12 years. I've worked in several different countries and in different healthcare systems. Some of which there's been student education. Some of which that hasn't. So, it's not been continuous, but I first did it in 2007-8."

Luther: "So, within Ireland, all the hospitals I worked with was a student-training hospital. So, we would have had students who at the years, coming from some universities in Dublin. So, we...I'd say for the last 3-4 years, I would have had, not considering consistently, but I would have students."

Rhada: "I did my first year without students but in the UK, as part of your, if you have a license in the UK, it is mandatory to have students. So after the first year, I signed up with 2 universities in the UK to take students, so I took students ever since then. And then we have been working with [the College] now for several years."

Gretha: "Actually, the formal guidance really is just recently. But, way back in Saudi, I have been handling also, students, but very informal because I am not the one who is responsible for them. Unlike here, it is really me. And some other colleagues."

Alona: "Well, actually I have different experiences so once I graduated, I was assigned to the junior class. And it was just informally. And then I started to supervise students, but it is part of physio at a master level and, since 2017, I am academic supervisor. And for 2nd year master's students in a different college. But it is not, it is a part of

physiotherapy and once I joined here, I was assigned to see, to supervise one of the students and other students I was just around them to help them."

Fely: "I would say maybe 18 years."

Mateo: "About 6-7 years."

Apart from managing patients daily, taking a student or students under their supervision did not cause any issue into the clinical practice of the educators. They were generally happy to accommodate students. In one clinical placement where most physiotherapy clinicians are from countries that require clinicians to be educators as well, clinical education is a typical scenario in their day-to-day practice.

Rhada: "And I think the staff have all come from mainly the UK, Ireland and South Africa, where being an educator is expected of you. And, we have taken that responsibility. Because this is the workforce that you are going to work for in the future. So, you really want them to be good."

When asked about the setup upon which clinical education took place in their experience as clinical educators, the "one-educator-to-one-student" is the most commonly cited setup.

Rhada: "Usually one-to-one. I feel it's easier for the student to have that one direct educator they can go back to. But here... in the UK we usually take one student, that is your student. And at the same time, there is not usually any other student in the department. But here, we tend to take two at a time, but they still have their separate educators."

Emilia: "You'd have one student in the department, and they'd come with you for a part of the day depending on the patients you have so they might not be with you for the whole day. But then the past like 4 years became I came to the UAE, I had one-to-one students with myself."

Greg: Yeah, so, it's mainly been a one-to-one model. Sometimes though I've done 1-2. Myself and 2 students. But it's mainly one-to-one.

Fely: "Yeah, yeah. I have always just seen one-to-one."

Luther: "Usually, students will come out and they would be into the department, so, the department would have 20 odd physiotherapists, within the department so we might have 2-3 students. But definitely, students would come out and pair so they would have the support of each other. So, at any one time, you might have 3. Yeah, 2-3 sometimes maybe 3-4 students at one time. So, you will have a mix of students. Some students would be in inpatient, so they would be treating patients in the respiratory or neurology-gerontology, that area of practice. and then other students would be in MSK outpatient, so you'll have that difference."

However, each physiotherapy student is not limited to one particular clinical educator within a day and all throughout the 4 to 5 weeks of clinical placement. During instances when patients cancel physiotherapy sessions, clinical educators would do either of the two things: (1) refer his or her student to another clinician so students would continue having case exposure during down time; or (2) practice therapeutic techniques and discuss basic topics with the students.

During clinical placement, students are advised to mimic the working hours of their clinical educators and spend most of these hours with their respective clinical educators or other therapists. The clinical educators have full decision-making capacity on how the students spend each day of their clinical placement.

Greg: "When they have the placement with us, they're assigned to a clinical educator. We very much expect them to work as if they were in that position. So, they have full time hours."

Filomena: "So, it's, if they're imaging our working hours which we usually want that, that they image our working hours, then it's usually... because with each patient, with a new patient we spend close to an hour. So, the student is with us throughout. And then as, depending on the patient, and the student, if we see the confidence, then usually, we leave like half an hour slots for the patient and the student to get that."

Fely: "So, the day, they would spend the whole day with me. They will take usually an hour for lunch and then they might take a little bit of time if they want to break for prayers. But generally, they would be with me the whole time."

Emilia: "At the moment, I have a full caseload, so I meet the students in the morning. So, from like this time, 8-9 am, is usually quiet because all the patients are either having breakfast or being bathed so it's kind of a protected time for them. So, that's when I like to sit down and chat with them."

From a management point of view, some clinical placements allow the clinical educator to have less caseload in order to have more time educating the physiotherapy student, which is the case with Rhada's institution:

Rhada: "I manage the department, so it is easier for, I allow the staff to have students to try and drop a little bit of their caseloads so that they have extra time for the students. Well, see that is not always that easy if the staff is on leave, it can be quite difficult. But we try and allocate, those individuals with less patients so they can spend time with the students. I usually just give them like an hour every day. So, they have an hour a day. Because it is usually, obviously they've seen the patients, but it is usually the time to answer the questions because students have lots of questions or give them direction of where they need to continue."

Sources of evidence. All of the twelve clinical educators interviewed for this study declared that they consult research evidences to inform their practice. Each of the clinical educators listed a variety of sources where they rely on to keep their practice up to date such as: (1) clinical practice guidelines and research articles from online databases, (2) further education, and (3) sharing clinical experience among colleagues. Some of the less common sources but equally efficient in delivering information are: (1) podcasts and (2) social media.

With the help of institutional access provided by the management of certain hospitals and clinics, the clinical educators have access to full-text articles like clinical practice guidelines and systematic reviews from online databases. In institutions where access is not provided by the management to the employees, the clinical educators do find their own main source of evidence.

Luther: “For myself, so I would refer to international guidelines. So, whether be the national guidelines, whether be American guidelines, Australian guidelines or different guidelines that are there and so for any, for any condition, I’d be reviewing EBP according to it, national guidelines.”

Filomena: “So, we have the guidelines, we have the clinical practices, grade A evidences, and then it’s always a combination with your experience, clinical experience. You cannot really replicate the protocols 100% because protocol is an average information, and then you replicate according to each patient. But that’s like guidance for us.”

Mateo: “I also bring again, occasionally if I want to check different patient or different syndrome and I want to keep up to date with the most recent practice, I would go online obviously. PubMed, Medline, PEDro. I would extract some articles. So, that’s normally my basis.”

Fely: "I use, I read a lot of papers. So, sometime usually I generally have a plan about something that I want to look at particularly. At the moment I have been focusing on plantar fasciitis. So I would maybe have a plan for the month of something I want to look at. If I know a patient is not coming, then I can do a literature search."

Filomena: "We do have some database within the hospital where we can access if you want to search, so we can do that. It's not very good but it's helpful sometimes and I think most of us have access to certain databases outside because of the education and everything."

Greg: "...library access, which I have now because I am still technically under my university as a student. But in a year's time, that will go. And I'll just have PubMed and OpenAccess things."

Bridgette: "When we [were] in India, we had a journal for physiotherapy. Indian physical therapy association. Every month, we will receive that one. We were reading and following like that. But here... from the, only all the information, and from the books."

Gretha: "Of course, the internet is a good place, like physiospot, physio, like Cochrane reviews, so of course it comes with, so we discuss it as well. We have individual access only. For us, it's like our own initiative to, like for me, because I'm onto stroke so what updates are there, like from the APTA and others."

All of the clinical educators who participated in the interviews stated that they attend continuing professional development (CPD) or continuing medical education (CME) courses.

Greg: "Okay. Multiple sources really. I personally have just done some further education, so that's been a big part of my life the last 4 years. We do, in-house case studies and continuing education which we pay for a program in the United States."

Listen to lectures and watch tutorials. We're quite selective in what courses and conferences we do because unfortunately the quality of them here is not so high."

Gretha: "Of course, we have, every year we also have continuing education for us PTs as well."

Within the clinical placements, physiotherapy students get to witness clinical educators' sharing of evidences and clinical experiences during protected hours of in-house meeting (seminar, training, research or journal club) provided by the management (see Management Support).

Fely: "I think that because we are all encouraged to do it, I think we're all, the strengths of our team is that we're all from diverse parts of the world, we all have a different approach to learning, we all have different skills, so I think you know, we're a really great team because we can mix together, so I think, every one of us can teach each other new things. So, I think you know, for me, I like it when the whole team comes together, and we discuss cases and people give their different opinions and different ideas. And it's a really lovely way of trying to stimulate some evidence-based conversation. And of course, I think for me, what I do is I find the person who's got the skills that match the issue that I have. So, if I have a patient who's also got Parkinson's, I might go and speak to the person who is more into neurological outpatients to help me out. So, I think I don't have a particular role model because we're all enthusiastic and we all do it, but I pick out particular skills for particular people to ask that help me out."

Filomena: "So, usually, in our team here, we do that probably bi-monthly or, if any of us is stuck with a case and were not really sure, we are very open as a team to discuss and share information, whether it's about any study or evidence that I'm not able to reach, I can ask my colleagues. And it's a very healthy relationship, that ways."

Alona: "So, we do have different things. We have every week, we have a meeting, a department meeting for med-spinal and rheumatology department. And we share cases together. And we share the evidence though if I had a patient that I am stuck with and I cannot further do anything. So I just put it in the table and we discuss and everybody is sharing with their evidence. And we have a very open talk, we have an open talk with each other because other staff they also have experienced different experiences. They are coming all over the world and they have different experiences and we share together. And this is one of the, also one of the meeting. This is one of the aims of the meetings every week so if they have cases, they will just present. If they do not, so I attend the course, I will just present it to my colleague. So, we always have sharing knowledge and... will ask "did you try this" and how was the outcome. So, we always share the knowledge and experience."

Fely: "We have a database on the computer on our shared drive, so if we have a good paper, we would share it with the rest of the team and then we would put it on the shared drive. So we always seem to have quite a lot of evidence-based work ready just in case, you know, you have time and you have time to look. Which is quite good for students because if there's a particular thing that they want to look at, we generally usually have some quite up-to-date literature ready for them to look at."

Mateo: "So, we have kind of a rehab-based practice clinics, on a weekly basis we bring, some of our colleagues bring articles or they bring cases that they think is important to discuss. Also, directly with my colleagues on a daily basis. We can also extract information from each other. But I would say internet of course and some books. Some older books I would say but that's not the most up, the most recent technology, but say yeah."

Gretha: “And also, if anyone also, like, get, our team leaders, if they get something out, and they see some new research, they share. We share also.”

Podcast was noted by one clinical educator as her source of evidence. The CE pointed out that listening to podcasts make digestion of information faster and easier.

Fely: “I listen to quite a lot of podcasts. Mostly, from the UK, some from Australia. That’s, the podcasts that I usually listen to are researchers themselves, talking about their research projects and the implications it has for practice. So, I try and keep up that way and then I put everything together and then maybe after that, I would present it in one of our team meetings, so I let the rest of the team know if there is anything that is really good that I have learned.”

Another clinical educator shared a unique point of using social media platforms as source of evidence.

Greg: “Actually, in the last year or so, this is just me personally. I just started finding a lot of good content via social media and in specific forums and dedicated Instagram pages and Facebook groups. Whereas a couple of years ago, that would be pretty weak or loose information. Now, actually there’s some good stuff on that. And you need to be able to discern and you know check references. But I actually get a lot of helpful things from Instagram and Facebook which is a new thing for me.”

4.4.2 Challenges towards developing EBP application and skills in clinical placements

According to the students, the perceived challenges towards developing propensity to EBP in undergraduate clinical practice include: (1) the clinical educators’ resistance to EBP, (2) the lack of facilities, (3) patients and their health insurance providers, and (4) limited time and substantial caseloads.

Clinical educators' resistance to EBP. Students noticed that the seniority of clinical educators in clinical practice may put them at a position that makes them resistant to the concept of EBP. The years of clinical practice make them set in their own ways and choices of treatment.

Alaa: "If I'm applying an evidence and the physiotherapist came, with like 10 years of experience, they won't agree because let's say they did the treatment for several patients and they will say it was good for these patients, why are you applying something new?"

Sabah: "I think I believe some therapists believe that their treatment is working out for their patients. So, they think 'why would I change that if it is working out for my patient?'. So, it actually depends, it varies from person to person. So maybe that's why they stick to the same therapy or technique they're using, and they don't update or upgrade themselves."

Resistance to adopting an evidence-based physiotherapy practice among clinical educators trickles down to students' clinical experience.

Haneen: "Actually, it depends on your or my clinical educator. If he has, I don't know, enough courage to let me handle the session or believe in students. Some educators, they don't believe in students, so they're just like 'step aside and you observe. And we'll talk later.' And this talk never happens. That talk later. And some educators, they really, they stand in a corner in the room and they're like, I'm here if you need me, just do whatever you want to do. And even if you're wrong, they never tell you that in front of the patient. Just for your sake of courage and everything, you wouldn't lose any of that."

Lack of facilities. One of the notable obstacles to the EBP process is lack of facilities particularly having no internet connection within the institution, having no equipment and/or office space to do the search. The availability of these tools depends on the provisions of each institution and is not uniform from one clinical placement to another.

Harroof: "In some placements, there was no Wi-Fi."

Harroof: "Because every therapist has a computer, so they don't have extra computer for us to sit and search."

In some instances, bringing their own laptops do not solve the concern.

Alaa: "Even if we get our own laptops, we still don't feel comfortable to open it. We don't have a place to sit."

Aysha: "Not all of them will have a space for us to sit."

Patients and their health insurance providers. To some students, patients' preferences for treatment deviates them from applying evidence into their patient management.

Haneen: "Sometimes, you want to apply evidence-based practice but on the other hand, you're forced by the patient. So... to give an example, it would be easier [to consider] electrical therapy. It has been proven throughout research and evidence-based practice that it is not effective. Like exercise, and strength training is more efficient than using electrical therapy alone. The patient would come in and he doesn't want to do anything of that. He just wants the electrical therapy. They Googled it, so they want what they found on Google, not the information that you're trying to provide them. So, that is an obstacle."

Each hospital or clinic has a list of health insurance providers that they accept as third-party payers for patients' health care service needs.

Haneen: "Maybe a hindrance would be the insurance. Some facilities would allow only some type of [health insurance] cards. And other [health insurance] cards, it's not approved. So, other cardholders would opt to another places."

Moreover, patients tend to choose hospitals or clinics that provide electrical therapy over institutions that are focused on evidence-based treatments such as manual therapy or

exercises. Besides, their health insurance providers might actually be handling fees for electrical therapy only and not for other kinds of treatment.

Limited time and substantial caseloads. Students felt that with the number of patients needed to treat per day, there was no opportunity to search for evidences that would support their treatment or that would lead them to a more efficient treatment process.

Alaa: "I think, because, we used to spend more time in treating. Like for example, especially if we have so many patients, like 7 to 11, or more than 11 patients a day, we don't get the chance to search."

It was also pointed out during the interviews that being in the inpatient department, there were more flexibility than in the outpatient.

Loudjen: "Like, for outpatient, they range from 12 to 16 patients, so far that's what I experienced. And for inpatient I guess also maximum, we would have 15. But sometimes, they don't really have a lot of patients for inpatient. Because sometimes, you know, the patient maybe undergoing dialysis, or not up for physiotherapy, stuff like that that come up and I might have an extra time where I could get and do research. But for outpatient, it was a bit challenging because it was, like some facilities also provide walk-ins so walk-in patient might come in between and might have overbooking. So, yeah. For inpatient, I had more time rather than outpatient department."

The difference with time allotment in outpatient and inpatient departments even makes the caseload per day more unpredictable.

Haneen: "In [a certain facility], [clinical educators] are expected to finish in a day, ranging from 6 to 8 patients maximum. That's the expectation for you to give the patient their time and for you to write the notes in a proper way. And to have your break which is an extra half an hour to the 8 hours. And for the outpatient, it's usually the first

because as [my classmate] said, there will be overbooking. Sometimes, there is lots of no shows so there is an appointment, but it is a no-show. But usually, it is a maybe 10 patients throughout the day. And sometimes, it's only two. So, you can never know."

In case of a "no-show", the student and clinical educator get to have more time for case discussion. Each student-clinical educator tandem has their own way of utilising their time in case a patient who is scheduled to come for a physiotherapy session does not turn up.

Haneen: "We utilize that time of no show with lots of discussion and also like challenging questions. Sometimes, my educator would ask the question knowing that I don't know the answer just for the sake of me thinking too much about it and not knowing the answer, then when he finally tells you the answer, it just sticks. It never leaves."

Shefa: "Sometimes when we don't have a patient, for 1 to 2 hours, they tell us to search [for evidences]."

For hospitals and clinics that allow walk-in patients for physiotherapy session without prior booking, overbooking usually happens. And when the staff and students are overbooked, there would really be no time for clinical educators to facilitate problem-based learning or case discussion with the students. Nearing the end of the cohorts' clinical placements, the institutions have started removing the walk-in policy and requiring all patients to have prior booking to avoid overbooking among staff and students:

Sabah: "Some hospitals take a lot of overbookings. And nowadays, they're stopping that. They're not allowing it anymore. So, like the maximum number of patients that you're getting is 10. This is the ideal number. You shouldn't have more than 10 patients in outpatient. Because, in that way, you'd have 10 patients, you'd treat them properly

and you document properly. So, you wouldn't be like misjudging the treatment or the documentation. It wouldn't be fair for them."

According to the clinical educators, the challenges that they noted upon training the students in implementing EBP during their clinical placements were: (1) students' weak basics and lack of depth, (2) patients' refusal of being managed by a student, (3) students' limited language ability, (4) students' lack of interest, (5) students finding EBP difficult, (6) cultural barrier, (7) substantial caseload and limited time, and (8) prioritising case presentation of over clinical experience.

Students' weak basics and lack of depth. When clinical educators find weak theoretical foundation among physiotherapy students, it challenges them to build up on what the students currently know. One clinical educator from a tertiary hospital in Abu Dhabi who shares the same opinion as her other colleagues explains:

Alona: "And the basics actually, I know that they have it but they have to be emphasized before starting the practice. Because, she cannot, or any student cannot practice without having a solid basic."

Not knowing enough basics affects the dynamics of furthering an evidence-based clinical practice because rather than spending time toward advancing students' knowledge and skills, clinical educators have no choice but to refocus some one-on-one time with students to review basic concepts which should have been fortified prior to advanced clinical placements.

Alona: "And they have to invest, as you said, we have them only for 4 weeks, and we want them to learn. So, if we just spend the time on the basics, on these things that already should be done because it is their 5th year, that is sometimes it's uhm, wasting of other things that we can invest our time to."

In another private tertiary hospital, expectations of clinical educators towards students' evidence-based practice are not met. The depth of EBP application expected from a graduating student nearing the end of her advanced clinical placement does not match the clinical educator's expectations. For some students, the search for literature remains to be basic and does not progress into a more meaningful search that can aid in acquiring research evidences to inform undergraduate clinical practice.

Greg: "Well, I think they... not many of them, when we were kind of probing them a little bit deep, when they're near the end of their placement, we were expecting a little bit more, they didn't really come back with, apart from 1 or 2, but the majority of them, they weren't kind of able to take it a little bit deeper than a Google search or a something on Physiopedia. And, I don't know whether it was their, it's been their expectation in previous placements. We generally, for context, we generally get the students close to their graduation, so they've had 7 or 8, 6 or 7 placements before. So, we generally assume that they're into this rhythm of this."

Patients' refusal of being managed by a student. The more cases handled by physiotherapy students, the more opportunities to integrate and hone an evidence-based practice. However, when a patient refuses to be managed by a student even with supervision of the clinical educator, case exposure and students' clinical experience are affected.

Bridgette: "Some locals, they are too much, they need privacy. And some of them, they will tell 'no, we need main therapist only'".

Sometimes, some patients refuse having students around during treatment mainly because of the condition that they are having treatment for requires a higher level of privacy when compared with any other condition.

Filomena: "Mostly. Like there will be a few who are not comfortable, especially because of the women's health caseload. With musculoskeletal, usually people are fine. But with women's health, with the locals, sometimes they refuse."

In other instances, patients and their family consent on having students watch during physiotherapy session but refuse for students to lead the treatment:

Rhada: Sometimes, we have had issues with, the patients accepting students. So, we have other few, we obviously ask the consent of the family and they are happy a lot of the time for the students to watch, but when you want the student to direct some of the sessions even though it is under supervision, some families can be quite apprehensive about that. And it can be... which makes it difficult for the student and it is not really fair for them because they need to practice to learn.

One clinical educator pre-empts this challenge before it becomes an issue by ensuring that both the patient and student are confident with each other. The patient needs to be assured that the student has the right set of skills in par with that of a clinician in order for him or her to entrust his or her treatment to a physiotherapy student.

Fely: "I think it helps if you're sitting in the room, if they can see that you're here and that you're watching them, and that you're confident with them, and often I'll say to the patient, you know, she's been here with me for 2 weeks, she's excellent, I'm really happy with her. You know, just really try and build some confidence in the patient because the student, you're watching them the whole time so they're not going to do anything unsafe. So, you know I try and make sure that the patient feels confident and I think I find that because the patients here are local and the students are generally local, they seem to build up a good rapport and so they seem very happy to let the students mobilize them and treat them and progress them and do everything which is really great."

Students' limited language ability. Though language was not brought up as an issue by most clinical educators, one particular educator mentioned how language can be a hindrance to furthering evidence-based clinical practice.

Mateo: "I mean, some of us are not native English speakers, and most of our students are not, obviously. So, I felt that in some occasions, yes, the language is a barrier. It wasn't a red flag I'd say, but in occasions, it wouldn't let them go to the next level of expertise. Or even of confidence. So, language is a barrier, I'd say."

Students' lack of interest. The attitude of some students in integrating EBP toward undergraduate clinical practice may not complement the actual need for it.

Filomena: "I think it's the, sometimes laziness. You know. The attitude towards that... it's sometimes it seems like, you know [students think] 'I know I will just clear this one' like 'I don't really need to...'; 'Okay, at the end when I have to do the presentation, that is when I'll do...'. So it's not with each case that you give them that they showed this ability, which we would really appreciate but it's like maybe once that they will do it."

The same clinical educator even added that the students' lack of interest affected their enthusiasm towards training the students with more depth: *"So, sometimes that kind of pushes us back that, okay, if they don't want to learn, why should we push them that much. So, laziness and not being proactive probably [are the barriers]."*

Another clinical educator highlighted that students' lack of interest leads to wasted opportunity of maximising unique clinical experiences that only specialty clinics can provide. Such is the case with a neurological rehabilitation facility in Abu Dhabi that provides integrated programs with the whole package of initial family meeting, care planning, progress meeting and discharge planning.

Cassandra: "The will to experience like, to be, "I am being here!" because neuro rehab, [there's] not so much facilities having this one. And it is not so much would a facility that really you can't have this family meetings that you incorporate it really. But sometimes they just come, there are some girls that just come there and okay, they just find it like normal. But you can see really, you can find really girls that really interested. I think the interest, the interest to know, and to appreciate the situation that they were in. If there is no interest, because really, there are some, who just really want to pass. And finish the program. So, there is some students that are like that."

And for Cassandra, despite giving feedback to students who need to improve their clinical practice: *"I think that [they should come] with interest. If [they are] not interested, even if you give them feedback, still they are not [performing as expected] ..."*

Students find EBP difficult. Clinical educators have noticed that most students find the concept of evidence-based practice difficult as shown by their limited search and critical appraisal skills which correspond to the "access" and "appraise" steps of the 5As of EBP.

Alona: "They found it actually difficult to search, they found difficult to critically analyze. They want fast results so, they, the first article they would find, they will just take it as standard."

To make students more aware that EBP is not just about using the first found article to inform their clinical practice, Alona would then advise the students: *"No, you need to just search more and just look for more."*

Though another clinical educator found the opposite when it comes to searching, it was obvious for him that students found it difficult to apply the concepts into actual patient setting.

Mateo: "I feel like in theory, the students have the ability to go and search and bring information to us. And they're able to verbalize it, they're able to express it correctly. But then applying it directly to a clinician job, there can be a struggle."

Another clinical educator was not quite sure whether the perceived difficulty stems from the concept of EBP itself or from the demands of the case presentation at the end of each clinical rotation.

Fely: "Yes, I think with some students, some students find the presentation at the end, although it is very useful, I find, they find it really daunting. I don't know if it's the public speaking or if it's presenting in front of your peers or if it's the whole evidence-based thing, but for some students, they find it a very big thing and it becomes quite distracting."

Cultural barrier. Clinical educators noted a reserved and shy nature of the physiotherapy students and deemed it as typical to the culture. This, however, hinders their ability to verbalize knowledge and be forthcoming in expressing information relevant to the clinical scenario at hand.

Emilia: "But I think it goes back to, again, maybe like the cultural, sometimes they need to be quite pushed and can be quite shy. So, they are kind of barriers to get [the information] out of them. That's a huge thing. I feel like that's a big barrier for us but it's not necessarily a something the university can address head on. They just have to keep working on it."

Cassandra: "Some of them still are a little bit shy to impose on."

Mateo: "So, I think personally, they can have different personalities. Some students are very forthcoming and demonstrating all their knowledge and being very confident,

presenting that and other students maybe, require more facilitation or prompting to demonstrate or to show knowledge. But I think it can vary depending on the person."

On the other end of clinical experience are the patients whose cultural background also serve as a limitation into a wider exposure of different patient demographic thus indirectly affecting the honing of an evidence-based clinical practice among physiotherapy students. The particular cultural traits pointed out by some clinical educators are extreme sense of privacy and certain level of conservatism that prevents female physiotherapists to treat male physiotherapists and vice versa. Considering that all student participants are females, this limitation would have been encountered in certain clinical placements.

Mateo: "For me, I would say yes, a little bit the culture could be a challenge. Culture and the limitations of the country we're in."

Gretha: "Because you know, that we live in a very, a Muslim country and a conservative country, we can never deny the fact that the male and female patients are really having their own privacy. They really need that."

Even if a male patient would be willing to be treated by female physiotherapists, the challenge arises when the student herself refuses to treat the male patient.

Gretha: "Because based on my experience, I have noticed some interns who refused to take male patients because of this culture something. I am just trying to tell them that we are here as a professional, so we just have to be at least professional by... it does not cause any harm or something that you will be exposed or see male patients, something like that."

Substantial caseload and limited time. A larger caseload leads to more demand in time of both the clinical educator and the physiotherapy student. An ideal caseload for a novice in clinical practice would be something wherein there is enough time to manage each patient case

in-depth, with the opportunity to consult evidence required to support the management of the case.

Luther: "If somebody has a very large caseload starting off, and time, can be a barrier too. If there's not enough time to be able to review, or students, or when they're young professionals, when they're bombarded with a large caseload, then it can make it difficult to be able to review the evidence for all that's required."

The remedy for such a challenge is quite obvious: to start off with a manageable caseload while students are being introduced into the nature of the clinical placement. As student gains more clinical experience, caseload can be adjusted accordingly to balance clinical experience with depth and evidence-based practice.

Luther: "Sometimes if they have a gradual building of caseload, so when we try and do that to the students, we try to not overload the students so if they have few patients but are able to go into a lot of more depth, rather than seeing a lot of patients and not being able to go into, maybe have the time to go into the depth that's required. So, to start off small, caseload and being able to have time to be able to really get into the evidence for those patients, and that's maybe one way they can get over and the barrier of time and to be able to review the evidence."

One clinical educator even pointed out that this challenge is more obvious during the first week of students' placement.

Mateo: "Sometimes even time and time management can be an issue. I felt like a lot of students had struggled especially in the first week about time management."

Prioritising case presentation over clinical experience. Though case presentation is considered as the most used strategy by clinical educators in incorporating the use of evidence into clinical practice, one educator noted that some students tend to give an unmatched attention

and effort into preparing for the case presentation from the moment they pick their case in week 1 of their clinical placement up to the days leading to the actual case presentation which usually happens on the last day of their clinical rotation.

Fely: "I think they think that it's kind of the apex, it's what you're leading up to. This is the whole experience is in that 10-minute presentation, whereas actually it's many other things. But I think it's finding the paper, it's reading the paper, it's understanding, it's choosing the patient, you know, the whole thing sometimes can turn into quite a big project. And it's not supposed to be quite that way."

This overshadows the importance of clinical practice itself and all the experience that comes with a holistic practice.

Fely: "Some students, they find it a very big thing and it becomes quite distracting so, maybe you might have a patient in the 2nd week and they'll be saying, 'oh but I want to work on my presentation, can I not see this patient?' and go on work on the computer. So, it's not, you know, I find that some students that they've become such a big thing that they forget that they're here for the clinical."

To further show how case presentation shifts students' attention away from clinical training, *Fely* adds: *"And then students who have done the presentation, they're back on concentrating hard on the clinical. I think for some people, it's a really big thing, and it becomes a bit of a distraction."*

As a remedy, *Fely* plans on managing the intensity of the case presentation requirements for her upcoming students.

"So, I think with my next student, I'm going to try and play it down a little bit, try not to make it such a big part of placement because I think it can distract them from their hands-on treatments."

Table 4.20 Summary of facilitators and challenges towards developing an evidence-based physiotherapy practice among students, as experienced in clinical placements in Abu Dhabi.

Facilitators in implementing EBP	
Students' perspective	Clinical educators' perspective
<ul style="list-style-type: none"> - Clinical educators' profile and EBP inclination - Students' readiness in applying EBP in clinical placements - Full-text access 	<ul style="list-style-type: none"> - Years of working experience as clinician - Background as clinical educator - Clinical educators' sources of evidence
Challenges in implementing EBP	
Students' perspective	Clinical educators' perspective
<ul style="list-style-type: none"> - Clinical educators' resistance to EBP - Lack of facilities - Patients and their health insurance providers - Limited time and substantial caseload 	<ul style="list-style-type: none"> - Students' weak basics and lack of depth - Patients' refusal of being managed by a student - Students' limited language ability - Students' lack of interest - Students find EBP difficult - Cultural barrier - Substantial caseload and limited time - Prioritising case presentation over clinical experience

Integrating the factors considered as challenges by both students and clinical educators, it can be noticed that factors can either be internal or external to the students' characteristics. Internal challenges were (1) students' weak basics and lack of depth, (2) students' limited language ability, (3) students' lack of interest, (4) students finding EBP difficult, and (5) students prioritising case presentation over clinical experience. External challenges were (1) clinical educators' resistance to EBP, (2) lack of facilities, (3) patients and health insurance providers, (4) patients' refusal of being managed by a student, (5) cultural barrier, and (6) limited time and substantial caseload.

4.5 How do institutional policies and clinical education influence the students' propensity to adopt an evidence-based practice?

Following are the subsections upon which findings from the interviews answer the third research question: (1) clinical education strategies that developed students' propensity towards

EBP according to students, (2) clinical education strategies that incorporated EBP into undergraduate clinical practice according to clinical educators, (3) management support towards an evidence-based practice culture in the clinical placements, and (4) institutional policies.

4.5.1 Clinical education strategies that developed students' EBP knowledge and skills (according to students)

Students mentioned that not all hospitals and clinics are EBP-inclined. Despite that, the students were still given opportunities to enhance their EBP in some clinical placements more than others. Students attributed the EBP experiences more on the clinical educators' disposition rather than the hospital's or clinic's policies:

Halima: "Because I used to be on 8 hospitals or less. But, especially in [one particular clinic], they're focusing more in evidence based. So, at that time, I was focusing on evidence-based more than other hospitals. So, yeah, I think it depends on the clinical educator."

Alaa: "I actually look at the fact that the clinical educators do a weekly meeting to check what I'm missing and what do I need, and to set a goal every week. So, that helped us. And when I went there, I told my clinical educator, that I feel like I'm quite lost in evidence-based, and I don't know how to apply it. So, I think that rotation helped me a lot in applying it to the, in the other rotations."

For clinical placements that facilitate integrating research evidences into clinical practice, students cited the following as helpful activities that enhanced their EBP knowledge and skills: (1) case presentation, (2) application of evidence to patient cases, (3) homework and (4) attendance to multi-disciplinary meetings.

Case presentation. Case studies or formal case presentation are mandatory for each clinical placement and they require it to be done at the end of each rotation.

Haneen: “In one clinical placement, they enforce to do it once at the end of the rotation.

You have to do it at the end of the rotation.”

Application of evidence to patient cases. For hospitals and clinics with existing patient management protocol, clinical educators still encouraged students to search the literature, for other existing protocols and allow students to discuss it with them, and even apply it on their patients.

Halima: “They already have a protocol but they will ask us to go and search about it and bring whatever research that we’ve found and then we can discuss it with the clinical educator and then very often to apply that treatment or the research that we’ve found. They’re very open to discuss and apply it on the patient.”

Applying findings from research into patient care by leading a group exercise is one way of applying evidence to patient case.

Halima: “I’ve led the group exercise in [one particular clinical placement], full session, one hour with 9 to 10 patients.”

Prior to leading the group exercise session, the student was guided by her clinical educator on how to select the exercises to be provided to the group of patients:

Halima: “We had a meeting, me and the clinical educator, about the latest research for chronic low back pain and the most effective treatment. And we figured out that core stabilization exercise is the most effective, are the most effective exercises for those patients. We’ve led a session based on this treatment.”

Another experience of applying evidence-based treatment on a patient involved a Women’s Health case.

Heba: "If I have an interesting case, for example, if I will see a women's health patient, and then the educator will ask me to treat her. I will give her some example of the treatment that I will apply to the patient. Upon the treatment that I will choose, she will ask me that, how did I get them, or from where did I got this idea. So, I will present the evidence that I got from the database."

Homework. Homework is given with varying frequency among the students undergoing clinical placements.

Heba: "Some placements, they will ask you questions each 1 or 2 days. It's like a homework. It's like an assignment where you have to search for it and then you will discuss."

Homework enhances students' capacity to search for answers based on a focused question provided to the students by the clinical educator, allowing the students to get back with their clinical educator with the relevant information. Moreover, homework is not limited to EBP-related skills only but includes other topics as well.

Halima: "It's more of a revision of the academic materials."

Attendance to multidisciplinary meetings. Exposure to other professions' work through multi-disciplinary team meeting was helpful in giving the students a better picture of their role within the clinics.

Alaa: "I joined a [multi-disciplinary (MDT)] meeting. So, I was talking to the doctors when I was seeing my patient independently. So, I was the one who tell him what happened during the session and I used to discuss with the nurses about any changes. We got the chance to be part of it actually. We felt that we are really physiotherapists there, not as a student."

It also helps bolster students' enthusiasm to implement EBP whenever they are treated as an integral part of the multi-disciplinary team. This usually happens when they get consulted by doctors for their plan of care for the patient.

Haneen: "In lots of settings, other doctors would approach us, like [Doctor says:] 'Okay from my point of view, he's safe to be discharged, what about you, what do you think? Do we need more time? Do you think that he need, that he's safe to be discharged? I was thinking of giving him this, but, of ordering this device, what do you think? Is it appropriate for him, is it not?' Like they do approach physiotherapists to discuss with them, things that are related to us."

Apart from interacting with doctors, the students also benefit from attending case presentations done by clinicians during multi-disciplinary meetings.

Haneen: "Also, some clinical placements, they would have like once in two weeks, or once a week, presentations done by colleagues or physiotherapists regarding a new technique that they learned or condition and what are the different types of symptoms, treatment options, stuff like that. Sometimes, if it needs like to be demonstrated also, there's that."

4.5.2 Clinical education strategies that incorporated EBP into undergraduate clinical practice (according to clinical educators)

There are a number of strategies used by clinical educators to incorporate an evidence-based practice into undergraduate clinical practice of physiotherapy students. These are: (1) case presentation, (2) shadowing, (3) clinical application of evidence, (4) timetabling to allow working with different clinical educators, covering similar patient's progress and exposure to a variety of patient cases, (5) revision of basics, (6) demonstration, (7) problem-based learning, (8) allowing students to lead the session, and (9) presentations.

Case presentation. Case presentation is the most commonly used strategy to facilitate an evidence-based practice during clinical placement of physiotherapy undergraduates. This is usually done on the last day of their 4- or 5-week clinical placement, wherein students are required to present a chosen case from among the cases they have handled the entire clinical rotation and present it during the in-house meeting with all clinical educators and physiotherapy clinicians as audience.

Emilia: “I really like at the end of the placement, we get them to do a presentation. So, we give them, they have to pick a patient and at the end of the 4 weeks, we say present that patient to the whole therapy team. And that’s where we get them to hone in and to show is they know how to do evidence-based practice and tell us the diagnosis, what they treated them and why they did that treatment so the evidence has to back up why they did it.”

Greg: “So, I think when the students have placements here, we ask them to do a short case study presentation and we always say, you know, picture you’re like, picture you have an interest of but you know, link it with some form of evidence, even if it’s not really strong evidence. Just the fact they actually, it’s not just a, they get a picture off Google, and talk about something they see. But how does that link to kind of known literature. And some other stuff is easily accessible so, some stuff isn’t.”

Fely: “Yes, we also have, they will also do a presentation in the last week. So, they would take a case. In the first couple of weeks, they would try and find an interesting case and then we ask them to go away and look at the latest evidence for it. And if they’re struggling, we’ll help them, show them how they can look or if they’re struggling to understand the paper, we might go through it with them, with the idea that they’re looking at the evidence on how to treat and progress them. So, then we would sit down

and formulate a plan for the patient next treatment, and then they would present it. So, in the 4th week, they may have seen that patient 3 times. So, hopefully they can present it, they can present the evidence that they picked up on, and the evidence that they used to try and plan and guide their treatment, and then they'd present it to their peers, and usually their college lecturer comes and we try to get as many of the clinicians who are free at that time to come and listen as well. So, it's a good way of getting the students used to incorporating evidence-based practice actually into the treatment of patients."

Filomena: "At the end of the posting, we have a discussion as the entire team where they give us background on what they did, what they saw and the evidence or the guidelines or their experience. So, kind of a case presentation, informal, but a case presentation which kind of at the end of 4 weeks or 5 weeks gives us an idea of what they have actually learned. We don't think, or we don't want them, or we don't expect them to know everything before they come here, but it should be over the 4 weeks or 5 weeks that they do learn something. So that is why we do that, case presentation."

Luther: "So I think, definitely I think, one of the things that we try and sit up for at the end of placement is that students would present, so they could have time to do a presentation at the end of placement. So definitely the presentations are the major prompter that we have which the student present at the end of the placement which we can review or we can see at the end of placements, the students' ability to, and to demonstrate their awareness of clinical guidelines and evidence-based practice."

Rhada: "Sometimes because we are constantly having students here usually, sometimes I do not think they quite understand what evidence-based practice is, so usually during the placement here, we ask them to do a presentation on the case study, and to bring in

evidence-based practice and guidelines to depends on why they're doing what they are doing, and sometimes I think they misinterpret, what evidence they need."

Cassandra: "We ask them for, during the case report every month, we ask them to present a case report or any, and then discuss what, and mostly with the case report, we ask them to pick a case that they handle and then explain and provide the evidence based treatments that we have and explain to us back why. They really are good. That's why we are really impressed with most of the girls."

Alona: "At the end of the 4 weeks, they will have actually a presentation, like 5-10 minutes presentation to present what is the case, what is the evidence that they used, and what is the outcomes, if they have the outcomes. So, you gave activities to the students such as case presentation at the end of the month and an actual crafting of the protocol every week when they meet these patients for the 4 weeks."

Shadowing. Shadowing is one of the most-practiced strategy in clinical education to ensure that students learn optimally from their clinical educators prior to being entrusted with leading a physiotherapy session on their own with supervision.

Fely: "What I would do is maybe, if I was mobilizing maybe a shoulder, I would mobilize start it, and then the student is going to take over now and I want you to tell me if it feels the same, if it feels different. Is she doing it as strongly as I am doing it. Or is she pushing it further than I was doing it. So, we get some good feedback from the patient about how they feel. And usually the patient you know, is very happy to do it."

Alona: "So, the students will start at 8 and finish at 4:30pm, five days week. So, all that, it will be, the student will be assigned with me, like, shadowing me and just and, I will supervise her from day 1 til they finish. She may have some meeting with her supervisor in the college or with our clinical educator. But basically, the student will be assigned

to me as full-time. Actually, for the first maybe week or week and a half, I have to be like comfortable with the student, to know what is her skill and then gradually, I will ask her to try to do the hands-on treatment to the patient and then eventually she will handle the patients with my close supervision. So, I will be with her in the room. But it will be gradually til because the patient sometimes they, we have to take their consent, to make sure they are confident enough.”

Emilia: “I just get them to shadow me. They’ll just get used to the environment and shadow us. After a couple of days of shadowing see what it’s all about and go through their objectives and then we’ll start doing each one will do one presentation, so maybe, professionalism, the next day we might do goal setting, the next day.”

Filomena: “And as we assess the patient, I think the first week, as they are observing, we’re observing them as well.”

Clinical application of evidence. The actual application of suggested assessment or treatment protocols from scientific findings is also an effective strategy used by clinical educators to enhance students’ evidence uptake.

Alona: “So, what they will do, they will pick one case of their 4 weeks. So, they will pick one case, this is from the early beginning and they will treat for multiple sessions. By doing the multiple sessions, they have to give evidence of why they chose this treatment modality or treatment technique, and they have to support it with evidence from the literature.”

Fely: “It will either be me and with the student, but if the student is quite competent and perhaps getting to the end of their placement, then perhaps I would leave the student alone with the patients and I would be outside so that they can come and report intermittently in between and how they are getting on.”

Fely: “So something like, say for instance, lateral hip pain takes a very long time to settle down. So, you’re looking at about 12 weeks or so. So, you read the papers and it tells you that. And then what I will be looking at is when the students educating the patients, are they telling them, you know, I’m not expecting you to be better by next week, this takes a long time to settle down, so I’m looking to see whether that student understood the paper and then relays it in a correct way back to the patient. So, it’s making sure that what they read and actually what they do marry together.”

Cassandra: “At the end of the day, you have to feel and you have to feel the patient, you have to empathize and see, prioritize the need of that patient, you cannot say ‘oh this is evidence-based...’ but you are not at the right timing for that stage of the patient journey. So, you have to be intuitive enough on where in that patient’s journey am I applying this particular evidence-based approach, and I think the experience, I think, the clinical experience itself.”

Mateo: “We’ll have, say again, we’ll review the charts for like maybe 20 to 30 minutes depending on how complex the patients are. And then we’re gonna go to the floors and start our clinical. Do this directly inpatient contact.”

Timetabling. Careful planning and proper timetabling allow for 3 more facilitatory strategies to ensue: (1) students get to follow patient progress, (2) students get to work with different clinical educators, and (3) students get to see a variety of patient cases.

Following the same patient allows them to provide assessment and treatment to the patient, re-assess patient and check for progress. In case if there is no progress or improvement on the part of the patient after undergoing treatment, students can rely on research findings to modify their treatment and see any changes to the patient’s condition.

Luther: "So, it's not that we're with the students all the time but we do and try on a daily basis to workout the timetable to give the students maximum exposure to [post-acute rehabilitation (PAR)] patients so they may be able to follow same patients over the duration of their placement so it gives them... they're able to see the progression then they might be able to."

Filomena: "So, one thing we again do is that during the course of their training here, we ask them to pick up one particular case which really interested them and they have kind of followed it up over the weeks."

Rhada: "We usually do it, because the patients are here for between 30 and 90 days. They can follow one rehab patient for the whole of their placement. So, they can see them 5 days a week, when they are here and get that continuity."

Cassandra: "Yeah. And also they can really see, because before we started for one month, I handled one student with me for the whole month and the other also. But sometimes, we see it that it's good that, actually there's advantages and disadvantages with it because if I have this patient, and they started with it, then they really can have that journey, and they can really see it and plan the whole program for themselves and see, if your treatment is effective and then you can change."

Being able to work with different clinical educators ensures that students get maximum exposure to different treatment techniques, a variety of patient cases and clinical decision-making approaches.

Emilia: "So we take all available therapists and create a timetable. So, they're not with me all the time. They're gonna be with this therapist to see this rehab patient. And then if there's gaps in between, then they come to me so, I'll be their main point of contact."

Luther: “We try, and, it’s not that we’re with the students all the time, it maybe that, another therapist they may be working with and with another therapist try maximize and the student’s exposure to PAR patients.”

Cassandra: “Usually, the first week they are just introduced, or have the orientation for the whole facility. And then the second week we divide it twice, 2 weeks for me and 2 weeks with the other facilitator and then we change load.”

The opportunity to see a variety of patient cases keep students’ inquiry and practice ongoing.

Emilia: “So, they come to us and see our patient and then they have to follow their schedules and go back when they join the next rehab patients and join that session. Although we are taking them, we’re not the only therapists in contact. And then we swap the timetables. So, there’s a different set of patients each week. Because it’s a rehab placement, so we want them to get as many rehab patients as possible and we have a mix of long term ventilated or rehab.”

Rhada: “We timetable the students. We have a timetable of which patients they see, we allocate, we always allocate time to make sure that they have time to do research.”

Cassandra: “If I see my load is redundant, or if I don’t have much, I usually have them exposed to the PAR, because it’s more, you get to have the treatment really. So, if I have less PAR patients, so I put them up to my other colleagues.”

Luther: “The learning option within [our institution], we have long-term ventilated patients and PAR patients, and if this is the students’ neurology placement, we try and give them as much exposure to PAR patients so that’s post-acute rehabilitation patients.”

Revision of basics. Going back to basic topics is also considered as one of the facilitatory techniques that will lead into an evidence-based practice. For clinical educators, a good

background on basic physiotherapy concepts allow for a strong foundation of more advanced physiotherapy techniques. Information from research evidences are deemed incomprehensible without a proper understanding of basic concepts.

Fely: “If you do not know the basic, you cannot build on anything. So, we review the basic anatomy, the basic subjective assessment, objective assessment, physiology, some even pharmacology if it is interfering with our treatment. So, every day we have assignments of ‘can you please review this’ and the following day, we sit together and ‘tell me what did you look for the night before?’. I know that they have it but they have to be emphasized before starting the practice. Because, she cannot, or any student cannot practice without having a solid basic, the basic anatomy of shoulder or basic anatomy of knee. So, I believe that just go back to the basics, and they need a strategy of reviewing the basics, that could be good.”

Mateo: “So, what, specifically here in the UAE, with [the]College, we’ve come to an understanding that sometimes we have to go to the basics, a little bit and the basics would also, sometimes involve evidence-based practice. Okay so, before I maybe, have a day where I can give a complex patient or a complex situation to a student, I might go back to evidence-based practice and then again, go through a couple of articles, go through a couple of books. So that they can understand the theory behind the practice. so, that would be my strategy. If I feel like this theory is still a little bit shaky or that the student is not a hundred percent aware of what’s the purpose of the technique that we want to apply or the test that we want to apply, I would go back to again reviewing that technique and reviewing that study. And then after that, going on direct patient care.”

Fely: “But usually if I have a student with me, what I would do is if we have time while we don’t have a patient, we would be maybe practice something. So, we would say okay

we will do, dermatomes and myotomes today. Or, tomorrow you know, if we get a free slot we might look at practicing reflexes.”

Emilia: “I think it’s usually basic and really, really important. So, professionalism, how to write SOAP notes, how to set SMART goals, and this profession. And then we have a few neuro topics that we just give a little bit of information that we see here commonly like stroke, spine spinal cord injuries, traumatic brain injuries and Parkinson's and M.S.”

Filomena: “Usually, before we take the students, we give them certain areas to read about and... because these are the cases that we mostly see, so we want them... they come to us, they are a little informed about it.”

Skills demonstration. One way to review basic topics is through demonstration. Clinical educators task the students to demonstrate techniques of physiotherapy assessment and treatment. The clinical educator played the role of a patient and the students demonstrated therapeutic management on them.

Alona: “If we don’t have patients, we even have [colleague’s name] as a model and she will practice on me. So, we do have like an extra time for the student.”

Bridgette: “They demonstrate how to do, use special tests, how the treatment and what to do, the splint and everything.”

Fely: “If there’s practical applications, we would perhaps practice. But usually if I have a student with me, what I would do is if we have time while we don’t have a patient, we would be maybe practice something. So, we would say okay we will do, dermatomes and myotomes today. Or, tomorrow you know, if we get a free slot we might look at practicing reflexes, so I give them some plan about what we might do the next day so that they can do a little bit of reading or a little bit of preparation and then we’ll

practice. But mostly if I have a student with me, we would do practical stuff. Because that's where they get their most learning."

Practicing the basics through demonstration makes the students more prepared when the patient comes.

Problem-based learning. For most of the clinical educators, the classic act of asking questions based on patient cases any time of the day is one of the most used facilitatory technique for enhancing evidence-based research among physiotherapy undergraduates.

Emilia does this by asking questions about the case at hand. If the student does not know the answer, she encourages the student to look it up and she gives ample time for the student to come back with the answers. She also checks how sophisticated the search for information done by the student was to ensure that the student relies on credible information only.

Emilia: "Sometimes, you might ask a question and they don't know the answer. So, I encourage them to go and look up and come back and tell me because I don't know they know unless they tell me. Well sometimes, like, like for example, yesterday, when my patients with motor-neuron disease and I asked does she know what it is, so I said will you go and look it up. But I'll ask her today "did you look it up", "tell me what you've read", "where did you get that information"? So, I know what she, did she google or did she look up an article."

Greg on the other hand would usually ask evidence-related questions regarding the technique being done by the student on the spot and the use of modalities.

Greg: "Typically, they might try and do a certain technique and I'll say why are they doing this, what is the evidence for this. And, typically they might say "well, I saw it in my last placement, so I'm doing it now." And I'll say that's fine, but... "have you ever

learned this in the university? Or have you looked into it?” And this is typically around modalities, the use of modalities.”

Filomena: “So, usually when the patient leaves, that is when we discuss it with the student, what was their impression, what was their idea and how I can judge that, whether they have any idea about evidence-based practice, about that practice or not is when they are explaining it to me. How much they are relating to or... because when I see students, I don’t see them telling me “oh, in my experience, this patient would be this”. They would be talking more like “oh what I have read, or what I have learned, or what the evidence says is this”. So, that is how you kind of weigh.”

Fely: “If the student is with me, then what we would do is maybe, we would discuss, perhaps if we have a case that is interesting or maybe a little bit challenging, we would discuss that case and maybe the things that we need to look up or the things that we need to find some more information about. So, I would look at the, being able to, so maybe I would ask them if we had this certain condition, I would say you know “how would you treat them?” and then they might tell me, I said “but how would you know that that’s better than anything else?” or I might say “what about electrotherapy? What evidence do you have that your choice of treatment is better than this choice of treatment?” so we try and get the student to weigh up different kinds of treatments. We would perhaps ask them what paper they have read, or you know where is it that you got this information from. And we see whether they are actually applying what they have read, and they reply in practical terms.”

Rhada: “Because we give them things throughout the day, things they have seen, throughout the day we will ask some questions and expect them the next day to say come and tell us about this. We have to plan their sessions so if they are going to be treating

in a treatment session, they need to come the next day with the evidence of why what they are doing that treatment session that they are going to do.”

Allowing students to lead the session. When clinical educators see the confidence in the student, they usually take a step back and let the student lead the physiotherapy session with their supervision.

Rhada: “By the end, we can step back and watch them lead some sessions with us, under supervision. Uhm, so it is very good for the students. We just want them to be able to demonstrate their understanding of, like the whole process from the assessment, intervention, goal setting to the discharge planning. And use of outcome measures and evidence, so we want them to demonstrate that. And some students have been really impressive, some students, the later, these batches now are much better than before.”

Luther: “They may be able to follow same patients over the duration of their placement so it gives them... they’re able to see the progression then they might be able to help out with the session and be able to lead the session where patients are contented, we are happy too.”

Didactic sessions. To standardize the set of lessons being taught to students every clinical rotation, clinical educators from a rehabilitation centre in Abu Dhabi created presentations regarding select topics.

Emilia: “We have actually, we’ve developed a little bit of a, like a package, or a pathway for us so that we can ensure that the students are getting the most out of their placement. We’ve created, uhm, a few, not lectures but presentation of common topics that we felt we have to go over with every patient that comes. So, we developed into a more of informal but formal presentations.”

The clinical educators' objective was to ensure that each student coming for clinical placement in their institution will have the same set of lessons to aid their clinical experience. Some of the lessons mentioned were basic topics like professionalism, how to write patient goals and documentation.

Clinical educators were also asked to provide the strategies they used to positively enhance students' attitudes, perception and practice towards EBP which included: (1) providing constant motivation, (2) providing prompting and facilitation, (3) setting objectives, (4) providing feedback to the College on their role in preparing students towards EBP, and (5) role modelling an evidence-based physiotherapy practice.

Providing constant motivation. For students who lack the motivation and enthusiasm to integrate evidence with their practice, clinical educators have shared ways on how to do this. A simple suggestion is to constantly encourage the students and provide them with the appropriate feedback.

Emilia: "I think we need to encourage their confidence to tell us to try and show off their knowledge. They might have it, but we don't know whether they have it unless they tell us."

Cassandra: "[During midway feedback], some of them are receptive enough to get [our feedback]. We talk to them and just encourage them to participate more, to participate more and be proactive more and, to show more their hands-on skills."

Reminding students that the profession is a fulfilling one also cultivates motivation.

Mateo: "...that again, it's a profession that they chose from the beginning and that they should feel inspired. They should feel like, that they can make a change. And again, in a health care setting. And it's a growing profession and so, most of our students understand that and they bring enthusiasm on a daily basis. So, I feel like it's important

especially not only getting back to the basics of the theory but also, being able to show them diversity within the team, diversity within the patients that they see.”

Providing prompting or facilitation. Some students require more prompting as compared to their contemporaries, as mentioned by clinical educators in these two citations:

Luther: “Some other students may require more prompting and facilitation for that.”

Rhada: “Sometimes they lack in and sometimes they need a bit more guidance.”

Setting objectives. Goals setting is also seen as a way to enhance students’ positivity towards EBP and clinical placement in general.

Emilia: “When [the students] start, we start by sitting down with them together and then we, I like to get them to give me some objectives.”

Filomena: “For me it is that I always want to start their posting where they give their expectation out of the posting and I give them my expectation out of their posting. And that helps both of us to have a mutual goal and also, as an educator, I want them to kind of take that step forward which I usually tell most of them on their first day that I will not run behind you, but I would really appreciate if you would run behind me, to know or to ask. I will not take a step back and not tell you anything, as long as you’re coming.

Providing feedback to the College. Also, the clinical educators expect more reinforcement of the EBP concept within the College, even before the students arrive for clinical placements.

Filomena: “I think, maybe, I’m not too sure, but maybe, if these expectations are kind of laid in the university before they start their clinical placements, that this is something that they need to do, not because of the center they are going to but for them. Like for them to actually, clear that stage of semester or whatever, so. It’s like an essential thing and not an optional thing.”

Another clinical educator noticed that the students are prepared well enough in the College but needs more facilitation.

Emilia: “I’ve seen that they’re definitely learning like a lot in college. I know that the knowledge should be there because they do this really nicely done. So, now I think, we just need to try and pull it out a little bit more.”

Role modelling. Role modelling the behaviour necessary for an evidence-based practice is another strategy to positively enhance the mindset of students regarding a research-informed physiotherapy practice.

Greg: “We try and practice what we preach as well. So, we try and demonstrate. If I see like a completely new case, and someone’s got a rare nerve palsy, assuming which I haven’t seen in a while, you know, I should be doing my own kind of review of that using credible websites, healthcare resources and then you know, modelling that. So, it’s asking questions, it’s modelling behaviour, and it’s also asking them to apply it in the form of teach-back or case study. We tried to make the cases as low key as possible because it’s more about the content than them feeling like nervous and putting a PowerPoint. It’s not about that.”

Table 4.21 Summary of clinical education strategies used to inculcate EBP among physiotherapy students undergoing advanced clinical placements in Abu Dhabi.

Students’ perspective	Clinical educators’ perspective
(1) case presentation (2) application of evidence to patient cases (3) homework (4) attendance to multidisciplinary meetings	(1) case presentation (2) shadowing (3) clinical application of evidence (4) timetabling to allow student working with different clinical educators, covering similar patient’s progress and exposure to a variety of patient cases (5) revision of basics (6) demonstration (7) problem-based learning (8) allowing students to lead the session (9) didactic sessions

4.5.3 Management support towards an evidence-based practice culture in the clinical placements

The management of all the hospitals and clinics where clinical educators and physiotherapy students involved in this study work, do support an evidence-based culture within their physiotherapy department and at a multi-disciplinary level. The concept of implementing an evidence-based practice is supported by the management to ensure that physiotherapists within each institution are at par and up to date with the current and best physiotherapy practices internationally. The top three ways by which support is given by the management to the staff are: (1) protected time for in-house seminar or training, (2) subsidised attendance to continuing professional development courses, and (3) access to databases which allow for full-text acquisition.

Protected time for in-house seminar or training. The in-house seminar or training, also referred to as in-department training, in-service training or journal club in other institutions, entail an exchange of information and discussion of current trends and best clinical practices among physiotherapists based on clinical practice guidelines they have read or courses they have taken.

Filomena: "We do some in-department training, as I said monthly or bi-monthly sometimes, like each of us will do some CME or course online and then feedback on it to everyone and if anybody is more interested in, then they can go and do that."

Gretha: "We have the in-service that we have for the team, like, latest things that we have picked up or like, latest evidence-based or research that we, we also discuss. Before, lately we are, because we are so, it's not being done. Every week, every month not every week, each team member, we present a, we call it an in-service training so we pick up topic of our choice and then give the evidence-based treatments that we can add into what a case is."

Fely: "Interspersed in the week, we have our weekly team meeting which is mostly case studies or discussions on paper we might have read. Something like that. And then we have a couple of times a month, we might have best practice clinic where we come together to discuss an issue around best practice, and we have a unit-based counsel where we would meet together and talk about things that are going on within our area. We also have a research council which meets, I think it meets once every month and it's usually a lunchtime meeting."

Some in-house seminar or training are done with other professions making it a multi-disciplinary team meeting which shows to students how members of different professions work together for a holistic evidence-based medical care of patients across the disciplines.

Fely: "What we would do is take a paper and we try to make it applicable to a wider range of professions as possible. And then what we would do is we would critique it and we would have the research specialist critique it with us and then we would present it. We would send it out maybe a couple of weeks before the meeting to give the people that are interested a chance to read it and then we come together at the meeting and we discuss why it's a good paper, what are the strengths, what are the weaknesses. And it's a really nice way of learning how to look at different papers so we might choose one that's really statistically challenging, we might choose a qualitative study. You know, we go through all the different kinds, and that's open to anybody in the hospital who wants to come and learn about how to read papers and how to understand them. So, I think I'm going to present one this, next month. And that's a really good way of people getting together who are interested in research."

Bridgette: "Sometimes, we are, every month we are, we have a meeting here, one-hour meeting, 30 minutes. There we will be discussion, another 30 minute we have ah case

presentation if anything is having new knowledge, we are sharing like that. Like demonstration. Every Wednesday, we have, but not only for physiotherapists. It's generalised. Every Wednesday we have a seminar here. From the management. It's all for doctors, physio, dietician, like that. Group. Only sometimes we are getting every Wednesday for physios some topic. Ah yeah, if doctor is having any tips in during the meeting, then he will present that on here to everyone. This is our meeting room. He will, everybody will be here during the meeting time."

The protected hours for in-house seminar or training also run as a structured program delivered by an external body in partnership with the institution.

Cassandra: "We have an in-house Spaulding sem...no not seminar but training. Like an hour or two, every, almost every 2 weeks or so in a month. And so it is from Spaulding rehab from the US, from the medical school. Because we are partners so, they give us an in-house training as well. So, that way also we are being like if our current management are in par with their current management."

Subsidised attendance to continuing professional development courses. Management also supports the clinical educators by sending them to continuing professional development (CPD) or continuing medical education (CME) courses, both online and face-to-face, and conferences with coverage of fees and official leave days.

Greg: "Yeah, we attend the bi-annual Emirates Physio Conference which is pretty good to be fair. I think, a lot of the other courses here are method-based courses which will have varying levels of clinical evidence."

Alona: "We attended courses that is the most "evidenced" and we make sure that it is the most evidence-based practice. They help us actually if we want to go to the course, they help us with the expenses. So, if we want to go to the course and they find that it

related to our practice, they may cover, whether it is here or international. But we have to provide supporting documents for that. Even with the days off, so they can give us also days off as education and which I found out in some other clinics and facilities, they don't give us off, even the days off, they don't consider it as, their matter, because they believe that we are responsible in our own personal development. But here, no, they found that whenever we are just having this personal development, it will be reflected to our practice."

The frequency of attendance to CPD courses paid for by the management differs from one institution to another.

Bridgette: "Here they're promoting us for attending the CME and some workshop. And they are sending us to Dubai and there is every month or like 2 months once, we are going for like seminar and workshop, like that, to gain external knowledge like manipulation, like soft tissue release and some new techniques."

Cassandra: "Most of us also attend CMEs, not just conferences especially for me, I attend on conference when it is free from here, but that I do within a year,"

Though, attendance to CPD courses are not subsidized for physiotherapy students, clinical educators pass on the knowledge and skills they have learned from the courses to their students.

Access to databases which allow for full-text acquisition. Management support is also reflected from the facilities provided to staff that aid in implementing an evidence-based practice such as institutional access to full-text journals.

Rhada: "For us, we have this Elsevier, which is a database, so all the staff have access to it and they could have their login provided by the company, and they can look for journal articles and things like that. The company has highlighted which ones they feel

are the best for the organisation, so it is very easy for the staff and for the students to log on to that, see which ones."

Filomena: "So, we do have certain learning databases as a department, which [the director] has provided for us."

Alona: "We have a website, Lippincott, I think, it is the name of. And we have, it is having the most evidence-based articles. And of course, if we do not have access for that, Google scholar will have some of the evidence-based articles."

Fely: "Well, we have access to the online library. So, if you're looking for a particular paper, you can generally find it there and if you can't, you can request it. And it will be given to you. So that's good."

Mateo: "We have an online library that we can use because we are connected to an American hospital so, we have membership to American Cardiac Association for example. Newsletters, magazines, for example stroke. So, we do have those resources. We have a lot of patient education resources that we can use online as well. I think there's like a kind of a company that's outsourced that provides that expertise. But I would say, I mean with the internet these days, you can access freely everything. But yeah, there's some support from the organization, from our management, and from our seniors to facilitate that information."

In some clinical placements, physiotherapy students are also given access to these databases during the term of their clinical placement.

Mateo: "Their access. I mean, they have the same access to anything that we clinicians have access to, with a couple of exceptions as you can understand. But yeah, they have access to our informatic system called Epic, they have access to database for patient education. For articles, the same way as we have. For the medical library, for

professional development courses online. So, they have almost unrestricted access. As you can imagine we have to limit a couple of things but yeah, they have unrestricted access to most of our again resources that we have in the hospital.

But for those placements that do not provide access, students use what is provided for them by the college.

Greg: "But I think as students, they have more access to this than clinicians because they typically have Athens login. And you know, and library access."

4.5.4 Institutional Policies

Institutional policies affect the culture and implementation of EBP within hospitals and clinics. The specific policies cited by the clinical educators include, in no particular order: (1) the UAE health care system, (2) compliance to accreditation standards, and (3) autonomy of practice.

UAE health care system. Health care system in the UAE allow third party payment of physiotherapy services through health insurance providers. Depending on the health insurance provider, physiotherapy management can be steered towards an evidence-based practice.

Rhada: "We are really big on evidence-based practice here and I think it really works a lot with the, also with the insurance provider. So, the department is very big, and also because we work a lot with the insurance like Daman, they are very up on making sure that we use the best evidence-based practice."

However, treatment coverage of certain health insurance provider compels physiotherapists to provide patient management that may or may not be evidence-based. These health insurance providers cover a limited range of physiotherapy management that put constraints on what a physiotherapist can provide to their patients.

Greg: “The majority of our patients come through their insurance company and the insurance companies don’t necessarily look at evidence-based practice. They look at the cheapest possible way to get, deliver a basic health care. If we’ve got somebody coming through their insurance company, their insurance company are only going to pay for certain types of treatment which we may or not actually want to do.”

This limitation imposed by health insurance coverage could affect the clinical experience of students as well as their future practice. Despite the best efforts of clinical educators to hone the students’ skills towards an evidence-based practice, the system may not allow them to freely apply the techniques and management that will truly be beneficial for the patients.

Greg: “I can say... and no health care system is perfect. But, the insurance system here is not a very pro-evidence based practice. And, that is where myself and my colleagues have difficulties. I think as clinicians, the students will feel this when they graduate, you learn what evidence-based practice is, then you want to try and put it into practice, but maybe the system that you are in doesn’t really facilitate that. If you want to be like true to the system, work in the system, there are certain practices that you want to do but the system won’t let you. I’m sure that’s not just physiotherapy. I’m sure, that’s probably health care in general.”

On the contrary, evidence-based management is not compromised when it comes to private-paying patients.

Greg: “For patients who come to see us and pay cash, we can give them the best pain science talk ever, give them graded exposure, mirror therapy, walk them through a chronic pain plan and they might be really well.”

Compliance to accreditation standards. When hospitals or clinics work towards an accreditation, they are compelled to measure up in par with the accreditation standards. Such is the case with one of the clinical placements which gives big emphasis towards EBP implementation within their institution.

Rhada: “For the department, we have CARF accreditation, which is Commission of Rehab Facilities, Commission of Accreditation of Rehab Facilities, so as part of that, it is a world accreditation for rehab hospitals. And so, to achieve that, we have to demonstrate how we work with the best evidence-based practice. So, for us, it is very important.”

Autonomy of practice. Clinical practitioners and in turn students who are given the freedom to apply their own clinical reasoning and decision making with regard to patient care tend to be more inclined to using research evidence to inform their clinical practice.

Alona: “I have the total autonomy to do whatever I... I will design my treatment plan. And we have a very open talk, we have an open talk with each other because other staff they also have experienced different experiences.”

Cassandra: “I am not being boxed by the doctors or by the physiatrists into ‘this is only what you can do.’ No, we are independent here. Like if we do the assessment, we do that, with my own care plan. And the doctors would give feedback. But the whole care plan, it’s ours. We are not being mandated or being told that this is, no. We plan it the whole journey especially for the post-acute rehab, the whole journey, it’s the therapists’ freedom to whatever you do.”

4.6 Integrated results

The table below shows the integrated results of quantitative and qualitative data from the survey and interviews conducted in this study across the three stages. The integrated results are presented according to the purposes of this research to show a clear picture of how the purposes of the study were achieved.

Table 4.22 Integration of results analysed from quantitative and qualitative findings based on physiotherapy students' and clinical educators' perspectives.

Research purpose	Sources of data	
	Quantitative Survey	Interviews
To investigate the attitudes, practices and perception towards EBP of physiotherapy undergraduates in Abu Dhabi and how one year of advanced clinical placement affect these constructs	<p>Students possess positive attitude towards EBP, practice EBP in clinical placements and are confident in their self-perceived EBP skills.</p> <p>One year of advanced clinical placement did not have a significant change in the results of the baseline and post-ACP survey. A ceiling effect may have been reached during the post-ACP survey hence the lack of significant change in attitudes, practices and perception towards EBP.</p>	<p>Students claimed feeling of improvements in searching evidences and applying them to patient cases with confidence. Overall, students felt positive changes in their use of research findings to inform their clinical practice.</p> <p>Clinical educators describe a student with inclination to EBP based on the following qualities: (1) aware of quality guidelines, (2) able to do an in-depth searching, (3) confident in applying evidence to treatment, (4) able to critique evidence, (5) forthcoming, (6) motivated, (7) open-minded, (8) organised, (9) reflective, (10) willing to learn and (11) being a self-directed learner.</p>
To describe the different enablers and challenges towards EBP implementation during undergraduate clinical practice	<p>Students</p> <p>Students see their clinical educators as a great influence in the development of their EBP skills during advanced clinical placements. Students also perceived that the College has prepared them well to conduct the first three steps of the EBP process with confidence. Having full-text access is very important in acquiring research evidences that can be used for patient care.</p>	<p>Clinical educators</p> <p>Clinical educators emanated expertise in their respective fields of practice based on their years of experience. Moreover, the clinical educators' background in clinical education assisted in inculcating evidence-based physiotherapy practice among the physiotherapy students under their supervision. Also, the clinical educators' inclination to EBP implementation is evident in their use of various sources of evidence.</p>

	<p>For the students, one of the challenges in adopting an evidence-based physiotherapy practice in undergraduate clinical placements is being supervised by a clinical educator who is resistant to change and to implementing patient care using recommendations from research. The lack of facilities such as Wi-Fi connection, a place to sit to do their search, or no access to full text are considered challenges towards a smooth implementation of EBP. Though students are aware that EBP should consider patient preference, some patients prefer to undergo management that they have seen via a simple Google search which yield treatments that may or may not be evidence-based. This defeats the objective of students to provide the best and evidence-based care to the patients. It also does not help if the health insurance providers of the patients do not cover treatment techniques that are evidence-based. Lastly, students find that they lack the necessary time needed to conduct search of evidence and uptake of research whenever they are fully loaded with patients.</p>	<p>Common opinion between the student and clinical educators when it comes to challenges in adopting EBP in clinical placements include the lack of time and substantial caseload leading to lack of time. Other than that, the clinical educators pinpointed on qualities of students that serve as challenges for them in teaching students how to be more EBP-inclined. These qualities include: (1) students' weak basics and lack of depth, (2) students' limited language ability, (3) students' lack of interest, and (4) students finding EBP difficult. As for challenges external to the student and the institution, these include patients' refusal of being managed by a student and cultural barrier particularly pertaining to conservativeness of patients. Case presentation is a challenge to EBP in instances wherein students prioritise it over the actual clinical experience.</p>
<p>To identify activities during clinical placement that enhance EBP implementation among physiotherapy undergraduates, including strategies used by clinical educators in Abu Dhabi</p>	Students	Clinical educators
	<p>For the students, case presentation, direct application of patient care recommendations from research findings to patient cases, completing homework and attendance to multidisciplinary meetings are ways used by their clinical educators that provide venue for them to develop their attitudes, practices and perception towards EBP.</p>	<p>Similar with students' perspective, case presentation and actual application of evidence were education strategies cited by clinical educators that helped in inculcating the EBP process among physiotherapy undergraduates. In addition to this, clinical educators optimally utilised the following clinical education strategies during the advanced clinical placements of the student participants: shadowing, allowing students to work with different clinical educators, letting student follow patient progress, revision of basic physiotherapy concepts, demonstration, problem-based learning, allowing students to lead the physiotherapy session and lastly, the conduct of didactic sessions to provide information.</p>

4.7 Chapter Summary

This chapter presented all aggregated results of the pilot testing done for the EBP² questionnaire, results of the survey research constituting stages 1 and 2 of the study, and results of the interviews with the students and clinical educators undertaken in stage 3 of the study. The next chapter is dedicated to comparing and contrasting the results of this study to findings of previous studies.

CHAPTER FIVE: DISCUSSION AND CONCLUSION

5.1 Introduction

In this chapter, the entirety of the research is presented in five sections. The purpose of the study, specific objectives and research questions are revisited in the ‘Overview of the research’ together with the theoretical frameworks used to guide the research approach and data collection processes. The “Summary of the research findings” highlights the findings that directly answer each of the research questions established in this study. Comparing and contrasting the consistency of findings to local and international research contexts were presented under the section “Discussion and implication of the findings”. Results and analysis of the study are also discussed in conjunction with the theoretical frameworks and previous studies that guided the positioning of this study and are laid out according to the following variables investigated in this study: attitudes, practices, perceptions, factors considered as enablers and challenges towards EBP, clinical education strategies, and institutional policies. Results and analysis were compared to data from studies published within the last decade (2009 to 2019) to maintain relevance and recency of point of comparison. Where studies with similar (or different) findings for a certain construct do not exist, studies published from within two decades ago (1999 to 2008) were searched and cited. A section is dedicated to describing the contributions of this research to the current body of literature. Recommendations for stakeholders (i.e. students, curriculum developers and clinical educators) and for future studies are also described. Lastly, ‘Conclusion’ provides highlights of the chapter.

5.2 Overview of the research

To the knowledge of the author of this study, this is the first study to investigate evidence-based practice in the physiotherapy setting within an undergraduate institution and its clinical affiliates within the emirate of Abu Dhabi, United Arab Emirates. The first purpose of

the study is to investigate the attitudes, practices and perceptions of physiotherapy undergraduate students in Abu Dhabi towards EBP upon entry to advanced clinical placements. It will also examine how one academic year of advanced clinical placement affects these constructs. The second purpose of the study is to describe the different facilitators and barriers towards EBP implementation during undergraduate clinical practice. The third purpose of the study is to identify the clinical education strategies, management support provided and institutional policies in clinical placements that affect EBP implementation among physiotherapy undergraduates. Following are the research questions answered by findings of the study leading to the fulfilment of the research purpose.

Research question 1: What are the attitudes, practices and perceptions of undergraduate physiotherapy students towards evidence-based practice at the start of and after one year of advanced clinical placements?

Research question 2: What are the facilitators and barriers towards an evidence-based practice within the advanced clinical placements?

Research question 3: How do clinical education strategies, management support and institutional policies influence the students' propensity to adopt an evidence-based practice?

The first research question was addressed by stages 1 and 2 of the study which involved the use of the EBP² questionnaire for the baseline survey and post-advanced clinical placement (post-ACP) survey, respectively. The quantitative data gathered from the baseline and post-ACP surveys were triangulated with the qualitative data from the stage 3 of the study which involved the focus group interviews of the physiotherapy students and the key-informant interviews of their clinical educators. A modified theory of planned behaviour (Ajzen 1985, 2002) with EBP in the centre of the variables was the framework used in connecting how

attitudes, practices and perceptions contribute to developing EBP inclination among undergraduate physiotherapy students.

The second and third research questions were answered through findings from stage 3 of the study by aggregating the examples, explanations and insights of physiotherapy students and clinical educators who underwent focus group interviews and key-informant interviews respectively. By being open to the idea that there is no single source of knowledge as seen in the interpretive physiotherapy practice epistemology (Edwards & Richardson 2008), the researcher was able to amass a variety of clinical education strategies that were used to develop positive attitudes, practices and perceptions towards EBP among undergraduate physiotherapy students in a health science education institute in Abu Dhabi. Moreover, by looking at how managers of the clinical placements pay attention and give importance to creating a culture of EBP in the workplace through embedding mechanisms (Schein 2010), the researcher was able to draw ideas on the conduciveness of clinical placements towards developing an EBP inclination among physiotherapy students.

Table 5.1 Summary of stages of data collection linked to research questions, participants, methods, instruments and data analyses.

Stages & processes	Research questions being addressed	Participants (Sample Size)	Data Collection Instruments	Data Analyses
<u>Stage 1:</u> QN (Baseline survey)	RQ 1 What are the attitudes, practices and perceptions of undergraduate physiotherapy students towards evidence-based practice at the start of and after one year of advanced clinical placements?	Convenience sampling of Year 5 physiotherapy students of AY 2018-19 (census of N1=34 with n1 ₁ =28 participated)	Survey: EBP ² Questionnaire	Descriptive statistics
<u>Stage 2:</u> QN (Post-ACP survey)		Same sample from Survey 1 wherein 6 declined participation on survey 1; 2 drop-out on survey 2 (n1 ₂ =26)	Survey: EBP ² Questionnaire	Descriptive statistics Wilcoxon signed-rank test Paired samples t-test

				Effect size
Stage 3: QL (Interviews)	RQ 1 What are the attitudes, practices and perceptions of undergraduate physiotherapy students towards evidence-based practice at the start of and after one year of advanced clinical placements?	Selected physiotherapy students, 3 groups of at least 4 students each (n2=14)	Focus group interview protocol	Thematic analysis
	RQ 2 What are the facilitators and barriers towards an evidence-based practice within the advanced clinical placements? RQ 3 How do clinical education strategies, management support and institutional policies influence the students' propensity to adopt an evidence-based practice?	Clinical educators (n3=12)	Semi-structured interview protocol	

5.3 Summary of the research findings

This section presents a summary of findings of the present study. The summary is presented in relation to each research question to emphasize how the purpose of the study was achieved by fulfilling the underlying aims of each question.

5.3.1 Attitudes, practices and perceptions of undergraduate physiotherapy students towards evidence-based practice—students' and clinical educators' perspectives

In the following subsections, a summary of EBP² domains representing the attitudes, practices and perception of physiotherapy students are presented.

5.3.1.1 Students find EBP relevant to physiotherapy practice

In this study, the attitude of undergraduate students toward EBP was reflected in the Relevance and Sympathy domains of the EBP² questionnaire. Relevance is about the values and importance given by the undergraduate students to EBP while Sympathy estimates how compatible work and EBP are together from the perspective of the students.

Physiotherapy students in Abu Dhabi showed positive attitudes towards adopting EBP. The investigation showed that students were aware of EBP and understood the meaning of it. Students were also aware of EBP as a framework of physiotherapy practice and of current developments regarding evidence-based physiotherapy practice.

Abu Dhabi physiotherapy students also have positive intentions of developing knowledge in EBP, skills in accessing, acquiring and appraising research recommendations, read relevant literature to upgrade their knowledge, and to incorporate best practice recommendations from research findings to improve their physiotherapy practice.

For the students, EBP is necessary for day-to-day physiotherapy practice. There were mixed reasons why students see the necessity of EBP in physiotherapy practice, the most definitive one being that it backs up their choice of patient assessment and treatment protocol considering that they are novice in the clinical practice. Students also saw the need to increase the use of research evidence to inform clinical practice during undergraduate placements and that doing so will require learning and improving requisite skills to better integrate EBP into their clinical practice. Generally speaking, students found that EBP improves quality of clinical practice and helps in clinical decision making.

There was no significant difference noted with how the physiotherapy students saw the relevance of EBP during the earlier days of their advanced clinical placement and after one year of it. There was a negligible increase in Relevance scores from the EBP² questionnaire which was perhaps due to the fact that there were more than 90% of students who agreed that EBP is valuable in clinical practice right from the beginning of their clinical placement.

For the clinical educators, the students signified propensity towards evidence-based practice based on the following qualities and attitudes emanated by the students during clinical placements: (1) willingness to learn, (2) ability to clinically rationalise their treatment option

based on evidence, (3) being able to communicate the findings of the research evidences onto their patients, (4) confidence, (5) the ability to make a clinical decision on their own without relying on being spoon-fed by their clinical educators, (6) being proactive with searching and forthcoming with sharing the information they know during case discussion, (7) highly motivated to learn, (8) open-minded, (9) organised, (10) good sense of professionalism, (11) self-reflective, and (12) possessing a wide understanding of what evidence-based practice is.

According to the clinical educators, not all students manifested the abovementioned qualities altogether. There were few students who were satisfied enough to drift through the 4 or 5 weeks of clinical placement just treating patients, because they were confident that they will pass the placement regardless of any extra effort (i.e. consult research articles to inform their practice) they make. Some students possessed the mindset that as long as they show up every day and do what is needed towards assessing and treating their patients with the supervision of their clinical educators, there was no need to do anything extraordinary anymore unless prompted by their educator (i.e. lack of initiative). And for the clinical educators, they saw this as lack of willingness to learn, lack of motivation, and lack of initiative to inquire. This reflected their attitude towards evidence-based practice and how they did not value the importance of cultivating such skills within the clinical placement environment.

To positively enhance the mindset of students who do not value evidence-based practice as much as their contemporaries, the clinical educators did any of the following strategies to positively influence the students. Reviewing the set of objectives established at the beginning of the clinical placement is one way to keep the student in track. Clinical educators also found that the midway feedback which is done every end of the second week of clinical placement was effective in re-setting expectations with students. More prompting and facilitation were also provided to those who needed it. Mentoring and constant encouragement are also proven

strategies used by some of the clinical educators in order to spark inspiration among the students who lacked motivation and willingness to learn. These clinical educators mentored and encouraged students not only towards the cultivation of evidence-based practice during undergraduate clinical placements but towards growing within the profession and bringing enthusiasm into their practice on a daily basis. Lastly, role-modelling proved to be one of the effective strategies used by clinical educators in positively enhancing students towards evidence-based practice. If the clinical educator and his or her student were about to receive a patient with a rare condition, the clinical educator shows to the student that he or she will prepare for it prior to the patient session by searching and reading about the medical condition and looking up research findings that effectively managed the condition.

5.3.1.2 Students have divided opinion on the compatibility of EBP and physiotherapy practice

With regard to how students see the compatibility of the demand of undergraduate clinical placement and application of evidence-based practice, there was also negligible change and no significant difference from the beginning and after one year of advanced clinical placements. However, physiotherapy students were divided in their opinions on the degree of compatibility between EBP and undergraduate clinical practice. For most of the students, EBP does not consider the limitations of day to day clinical practice to fully accommodate EBP. The participants were divided in seeing that there is no point in adopting EBP because there is not enough available strong research evidences to support the various cases they have handled. With regard to patients' preferences in physiotherapy management, students find EBP to be considerate of this. Between relying on research evidences and field experience in clinical decision making, students were equally divided into relying on research, field experience and a mixed of both. In terms of patient management, field experience emerged to be a more reliable

way over EBP. Minority of the students found the practicality in critically appraising evidence and in seeking relevant evidence while in the field of practice.

With only one student disagreeing to the usefulness of literature and research findings in her day-to-day clinical placement, it was probed and was made apparent during the focus group interview that the response depends on the clinical placement where the students went through. The value put on by the students towards the use of EBP into clinical practice is highly dependent on the value that the working environment puts into it. This marries with the input from clinical educators who work in institutions that identified themselves as being big implementers of EBP for reasons such as: (1) more treatment efficiency, meaning no time is wasted on providing service that are ineffective; (2) demand of the insurance provider, meaning third-party payers are more likely to pay up for the services that showed quantitative and qualitative results on the lives of their insured clients; and last but not the least (3) for accreditation purposes, meaning the standards of hospital services are monitored by accrediting bodies and one of the requirements is evidence-based practice. When the institution and the system value a culture that allows clinicians to embody an evidence-oriented practice, the students also benefit from the EBP-enhancement provided by the EBP culture within the institution. Hence, attitude towards EBP is positively enhanced.

5.3.1.3 Students understand few EBP-related terminology

One year of advanced clinical placements also did not make any significant changes in the understanding of terminology related to EBP despite having noticeable changes in the quantity of students who self-reported as having some understanding on select terms at the beginning of their advanced clinical placements and later on claimed as having understood the terms quite well. Two of the most well-understood terms that students can explain well to others were systematic review and randomised controlled trial. This is perhaps due to the early usage

of these two terms way back in their taught modules in the college. The terms systematic reviews and randomised controlled trials were introduced as early as their year 2 into the physiotherapy program, during the very first Integrated Evidence-Based Practice module they took. As students progressed into the program, they got to learn the levels of evidence and how each type of research differs from each other.

The lesser known terms were relative risk, absolute risk, odds ratio, number needed to treat, confidence interval, publication bias, forest plot, intention to treat, statistical significance, minimum clinically worthwhile effect, clinical importance, dichotomous outcomes, continuous outcomes and treatment effect size. The limited understanding of terms related to EBP and research may not directly affect physiotherapy students' clinical experience and treatment of patients on a day-to-day basis during clinical placements. However, it genuinely affects students' understanding of research findings upon which the assessment and treatment of patients are based on. With limited understanding of these terms, there might be a compromise in the quality of chosen evidence despite students claiming that they are confident in critically appraising a paper.

5.3.1.4 Students implement EBP in their advanced clinical placements

The frequency of formulating a focused clinical question (Ask), tracking down evidence relevant to the formulated question (Acquire), searching electronic databases for research evidences that can answer the formulated question (Acquire) and applying the recommendations based on evidence (Apply) were done between daily to weekly among most of the student participants. The critical appraisal of evidence (Appraise) was the least frequently done among the first 4 step of the EBP process with students claiming doing it at most on a weekly basis. None did appraise evidence on a daily basis. However, it is the only area of

practices towards EBP that had a significant change after one-year of advanced clinical placements.

Students also noted that they read published research reports on a daily to weekly basis. Moreover, the students experienced both informal and formal discussion or sharing of findings from research evidences on a daily to weekly basis as well.

One mismatch between what the students perceive and what clinical educators see among students in the use of evidence to inform their clinical practice is that students claim that it is easy for them to execute searching and choosing of quality evidence while their clinical educators see otherwise. For clinical educators, they saw that students have difficulty searching and critically appraising research evidences.

In the interview with the students, they had a very good recollection of the platforms for searching peer-reviewed journal articles and clinical practice guidelines such as PEDro, PubMed, Cochrane and Google Scholar. These similar databases and search engines were used during their management of hypothetical cases in case-based learning sessions in the College. Most of the students claimed that they continued using the same platforms during their clinical placements using the College's institutional access for full-text articles. However, some clinical educators noted that their expectations were not met at the end of the clinical placements when they expected students to bring more depth into their search, meaning to acquire research evidences beyond just a simple Google search.

Physiotherapy students shared their experiences pertaining to evidence-based practice in both government and private clinical placements. It cannot be generalised that one sector provides a more EBP-inclined clinical placement than the other as some government hospitals are big on EBP and some are not. The same can be said with private healthcare institutions: some clinics inculcate the importance of evidence in their practice while some do not. What

became apparent in this study is that the institutions who are considered as being in the competitive healthcare market do not sacrifice revenue-generating time to support a more evidence-oriented physiotherapy practice (e.g. time for searching and reading evidences, time for clinical educators to discuss evidence with physiotherapy students to support their patient management). For institutions within the competitive healthcare market, the objective is to accommodate patients every given interval of time and to achieve patient quota for each physiotherapist within each day. Some students have experienced treating up to 15 patients per day without much educational interaction with their clinical educator throughout the day. In lieu of not having time to discuss cases within the clinical placement premises, the students would usually receive a homework from their clinical educators, specifically how to treat a condition which they need to search, study overnight and be prepared for discussion with their clinical educator the next day. According to some students, the opportunity to discuss the homework may or may not happen depending on the caseload the next day. In such situations, the student drifts through the 4 or 5 weeks of clinical placement treating patients, day in and day out, without integrating evidence into their practice.

5.3.1.5 Students are confident in implementing EBP

The self-perceived abilities of undergraduate students reflected their confidence in their capacity to apply evidence into practice at the beginning of their advanced clinical placement and after one year. For the EBP² baseline and post-ACP surveys, there was no significant difference between the results meaning they were as confident at the beginning of their advanced clinical placement as they were one year after in using research evidences to inform their clinical practice.

Majority of the students declared confidence in the following EBP-related abilities: research skills, computer skills, identifying gaps in knowledge, converting information into a

focused answerable question, awareness of major sources and types of information, searching electronic databases, acquiring copies of research articles, determining the usefulness of evidence into clinical practice and applying the information into real cases. Only the students' research skills and computer skills showed significant change from early in the advanced clinical placement to after one year.

Students did not feel as confident in the following skills as compared to the aforementioned abilities: critical appraisal of evidence and ability to determine validity of the study. Upon further dissection of the students' perception towards evidence-based practice during the focus group interviews, students emphasised that they perceived being more confident on the first three steps of Sackett's (1996) 5A model of EBP (Ask, Acquire and Appraise) than the latter two steps (Apply and Assess). This aligns with their responses in the EBP² questionnaire. Perhaps, it was mainly due to the fact that during their taught modules specifically the Integrated Evidence-Based Practice modules, they formulated focused questions to address hypothetical cases during case-based learning sessions, searched databases for research articles that would answer their focused question and appraised the quality of the article the same way that they did it for real patients during their clinical placements.

What was different was the application of the evidence to actual patients and assessing the effectiveness of that application to the management of the patient. The "Apply" and "Assess" parts of the 5A model onto hypothetical paper-based cases had no carryover to the "Apply" and "Assess" to real patients hence, these are the two steps in EBP identified by the students that needs more execution to develop more confidence.

Through the observation of clinical educators, it was noted that students who were nearing the end of their clinical placements exuded more confidence in using research evidences during patient assessment and treatment as compared to when they were starting their advanced

clinical placements. This quality of better perception and confidence was made more evident by the students' initiative in volunteering information or presenting research articles that they have read to their clinical educators prior to patient session.

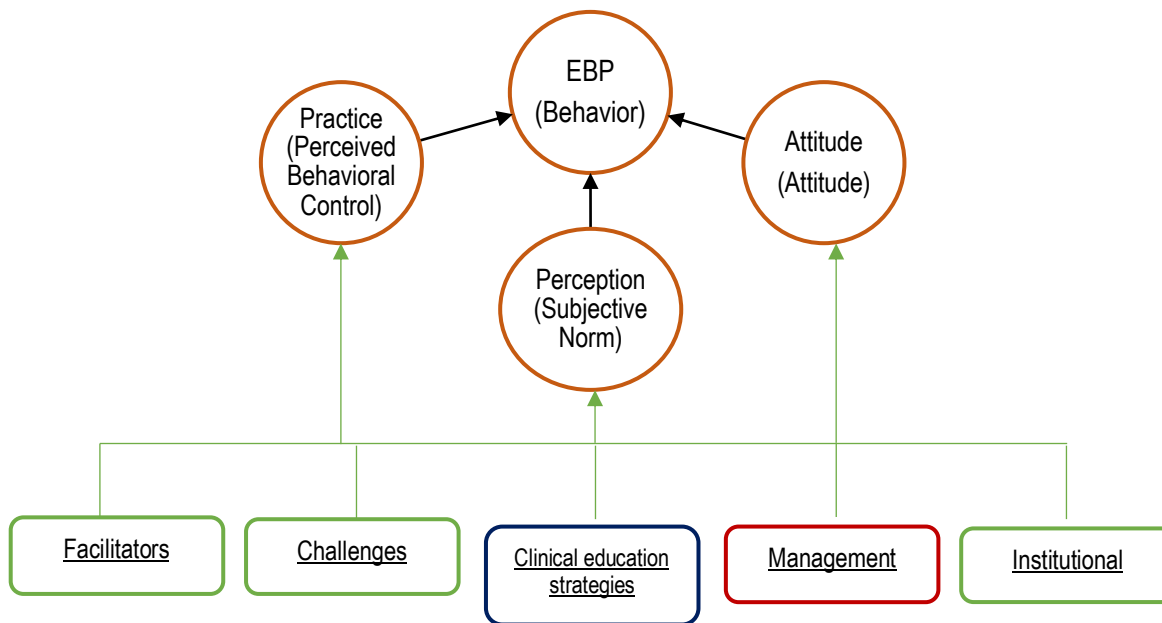


Figure 5.1 Framework of this study based on three separate theoretical frameworks put together to achieve the purpose of the study.

Legend:

Orange circles – based on theory of planned behaviour (Ajzen 1985, 2002); addresses research question 1

Blue box – guided by the physiotherapy practice epistemology (Edwards & Richardson 2008); addresses research question 3

Red box – probed through the 6 primary embedding mechanisms (Schein 2010); addresses research question 3

Green boxes – address research questions 2 and 3

All in all, perceived level of confidence, positive attitude and positive environmental factors allowing practices all contribute to developing an evidence-based practice.

5.3.2 Factors that enhanced evidence-based practice among physiotherapy students

Though quantitative data did not reflect a significant change in the students' attitude, practices and perception towards evidence-based practice after one year of advanced clinical placements, students felt and saw the changes in themselves that cannot be expressed in a scale

of 1 to 5. Changes noted were ease in searching databases, understanding empirical research findings and critical appraisal of papers. The factors that enhanced the students' ability or propensity towards being an evidence-based practitioner can be grouped into three main categories: (1) the clinical educators' profile and EBP inclination, (2) the students' readiness in applying EBP in clinical placements based on how the College prepared them, and (3) full-text access.

5.3.2.1 Clinical educators' EBP profile

In the interview with the students, it was evident that the students look up to their clinical educators as role models in clinical practice. This means that the amount of importance shown by the clinical educators towards EBP is imbibed by the students. For clinical educators who value and implement EBP in everyday clinical practice, students give the same amount of value, thrive to be better in applying EBP during their clinical rotations and hope to do the same once they go for their own clinical practice as graduates.

One common quality found among the clinical educators is that they are all having at least a decade of clinical practice and they are all practicing in specialised units, not as a rotating physiotherapist. Another facilitatory quality of clinical educators is to have had previous experience of training physiotherapy students in the past, in a one-to-one manner. This way, a clinical educator can focus on the learning needs of the individual student under their supervision. The learning objectives are established at the beginning of each student's clinical rotation and are tailored towards the need of each student.

Clinical educators who constantly keep themselves informed and updated of the best practice, latest research findings and clinical practice guidelines are the ones with the strongest influence on physiotherapy students towards evidence-based practice. They practice what they preach. Clinical educators cited different sources of evidence and one of the most common

sources are clinical practice guidelines and systematic reviews from online databases. Attendance to continuing professional education courses is also one of the most reliable ways on keeping up to date with findings of empirical research studies. Clinical expertise of colleagues is another source of evidence by the clinical educators. Discussing evidence during protected meeting hours (weekly, bi-weekly or monthly) and seeking clinical expertise from a colleague who is more experienced in treating certain medical conditions is a frequent scenario within the hospitals and clinics regardless of number of years of experience by each individual educator. With the further advancement of technology and the availability of massive information provided through the web, social media platforms and podcasts have been considered a wealthy source of evidence-based practice information as well.

5.3.2.2 Students' readiness in applying EBP in clinical placements based on how the College prepared them

Survey results showed some students responded not having undertaken formal EBP education despite passing 5 taught modules of Integrated Evidence Based Practice as part of their curriculum. During focus group interviews, most students recalled the courses easily upon hearing their classmates describe the tasks they did back in the day while taking each of the 5 Integrated Evidence Based Practice courses. Students claimed that these courses really helped them a lot in knowing how to create a focused research question, search online databases for research articles, and understand the differences between and uses of RCTs, systematic reviews and clinical practice guidelines. They also liked the sequence of how they were introduced to RCTs, systematic reviews and clinical practice guidelines. Students also appreciated the learning strategy of case-based learning used in the EBP courses they took as it simulated having to think for how to provide care to a hypothetical case.

Despite having a belief that they were prepared well by the EBP courses they took in the College, nothing stopped the students in providing recommendations on how to make the experience and EBP readiness better for future students. Students agreed that experiencing clinical placements early into the curriculum is imperative for a better understanding and implementation of EBP. Connecting and clarifying the future objective of learning EBP and providing examples while still in the College are also some ways to make the habit stick according to students.

5.3.2.3 Full-text access

Providing access to full-text research evidences will definitely allow more uptake of research. More research uptake leads to more information for ones' clinical practice. In this study, students tended to read more research articles when they were readily available especially in clinical placements that provided full-text access or access to a collection of studies available in the office computers of their clinical educators. Whenever in clinical placements that do not provide full-text journal access, students revert back to their College library account and use it to acquire full-text versions of studies that will help them answer their focused clinical question.

5.3.3 Challenges towards developing EBP application and skills in clinical placements

Students stated four challenges in developing pre-requisite skills necessary for implementing EBP in clinical placements. These are: (1) the clinical educators' resistance to EBP, (2) the lack of facilities, (3) patients and health insurance providers, and (4) limited time and substantial caseloads. Two of these four challenges (i.e. patients and limited time) were common with the 8 challenges named by the clinical educators: (1) students' weak basics and lack of depth, (2) patients' refusal of being managed by a student, (3) students' limited language ability, (4) students' lack of interest, (5) students finding EBP difficult, (6) cultural barrier, (7)

substantial caseload and limited time, and (8) prioritising case presentation over clinical experience.

The barriers faced in adopting an evidence-based physiotherapy practice can be grouped into either internal or external to the student. Internal challenges were (1) students' weak basics and lack of depth, (2) students' limited language ability, (3) students' lack of interest, (4) students finding EBP difficult, and (5) students prioritising case presentation over clinical experience. External challenges were (1) clinical educators' resistance to EBP, (2) lack of facilities, (3) patients and health insurance providers, (4) patients' refusal of being managed by a student, (5) cultural barrier, and (6) limited time and substantial caseload. Grouping the challenges this way can make it easier to see the implications of the findings in this study and make writing recommendations more specific to the target stakeholder.

5.3.3.1 Challenges inherent to the students

Weak basics and lack of depth. Despite students receiving comprehensive EBP content covering the 5-step process of EBP within the taught modules of the curriculum, and having been provided numerous opportunities to simulate knowledge derived from the EBP modules through application to hypothetical cases (i.e. case-based learning), still it was noted that one of the most notable barriers from the viewpoint of students is how late the clinical placements are taken within the entire BPT program. The placement of clinical courses at the latter part of the curriculum poses a big chronological gap between the taught modules and the actual application of knowledge and skills onto real patients. Therefore, this contributes to a weak carry-over of what was learned regarding EBP in the college to the clinical placements. Students learn research concepts and begin to develop their research literacy five semesters earlier than their first clinical placement. That is a 2.5-year gap between learning and real-world application.

On the other hand, some students deliberately see each taught module separately from the rest of the program, which obviously leads to a hard time connecting the concepts that they learned from case-based learning in the earlier years of the physiotherapy program to their actual patients in the clinical placement later on in the program. They have a mindset of not carrying their learning from previous courses to succeeding courses hence, when they arrive to clinical placements, it shows as if very little was taught to the students in order to prepare them for clinical practice. They think that once a module is finished, there is no use of the knowledge and skills learned from that module to modules in the higher levels of the program. Hence, the resistance to flawlessly apply their EBP knowledge and skills as soon as clinical placement starts.

Limited language ability. Considering that physiotherapy students in Abu Dhabi are not native English speakers and that most of the research articles are published in English, it could be difficult for some students to gain a quick understanding of the articles that they are appraising. Having limited English vocabulary can slow the process of appraising the evidence especially when understanding the context is difficult.

Lack of interest. Some students choose to just drift through the 4- or 5-weeks bout of clinical placement without putting extra effort into their performance in undergraduate clinical practice or taking initiative to enhance their clinical performance. This is seen as lack of interest from the perspective of clinical educators and whenever a student lacks interest, it becomes a bit challenging for clinical educators to inculcate EBP and other skills to the student.

Finding EBP difficult. Different clinical educators saw that different students have difficulty executing at least one of the 5 steps of EBP process, including conducting a search. It was noted that in searching, some students go for the first research article they find without going through

the search results to acquire the most appropriate article to answer their clinical question. Others found it difficult to apply evidence onto actual patient cases. It was also noted that the perceived difficulty could be coming from the demands of the outcome of a good case presentation at the end of each clinical rotation.

Prioritising case presentation over clinical experience. Expectation mismatch is another challenge that each clinical educator had to overcome while training a physiotherapy student. As objectives are laid down and discussed during the first day of clinical placement, expectations have to be reiterated time and time again to ensure that students are working on the most important aspects of their clinical placements. One best example of expectation mismatch is the amount of value dedicated by students on preparing for their case studies which is a 10-minute presentation at the end of each 4 or 5-week clinical rotation. Some students think that the case study is the culminating and most important event of their clinical placement, making them forget to focus on the clinical experience that each patient encounter brings.

5.3.3.2 Challenges external to the students

Clinical educators' resistance to EBP. Students noticed that some clinical educators are set in their ways, relying on their long number of years of experience and known treatment methods to provide patient care without updating themselves of current evidences in physiotherapy practice. If the clinical educator does not implement EBP, he or she would most likely not require the students to execute this skill, hence, serving as a challenge towards building EBP inclination.

Lack of facilities. The availability of Wi-Fi or internet connection within the facility and the provision of a space for students to sit and search have been identified as two of the most basic things that could either facilitate or hinder the development of an evidence-based practice

during clinical placements. Nowadays, access to research evidences are as easy as having access online. However, not all full-text articles are free to access. But being provided with an institutional access for full-text journals is not one of the things that students consider as a sole facilitator or barrier since they always use the access provided by the College. When internet connection or Wi-Fi access is not provided in the hospitals or clinics, students use their mobile phones to connect online. However, this can only be done during breaks as use of mobile phones are not allowed during clinical duty hours. On the other hand, if internet connection is provided, the issue would be if there is a computer terminal to use and search for what is being inquired by the clinical educator. The clinical educators are kind enough to let students use their own computer terminals that are dedicated for patient documentation. On the other hand, students would always have a reservation to ask for, sit and use their clinical educators' computer. And even if students bring their own laptops, not all clinical placements would provide a space where they can do the search in the middle of the day.

Patients and their health insurance providers. Some patients prefer undergoing physiotherapy treatment that they have seen in Google, which may or may not be evidence-based or appropriate for their condition. This limits the students' capacity to carry out the intended evidence-based management for the patient especially if the patient refuses to do so.

Another possible limiting factor towards EBP is the treatment coverage of health insurance companies. If the list of treatment covered are not up-to-date, not based on research evidences and are always inclined to just save money, then the patient who cannot pay from their own pockets will not benefit from the range of evidence-based treatments that are more beneficial and less time and resource consuming. This is the usual case in hospitals or clinics

identified as being in the competitive healthcare market where the number of patients per day is more important than the quality of treatment because the former is income generating.

Patients' refusal to be managed by a student. Another challenge is getting the students exposed to as many cases as possible. Patients' lack of willingness to be treated by students is usually the main culprit as students are seen by some patients as inexperienced.

Cultural barrier. Another reason is the cultural restriction that male patients be treated by male physiotherapists only and female patients be managed by female physiotherapists only. Though it is not a mandatory rule within hospitals and clinics, it is still the patient's discretion to allow students to treat them or not, and no imposition from the clinical educators nor the physiotherapy students usually happen.

Limited time and substantial caseload. Given that EBP is a process that involves 5 skilful steps, it is apparent that its integration to clinical practice requires a great deal of time. Lack of time is also one of the perceived barriers both by the clinical educators and students towards EBP. On the other hand, students have emphasised the creativity of the clinical educators when it comes to finding time for activities that facilitate the execution of the EBP steps especially during clinic hours wherein patients do not show up. These hours were redirected for searching the literature, discussing of cases and evidences.

Overbooking of patients is also another challenge stemming from the system. Overbooking happens because of the system allowing patients to walk-in to the hospital or clinics for outpatient treatment without a prior schedule, particularly in the outpatient setting. This leads to having 3 or more patients coming to each clinical educator-student tandem per any given time. And when this happens, there would be not enough time to plan proper patient care or discuss the case after the session. Those instantaneous inquiry-based sessions between

the clinical educator and the physiotherapy student prompt the students towards critical thinking and leads them to search for answers that they do not know of at the moment. An overburdening caseload is a hindrance to a rich problem-based learning that clinical educators facilitate within the clinical placements to foster their students' clinical experience.

It was noted in this study that students saw more flexibility in time within the in-patient setting as compared to the out-patient setting. Hence, more time was allocated for searching and learning what the evidence says, which facilitated the likelihood of applying what was learned from the evidences upon patient contact.

5.3.4 Clinical education strategies and institutional policies influencing EBP inclination among undergraduate physiotherapy students in Abu Dhabi

This subsection summarizes the various clinical education strategies used by clinical educators towards embedding EBP skills to physiotherapy students. Moreover, this section presents a summary of the institutions policies that may have directly or indirectly affected EBP inclination of students.

5.3.4.1 Clinical education strategies utilized by clinical educators

Combining statements from both students and clinical educators, it was found that several clinical education strategies were utilised by physiotherapy clinical educators in Abu Dhabi to train students how to implement EBP. These are: (1) case presentation, (2) shadowing, (3) clinical application of evidence, (4) timetabling to allow student working with different clinical educators, covering similar patient's progress and exposure to a variety of patient cases, (5) revision of basics, (5) skills demonstration, (6) problem-based learning, (7) allowing students to lead the session, (8) didactic sessions, (9) homework, and (10) attendance to multidisciplinary meetings.

Case presentation. One uniform strategy that all hospitals and clinics used in enhancing EBP among students is case presentation. Students were tasked to pick one particular case within the month of clinical rotation, treat the patient for sessions within the 4 or 5 weeks of clinical placement, follow patient progress and discuss to all clinical educators and colleagues the assessment, management and outcome measures used backed up by evidence. This strategy was deemed very useful by the clinical educators in seeing the capacity of the students to use and apply research into their practice, especially for those students who were not forthcoming enough to volunteer information to their clinical educators. This strategy emphasised all steps of the EBP process as students create their own focused question (ask) based on the case at hand, then searches or “acquires” the necessary references, “appraises” the quality of papers on their own, “applies” the treatment to the patient. During the case presentation itself, questions arising from the audience would usually include how effective the treatment was when applied by the student to the patient and this is “assess” or the last step of the EBP process.

Shadowing. Regardless of how many previous clinical placements the students have had prior to each rotation, the clinical educators’ first strategy into immersing the students during the first one or two weeks of their clinical placement is through shadowing. Through shadowing, the students get to see their clinical educators in their element of assessing and treating patients. This phase ensures that students know what is expected of them when it comes to patient management. Through shadowing, the students can observe their clinical educators’ individual approach to patient management. This opportunity widens their perspective on how they approach their future patients once they get full autonomy to practice as clinicians. Within the “shadowing phase” of the student with her clinical educator, the student also learns the things a clinician does outside patient management time such as consulting evidences and reading clinical guidelines.

Clinical application of evidence. Once a clinical educator sees that a student is competent enough to treat the patient on their own, they stand aside to observe the student manage the patient on her own. They look for signs of EBP application such as when students translate the research findings they have consulted and apply the evidence-based treatment onto the patient or deliver the informative education to the patient. Clinical educators make sure that what the students read and what they do are the same. This is a very hands-on strategy as research findings are applied directly to the patient during clinical placement.

Timetabling. Following a patient's progress, exposure to a variety of patient cases and being supervised by different clinical educators are three more common strategies that facilitate EBP skills. All three strategies are dependent on careful planning and proper timetabling of clinical hours of the physiotherapy students.

Following a patient's progress for at least 4 weeks gives a student an opportunity to look into the effectivity of the treatment being given to the patient. Consulting research evidences and guidelines, student can therefore suggest continuing the same treatment if progress is consistent or modify the treatment protocol if the patient's progress is halted. This gives them an insight on how clinical decisions are made based on the recommendations in research studies.

Exposure to a variety of patient cases, common or rare ones, compels students to do more research and reading. Nobody expects them to know all available physiotherapy treatment protocols but being exposed to multiple old or new cases keeps them up to their toes. This again pushes them to be proactive in search, understanding and application of effective treatment plans based on findings in research.

Exposing students to different clinical educators equals exposing them to different clinical decision-making approaches. At the clinical placement stage, they have met a variety

of clinical educators with different number of years of work experience and different personalities, who uses different sources of evidence and different methods in keeping themselves up to date with evidence. It is imperative for students to see this much variety so that they can choose for themselves the most fitting approach based on what they have seen worked among their clinical educators.

Revision of basics. Though clinical placement is not really the best place to teach the basic concepts to the students, clinical educators still found going back to basics as one of the most essential components of progressing the students' capacity to grasp more complex ideas, such as evidence-based practice. If presented with an option, clinical educators would not want to utilise this strategy so as not to waste time dwelling on the basics and be able to move onto advanced concepts right into the start of clinical placement. However, with the much latter placement of clinical courses in the curriculum away from the earlier taught modules, students are bound to forget foundational knowledge and skills once they reach clinical placements. Although this gap is being addressed by the College through a semester of revision of earlier contents prior to clinical placement, the strategy proved to be weak for some students as clinical educators had to reiterate the basics during clinical placements. To the knowledge of the author of the present study, none of the previous studies mentioned revision of basic physiotherapy topics as a strategy to improve EBP-related knowledge and skills.

Skills demonstration. Revising basic concepts is done by way of demonstration. During “no show” of patients, the time is used to revise manual techniques or exercises in preparation for the next patient. This routine emphasises the “apply” part of EBP. The practice demonstration of therapeutic intervention is being done by the physiotherapy student onto the clinical educator or a colleague who acts as a patient for the time being.

Problem-based learning. Another use of “no show” time is by discussing challenging cases and addressing clinical educators’ queries through problem-based learning. This is also done any time of the day whenever time allows. This somewhat resembles the case presentation done at the end of each clinical rotation but in an informal and on-the-spot question-and-answer kind of manner. When a student does not know the answer, the clinical educator asks the student to look it up and to come back with the answer the next time they are free to discuss, either within the same day or the next clinical day. Clinical educators ensure to ask and note the sources of information where the students gather their answer to make the students reflect on the depth of their search and the quality of the paper from which they are basing their answers on. This emphasises the “Acquire” and “Appraise” of the EBP steps.

Homework. Students are sometimes given work to accomplish after clinical hours. These could range from revising basic topics (as above) and looking up answers in preparation for case discussions with their clinical educators.

Allowing students to lead the session. Leading a session wherein the students take over the complete patient session while the clinical educator takes a step back just for supervision, is another facilitatory strategy used to enhance the “Apply” part of the EBP process. In this strategy, the physiotherapy student does all the treatment techniques that she has learned from the evidences read and the practice demonstrations done with the clinical educators prior to the patient session. Leading the session is further encouraged among patients whom students can follow progress for 4 to 5 weeks of clinical placement. One of these patients becomes the focus of the student’s case presentation at the end of the clinical rotation. By leading the sessions with this patient, the student can suggest to her clinical educator some modifications of treatment, if

needed, based on evidence. By experiencing how to apply a treatment protocol based on evidence, the student experiences first-hand the Apply step of the EBP process.

Didactic sessions. One of the strategies gathered in the findings of this study is the conduct of didactic sessions done by the clinical educators for the students. This strategy allows for standardisation of clinical experience that clinical educators put forth to ensure that all students going through clinical placement have a standard set of lessons. This provides opportunity for all areas of clinical practice to be experienced by the students.

Attendance to multidisciplinary meetings. Requiring students to be part of multidisciplinary discussions provides a bigger picture of the role of physiotherapy to students. It also enhances students' enthusiasm towards EBP especially when they are allowed to contribute to the care plan of the patient. Being asked by doctors for their inputs that will complement the doctor or surgeons' clinical decision facilitates students' reliance on research evidences to be able to provide a rationale of their choice of treatment strategy.

5.3.4.2 Management support

The results of the present study with regard to management support was analysed and understood using six primary embedding mechanisms (Schein 2010), as follows.

Managers pay attention to, measure and control EBP on a regular basis. The management of the hospitals and clinics where the clinical educators are employed provided their support in creating an EBP culture within each institution through various avenues, as explained further in section below in "Leaders allocate resources".

Managers react to critical incidents involving use (or non-use) of EBP. In implementing EBP within an institution, perhaps the most critical incident that can be considered is non-

compliance. Within the hospitals and clinics where the clinical educators in the present study are currently employed, non-compliance is not necessarily punished or strictly monitored. Some institutions have placed strategies to prevent this from happening such as peer evaluation and annual performance appraisals. These strategies serve as deterrent to non-compliance in implementing EBP.

Managers allocate resources. When lack of time is often viewed as a barrier towards EBP, time becomes an invaluable resource. Among the workplaces of the clinical educators involved in this study, the most notable support came in the form of protected hours for in-house seminar or training, which involved sharing of research updates pertaining to patient assessment and treatment, sharing of knowledge and skills gained from courses taken by any of the staff or course delivery of invited speakers external to the institution. During these protected hours for in-house training, all staff are encouraged to join hence, it is a time during the entire week (or month, depending on frequency of meeting) wherein no patients are scheduled. It is blocked off for the sole purpose of having all staff gather to discuss best practices and a time to meet with other allied health professionals whom they work with hand-in-hand for the holistic management of patients. Physiotherapy students are mandated to join the in-house training as well. This exposes them to multi-disciplinary meetings and widens their perspective on different approaches to positively enhance their EBP.

With regard to in-house meetings, journal club hours were also conducted by clinical educators together with other allied health professionals in some hospitals and clinics in Abu Dhabi. Journal club hours involves a research council and allied health staff of a hospital to gather, discuss and critique a pre-selected article read by members prior to the meeting. Critiquing involves looking at recommended interventions, statistical analyses applied in the study and/or the rigour of research methods used in the study.

In addition to time being an invaluable resource towards implementing EBP, physiotherapy managers become highly commendable when they consider lowering the caseload and increasing the administrative hours of physiotherapists who have clinical educator duties in addition to patient care.

Supporting the attendance of employees to continuing professional development courses by way of subsidizing their course fees and allowing official leave days is another method on how hospital and clinic management provide support towards the EBP enhancement of their staff. However, in the present study, this support is only available to employees and not for physiotherapy students undertaking clinical placements. Physiotherapy students still do benefit from these through the passing of knowledge and skills of their clinical educators onto them.

Providing institutional access to full-text journal databases is also another way that management support the cultivation of EBP culture within their institution. Students were given full access same as their clinical educator in hospitals and clinics that do have institutional access, though this was not the case in all of the private hospitals and clinics where students went for clinical placements.

Managers are role models, teachers and coaches towards EBP. This embedding mechanism is mostly seen from the departmental level managers from whom physiotherapists and clinical educators have more direct contact with as compared to hospital managers. While it is expected that managers become models, teachers and coaches of EBP for their staff, the present study saw that clinical educators do not limit mentors among their managers only. Physiotherapy clinical educators viewed everyone within the department as mentors and models with regard

to EBP, owing to the amount of knowledge and skills they learn from one another during both formal and informal collegiate discourses.

Managers do not allocate rewards and status. Workplace managers of clinical educators in this study do not allocate status and rewards for those who integrate research findings into their clinical practice. However, implementation is commended during review of key performance indicators and annual performance appraisals.

Managers recruit and select new physiotherapists with EBP knowledge and skills. Managers of hospitals and clinics in Abu Dhabi do pay attention to EBP skills when interviewing prospective new employees.

5.3.4.3 Institutional Policies towards EBP

Institutional policies enhancing EBP implementation within hospitals and clinics include (1) the UAE health care system, (2) compliance to accreditation standards and (3) autonomy of practice.

UAE health care system. With the UAE health care system allowing third-party payment (health insurance providers) of physiotherapy services, patient care can be driven towards an evidence-based management. However, this is still depending on the demands of the health insurance provider and the breadth of management protocols they are willing to pay for.

Compliance to accreditation standards. To ensure that a certain hospital or clinic keeps their accreditation status from select regulatory bodies, the whole institution is compelled to keeping the highest of standards of practice. According to clinical educators, accrediting bodies emphasise the need for EBP implementation within health care institutions.

Autonomy of practice. Having the autonomy to apply a care plan that is tailor fit to each individual patient gives an opportunity to clinicians and students alike to rely on proven assessment and treatment strategies based on research evidences.

5.4 Discussion

This section presents a discussion subsection wherein findings of the current study has been compared and contrasted with results of previous studies. A subsection dealing with the methodological and practical implications of the study is presented afterwards.

Findings of this study were compared and contrasted with the findings of studies conducted in different countries, context, and professions, published within the past decades, and with both professionals and/or students as participants.

5.4.1 Attitudes, practices and perception towards EBP

After undergoing a year of advanced clinical placements, students in the current study declared positive attitudes towards EBP, with daily to weekly implementation of it in their clinical placements and with good confidence towards the first 3 steps of the EBP process (i.e. Ask, Acquire, Appraise). The same results in self-perceived abilities were found among newly-graduate physiotherapists who were followed from the end of their final year and into their first and second year in the workforce (McEvoy et al. 2011) and among students who were evaluated from the time they took their first research course until 12 months after their graduation (Connolly, Lupinnaci & Bush 2001). In McEvoy et al.'s (2011) study, it is important to note that though there were negligible change in confidence from final year of undergraduate to first year in the workforce, the follow-up measure showed better confidence scores after being in the workforce for the second year. This implies that the one-year timeframe separation between the pre-test and post-test may not have been enough to show any significant change in

perception, which could also be similar to the results of Sabus' (2008) study with only a three-month gap between the first survey and the follow-up survey.

Physiotherapy students in Norway also showed similar perceived confidence when searching for evidence (Olsen et al. 2013). In a systematic review conducted by Condon et al. (2016), it was found that physiotherapists possessed confidence in the 'ask' step of the EBP process by translating patient problems into a focused research question.

In Connolly et al.'s (2001) study, it was concluded that professional physiotherapist students' self-perceived abilities in reading and applying findings of research studies onto clinical practice increased after one-year post-graduation.

Students in the current study showed positive attitudes towards adopting EBP, showing the same findings of positive attitude as physiotherapists in Iceland (Arnadottir & Gudjonsdottir 2016), students in Norway (Olsen et al. 2013), students in Maharashtra, India (Shaikh & Gad 2017), and physiotherapists in USA (Fruth 2010; Schreiber et al. 2009).

Students of the present study saw the necessity of EBP in day-to-day physiotherapy practice which was also similar from findings of previous studies (Ramírez-Vélez et al. 2015; Yahui & Swaminathan). Similarly, physiotherapists from Sweden agreed that EBP is necessary to practice (Bernhardsson et al. 2014). Allied health professionals (i.e. dieticians, occupational therapists and physiotherapists) of a Swedish university hospital also exhibited positive attitudes towards EBP necessary for clinical decision-making (Heiwe et al. 2011).

In earlier studies, EBP was implemented for various reasons including increasing quality of patient care (Ramírez-Vélez et al. 2015; Yahui & Swaminathan 2017) and using research findings as confirmation or assurance that the treatment done was appropriate (Condon et al. 2016). Published research findings were also used as basis for treatment to fulfil the expectations of patients and their relatives (Snoljung, Mattsson & Gustafsson 2014).

In a study involving Swedish physiotherapists, willingness and interest to have research evidences as basis of patient care are qualities considered to propel EBP implementation (Snöljung, Mattsson & Gustafsson 2014). In the same study, sense of autonomy and confidence in their treatment is boosted among Swedish physiotherapists owing to the knowledge that their choice of treatment is supported by evidence.

In the present study, two of the most well-understood terms that students can explain well to others were systematic review and randomised controlled trial. This is opposite to the findings in a survey done among physiotherapy students in Maharashtra, India wherein very few students can understand and explain the words meta-analysis and randomized controlled trials (RCT) (Shaikh & Gad 2017).

Similarly, a previous study done in Brazil showed that the least understood terms among physiotherapists also included publication bias, confidence interval, and odds ratio. However, meta-analysis is one of the least understood terms, while absolute risk and relative risk were fully understood terms (Ramirez-Velez et al. 2015), showing contrasting results with the current study.

A study involving Malaysian physiotherapists had similar findings stating that if EBP is perceived as time-consuming, management sees it as a deterrent to cost-effective time towards patient care (Yahui & Swaminathan 2017). Which is why in most previous studies, lack of time proved to be the most commonly cited barrier towards EBP (Fruth et al. 2009; Nilsagard & Lohse 2010; Heiwe et al. 2011; Gorgon et al. 2012; Cimoli 2012; Snöljung, Mattsson & Gustafsson 2014; Bernhardsson et al. 2014; Diermayr et al. 2015; Perraton et al. 2016; Wanjiru, Kabara & Milimo 2016; Tadyanemhandu et al. 2016; Shaikh & Gad 2017; Yahui & Swaminathan 2017; Quartey & Kwakye 2018). With the amount of time needed to search, acquire studies, appraise (Iles & Davidson 2006) and critically think (Dannapfel,

Peolsson & Nilsen 2013) on what protocol to apply to patients, a back-to-back full schedule will not facilitate the aforementioned skills (Schreiber, Downey & Traister 2009).

All in all, perceived level of confidence, positive attitude and positive environmental factors all contribute to developing an evidence-based practice. This result was further confounded by a study involving paediatric physiotherapists who exhibited positive attitude towards EBP but was not able to put it into practice due to lack of confidence in searching (Schreiber 2007).

5.4.2 Facilitative factors in implementing EBP in clinical placements

One emergent theme from a study involving physiotherapy students in Norway indicated that students do not develop the propensity towards EBP when they lack the role models to guide them in adopting it, thus putting clinical educators in a crucial position to influence students' inclination towards EBP (Olsen et al. 2013). Hence, similar to the results of the current study, if a clinical educator implements EBP, the student under his or her supervision imbibes the same practice. A supervisor's EBP inclination facilitates EBP engagement among subordinates (Skinner et al. 2014; Nilsagard & Lohse 2010).

In the current study, clinical educator's career profile and EBP inclination is considered facilitatory towards EBP among undergraduate physiotherapy students in Abu Dhabi. A previous study reveals that professional experience of 1 to 5 years was found to be associated with more positive attitudes towards EBP (Arnadottir & Gudjonsdottir 2016). The years of working experience was also positively associated with formal training in EBP among Ghanaian physiotherapists (Quartey & Kwakye 2018). Another study showed that highly experienced physiotherapists reported higher self-rating of their skills, higher frequency of searching databases and better understanding of EBP vocabulary compared to novice practitioners (Iles & Davidson 2006). A study involving mental health therapists in Hawaii also

showed that the therapist's years of clinical training was significantly related to self-reported implementation of EBP (Okamura 2016). On the other hand, another study found that older physiotherapists tend to show less propensity to EBP due to limitation in knowledge and skills in accessing scientific literature owing to the fact that older physiotherapy curriculum did not use to advocate EBP knowledge and skills before (Bridges, Bierema & Valentine 2007).

As for sources of evidence utilised by physiotherapy clinicians who are also physiotherapy clinical educators in the current study, research studies such as clinical practice guidelines sourced through online databases is the most commonly used avenue of acquiring evidence. In a study by Bernhardsson et al. (2014) involving physiotherapists in Iceland, participants agree on the importance of clinical practice guidelines for providing best possible care to patients. In Sweden, clinical guidelines are the most commonly sought source of information for clinical practice (Heiwe et al. 2011). In another study done in Adelaide, Australia, clinical practice guidelines, systematic reviews and randomised controlled trials were nominated as main sources of evidence by undergraduate respondents, with addition of case studies (Perraton et al. 2016a).

The clinical educators of the current study also keep themselves updated to best practices through attendance to continuing professional education courses. Findings of a systematic review supports the notion that workshops regarding EBP can enhance knowledge and skills (Dizon, Grimmer-Somers & Kumar 2012). A 6-month interactive and clinically integrated training program provided to clinical educators in Norway proved to be effective in impacting and increasing EBP knowledge, skills, beliefs and behaviour (Olsen et al. 2013). A theory-informed instructor's development workshop was well-received among orthopaedic manual physiotherapy instructors in Canada (Levesque & Yeung 2015). Attendance to

conference and external meetings among physiotherapists in Norway is believed to develop competence and commitment towards EBP (Dannapfel, Peolsson & Nilsen 2013).

Previous studies also proved the importance of formally or informally sharing bits of evidence-based information among colleagues. In a study by Dannapfel, Peolsson and Nilsen (2013), physiotherapists benefit from ‘collegiate discourses’, whether informally through day to day discussions with colleagues, or formally through meetings. Moreover, a systematic review found that physiotherapists and nurses alike rely significantly on colleagues as sources of knowledge (Scurlock-Evans, Upton & Upton 2014). In a study by Arnadottir & Gudjonsdottir (2016), there is an association between the attitudes towards EBP and the practice environment, and it was found out that individuals working in a group of at least 11 physiotherapists were more positive towards EBP than those who work in small clinics due to peer support, human resources, and the opportunity to converse with colleagues. In Ghana, it was noted that lack of collegial support and isolation from peers inhibit EBP among physiotherapists. Moreover, lack of encouragement and support from the institution which consequently leads to lack of protected time and inadequate resources all lead to challenges in implementing EBP particularly in physiotherapy treatment delivery for stroke survivors in Ghana (Quartey & Kwakye 2018).

5.4.3 Barriers towards developing EBP application and skills in clinical placements

Cultural background has been cited by some clinical educators in the present study as challenging in terms of students’ conservative nature and shyness which mask their proactiveness in volunteering information when needed. The recognition of the clinical educators to the shy nature of the students reflects cultural sensitivity from the part of the clinical educator (Papadopoulos 2006). Another cited challenge is the students’ weak English abilities which the clinical educators attributed to English as the students’ secondary language.

Though language was not commonly cited as a big barrier in the present study, this aligns with a previous study wherein physiotherapy clinicians in Brazil cited that the language of research publication is one of their biggest barriers (Silva, Costa & Costa 2015). Published scientific studies are hard to understand. Belgian physiotherapists do believe that having it published in the local language may lower the perceived barrier (Karin et al. 2009).

Other than language, a previous study conducted in Brazil had shown a variety of barriers internal to the individual and these include lack of research skills, lack of understanding statistical analysis and inability to apply treatment based on research findings to patients (Ramírez-Vélez et al. 2015).

Knowledge in evidence-based practice, positive attitudes and fewer self-perceived barriers towards research uptake were found to be positively associated with the level of academic preparation that an individual received (Dannapfel, Peolsson & Nilsen 2013). In the current study, students believed that if they were placed in the clinics early into the curriculum, they would have had a better grasp of EBP. This was similar to the findings of a study in India wherein a desk review of 13 undergraduate and 11 post-graduate physiotherapy programs showed lack of systematic approach and a disconnect between the EBP-related content of the curriculum with clinical education (Panhale, Bellare & Jiandani 2017). Students in Adelaide, South Australia further supports the importance of clinical placements as it impacted a greater understanding and appreciation towards EBP when applied to their patients, as compared to learning EBP lectures and practical sessions in the earlier years of the physiotherapy program (McEvoy, Lewis & Luker 2018).

Clinical educators in the present study noticed a degree of weakness in basic concepts among some of the physiotherapy students. In a study involving physiotherapy students from Adelaide, South Australia, students expressed the minimal carry-over of knowledge learned

from first and second year and the inability to retain it for long-term use, stating that most of the things in the earlier years of the program was absorbed through rote learning and simply forgotten after having achieved a good mark in the taught modules (McEvoy, Lewis & Luker 2018). In a study in South Africa involving students in the final year, which is similar to the level of students in the present study, even though students were aware of EBP concepts and were prepared for it during their taught modules prior to clinical placement, they were still unable to implement EBP during undergraduate clinical practice due to reliance on clinical educators' choice of treatment and self-perceived lack of competence (Hess & Frantz 2016). In another study conducted in Cape Town, South Africa with undergraduate physiotherapy, occupational therapy, human nutrition and speech, language and hearing therapy students, participants had a feeling that they are not fully-equipped in implementing an evidence-based clinical decision-making due to inadequate clinical integration of the research and EBP-related modules taught to the students (Schoonees, Rohwer & Young 2017).

Clinical educators of the present study stated that some students gave way more importance to preparing for the case presentation than to the actual handling of patients. This is opposite from what students in Norway exhibited as they gave more importance to clinical experience than the EBP process in order to gain more practical and hands-on experience instead of searching for articles (Olsen et al. 2013).

Yahui and Swaminathan (2017) found out among Malaysian physiotherapists that high workload is a disadvantage to consulting published evidences. A similar finding was indicated by a study in Iceland (Arnadottir & Gudjonsdottir 2016) saying that there is an association between working in a private outpatient setting and negative attitudes toward EBP. Students of the current study stated the same scenario in their clinical placements. On the other hand, this finding is opposite to Iles and Davidson's (2006) findings that the type of facility is not

associated with frequency of performing EBP-related skills and tasks. Same is true with and Arnadottir and Gudjonsdottir's (2016) findings that the type of facility is not significantly associated with positive or negative attitude towards EBP.

Restricted access to evidence is considered by many as one of the inhibitory factors for implementing EBP (Silva, Costa & Costa 2015; Perraton et al. 2016; Snoljung, Mattsson & Gustafsson 2014). On the other hand, Malaysian physiotherapists do not consider access to search engines as a barrier, but information technology support should be there (Yahui & Swaminathan 2017).

The EBP processes require a substantial amount of time and knowledge to execute efficiently, thereby posing a more than reasonable demand from practitioner's everyday practice (Heiwe et al. 2011). Based on many previous studies, lack of time is considered to be the main barrier towards a research-informed practice. In the past decade, studies conducted in Sweden (Bernhardsson et al. 2014; Snöljung, Mattsson & Gustafsson 2014), Ghana (Quartey & Kwakye 2018), Malaysia (Yahui & Swaminathan 2017), Adelaide, Australia (Perraton et al. 2016), Colombia (Ramírez-Vélez et al. 2015), and USA (Fruth et al. 2010) all agree that lack of time is a barrier towards EBP integration with physiotherapy practice. Evidence-based practice requires time to: (1) keep ones' practice updated, (2) search and access evidence, and (3) understand the evidence (Iles & Davidson 2006). The skills set involves research literacy skills such as searching and appraising research studies (Iles & Davidson 2006) and critical thinking (Dannapfel, Peolsson & Nilsen 2013). The lack of this set of skills required to access and interpret research articles served as an impediment to EBP which is compounded by the lack of support from the administration whose emphasis is on workload productivity rather than participation in research activities (Schreiber, Downey & Traister 2009). Nilsagard and Lohse (2010) also noted lack of knowledge, lack of interest by superior towards EBP and lack of

technical equipment as barriers. For physiotherapy clinicians in Brazil, the most frequently cited barriers include (1) difficulty in obtaining full-text papers, (2) the possible higher cost of adopting EBP, and (3) the language of research publication (Silva, Costa & Costa 2015). Self-interest, colleague's interest and the fact that EBP does not inflict any disagreement between patients and caregivers are considered as enablers (Nilsagard and Lohse 2010).

Less than half of the student participants of the present study responded positively regarding the compatibility of EBP and physiotherapy practice. This scenario further exhibits that there is an evident struggle in managing time needed for usual day-to-day physiotherapy practice and time required to execute the 5-step process of EBP (Dannapfel & Nilsen 2016).

5.4.4 Education strategies towards EBP

Shadowing was one of the strategies used to positively enhance students' propensity to EBP in the present study. One theory of learning in particular that supports this finding is Vygotsky's (1978, cited in Loftus & Higgs 2005) zone of proximal development. It highlights the vital position of mentors and supervisors in the learning experience of students, in creating a scaffolded learning, and in achieving higher order thinking skills and competencies (Loftus & Higgs 2005). Hence, shadowing other professions is also a good source of interdisciplinary learning (Delany & Bragge 2009).

In the present study, students were exposed to the works of different clinical educators within the same organisation and across different ones. The role of clinical educators is to impart knowledge and augment skills among students in a strategic and logical manner (Delany & Bragge 2009) hence being able to work with different clinical educators allow students to receive a wider breadth of knowledge and skills than they would if they were only assigned to one clinical educator.

In this study, role-playing was one of the strategies employed in clinical education to revise basic concepts of patient handling and to prepare students to apply techniques to patients. Role-playing activity was also used as a knowledge translation tool for EBP in the Netherlands (Maas et al. 2015; Van Dulmen et al. 2014; Bekkering et al. 2005). Discussion and feedback for corrections were given on the spot for improvement of handling and execution of the technique. Discussion & providing feedback were knowledge translation tool as well in earlier studies (Tilson et al. 2014; Olsen et al. 2015; Van Dulmen et al. 2014; Dizon et al. 2014).

A systematic review involving EBP-related studies from 1990 to 2013 found that physiotherapists access research evidences outside working hours instead (Condon et al. 2016) which proves that accessing literature outside clinical placements the way students do is not uncommon.

In the past decade, didactic sessions were also noted as a well-utilised strategy in earlier studies such as one in the Philippines (Dizon et al. 2014), in Sweden (Bernhardsson et al. 2014), in Norway (Olsen et al. 2015), and the USA (Tilson et al. 2014).

Setting clinical learning outcomes or simply setting and reviewing objectives is one of the key practical strategies to facilitate a more student-centric approach to clinical education (Delany & Bragge 2009).

Providing feedback was also identified as an effective knowledge translation tool in previous studies (Tilson et al. 2014; Olsen et al. 2015; Van Dulmen et al. 2014; Dizon et al. 2014). In a previously published systematic review regarding ‘knowledge translation’ interventions used to improve behaviour change and compliance towards research evidence uptake, strategies used similar to the present study were didactic sessions, discussion (informal and formal case discourse), feedback (midway feedback), reminders (through reiteration of clinical objectives), role-playing (clinical educator acts as a patient), and peer assessment

(clinical educator assesses physiotherapy student). In addition to the interventions listed were ones that were not cited in the present study which include, interactive sessions, use of printed materials, online support and opinion leaders (Stander, Grimmer & Brink 2018).

In a study about athletic trainers, the perceived strategies to enhance use of EBP were different from the findings of the present study. Welch et al. (2014) found 6 strategies to assist athletic trainers in using research to inform their practice: (1) provision of more sources of information, (2) provision of processed information to minimise time barrier needed to go through mounds of available literature, (3) offering of focused workshop, (4) peer discussion and mentorship, (5) repetition and exposure, and (6) professional responsibility that is acknowledged within education and clinical practice (Welch et al. 2014).

Outcome of transitioning towards EBP among physiotherapists who received real-time workshop and training may be influenced by many factors. These factors include the medical community, public, colleagues, administrators and health insurance companies. Effective transition to EBP requires motivation to change among physiotherapists and an effective way to reach out to all stakeholders that are directly involved in providing support towards this paradigm shift in clinical practice (Taylor 2015). An editorial piece by McLean and Durando (2018) cited three helpful tips to access evidence in a time- and resource-efficient manner. The first strategy described is to be notified regularly of updates from high-quality peer-reviewed journals. This way, the practitioner saves time by not actively searching for new evidences, instead a notification is pushed to their nominated electronic mail accounts through RSS feed. The second strategy is to find reliable sources of synthesised body of knowledge such as clinical practice guidelines and systematic reviews. The National Guideline Clearinghouse, Physiotherapy Evidence Database, Physiopedia and Turning Research into Practice or TRiP are some of the suggested trustworthy sources according to the article. The third strategy is to

procure a full-text copy of the articles relevant to the practitioner. This is the part where practitioners are encouraged to appraise the research to see if the interventions can be applied to their clinical practice (McLean and Durando 2018).

All in all, the strategies presented that proved to be effective in positively impacting the attitude, practices and perception of students toward EBP utilise the concept of learning by doing according to context, the situation at hand, and with real-time interaction with people within the clinical placement itself, which are the very characteristics of experiential learning. In this strategy, experiencing is central to the learning process of the student (Kolb 2005).

5.4.5 Management support towards EBP implementation

Lack of managerial support was seen in a recent study in Australia and was deemed as one of the biggest barriers towards EBP implementation within the institution (Perraton et al. 2016). Managers attending research events is seen as positive indicator of having a research culture within an organisation (Skinner et al. 2014).

In the current study, one of the resources allocated by managers of hospitals and clinics is protected hours for in-house meeting which is also used for EBP-relevant information exchange. Students are part of this. This allows students' gradual participation and inclusion from periphery into the core of the team, which was similar to what Lave and Wenger (2007) pointed out in their study.

The management of hospitals included in the present study also provides EBP support by way of providing time for journal clubs. In a research conducted in Australia exploring the effect of journal club towards research uptake, it was found that being part of a structured journal club [i.e. iCAHE (International Centre for Allied Health Evidence)] improved EBP knowledge and skills of allied health practitioners (Lizarondo et al. 2012).

This kind of management support shows the opposite of what was found in Yahui & Swaminathan's (2017) study involving Malaysian physiotherapists wherein it was noted that lack of encouragement and support from an organisational perspective deter EBP implementation.

Providing training opportunities within the organisation enhances research capacity (Skinner et al. 2014). In a systematic review conducted by Dizon, Grimmer-Somers & Kumar (2012), it has been known that undergoing workshops enhances EBP knowledge and skills. Attendance to continuing education workshop is one of the strategies to improve EBP skills (Schreiber et al. 2009). In Dannapfel and Nilsen's (2016) interview with physiotherapists in Sweden, budget allocated for training programs relating to EBP seemed insufficient to develop an EBP culture within the workplaces.

In a study involving Swedish physiotherapists, it was stated that even if access to scientific journals and full-text research articles is not given by the workplace management, this should not be seen as a deterrent towards implementing EBP as it is a common belief that prioritising EBP is not the responsibility of anyone but the physiotherapists himself or herself (Snöljung, Mattsson & Gustafsson 2014).

With regard to role modelling EBP, another study featuring Swedish physiotherapists found that individuals usually consult their colleagues for second opinion regarding physiotherapy intervention to which their colleagues are more familiar with. Moreover, they added that working collaboratively with colleagues who has research background or those with further degrees such as PhD facilitates EBP (Dannapfel, Peolsson & Nilsen 2013). In another study in Sweden focusing on leadership roles and its association to creating an EBP culture, physiotherapy leaders took their role seriously to mentor their subordinates in various EBP-related activities (Dannapfel & Nilsen 2016).

In Schein's (2010) embedding mechanisms, examples of rewards are salary increase, special status, and study leave days. None of these were mentioned by clinical educators in the present study. However, the deed was recognised through annual staff performance appraisal. According to Skinner et al. (2014), celebrating research achievements within the department is a positive indicator of having a research culture.

Lastly, the current study found that recruitment of EBP-inclined physiotherapists is practiced by managers. This is similar with Dannapfel & Nilsen's (2016) study that involved physiotherapy leaders in care units in Sweden.

5.4.6 Institutional policies

In a qualitative study involving physiotherapists in Belgium, one obstacle to implementing an evidence-based physiotherapy practice is the health care system itself, specifically the 'political position' of physiotherapists when it comes to being autonomous in practice. In line with physiotherapists being less dominant in the health care system as compared to physicians, the health insurance system continues to not consider the capacity of physiotherapists to give substantial and meaningful evidence-based advices in their own field of practice (Karin et al. 2009).

In the current study, clinical educators recognize their autonomous practice as an EBP facilitator. Opposite findings were found in a study in Belgium where physiotherapists do not possess autonomy of practice, they are bound to implement the physician's treatment prescription without deviating from it. Physiotherapists do not have the freedom to clinically reason and decide for the best treatment for the patient, but instead are left with no option but to apply the "vague and old-fashioned" (Karin et al. 2009, p. 481) treatment prescribed by the physician.

5.5 Implications of the Study

The findings from the analysis of results of this study provides response to the research questions established at the beginning of the study. This in turn fulfils the overall purpose of the research which is to investigate the undergraduate physiotherapy students' attitudes, practices and perceptions towards EBP and whether these changed after undergoing one academic year of advanced clinical placements.

5.5.1 Methodological implications

Findings from the quantitative data gathering did not reflect any significant changes in the attitudes, practices and perceptions towards EBP after one academic year of advanced clinical placements. On the other hand, students claimed in the focus group interview that they did improve in their EBP skills particularly the execution of the first 3 steps of the EBP process. Clinical educators also supported this claim by agreeing that they have seen massive improvements in some students who really performed well during undergraduate clinical practice. This shows that with regard to methodological considerations, the mixed research methods proved to be the most appropriate approach to answer the questions of this research. Findings from interview with the students and clinical educators gave a rich perspective of the constructs within this study, providing a much clearer picture than what a survey alone could have done.

5.5.2 Practical implications

This study has shown that developing positive attitudes, inclination to practice, and improving confidence towards EBP implementation among undergraduate physiotherapy students undergoing clinical education is multi-dimensional and influenced by multiple factors.

The results of the study showed that students are well aware of the concept of evidence-based practice. However, the concept of EBP remains abstract while undertaking the taught

modules in the College and becomes clearer only when faced with real patients in clinical placements.

It has been found that one of the core facilitators of students' inclination to EBP is their clinical educators' stance towards EBP. A clinical educators' stance towards EBP could enable or be a challenge towards students' development of their own EBP inclination. With clinical educators being the nearest in proximity to undergraduate physiotherapy students during clinical placements, seeing their practice influences the practice adopted by students during clinical training. It is important to consider that only in the clinical placements can there be a hands-on implementation of EBP and even though certain hospitals or clinics are not big implementers of EBP, the clinical educator is completely in control of the students' exposure to an evidence-based physiotherapy practice by giving enough opportunity to the students to execute each step of the EBP process.

Another core facilitator is the students' readiness in implementing EBP during undergraduate clinical placements and this is all based on how well the College has prepared them during their taught modules. The amount of preparation provided by the College to the students for 2.5 academic years prior to going to clinical placements should be substantial enough to have a carry-over towards application of evidence to real-life patient cases. In this study, it was evident that a minimum number of students had forgotten ever undergoing formal EBP education (i.e. had forgotten that they took 5 courses of Integrated Evidence Based Practice). Moreover, there are students from one of the two campuses who recommended having the EBP instructors to give them an example of how to do a case-based learning that was used as learning strategy for the Integrated Evidence Based Courses. Also, from within the same campus, some students asked that the purpose of the case-based learning integrated with evidence be explained to them clearly at the beginning of the modules so they would understand

that it is connected to their future clinical practice. These issues of lack of orientation and the need for a sample case-based learning approaches were not existing in the other campus who runs exactly the same curriculum and content of Integrated Evidence Based Practice. This implies the need to consider the College instructors' perspective for future studies to acquire a bigger picture of how some students are more ready towards EBP than others.

Despite having provided an integrated curriculum, some students kept seeing and treating each course as separate courses instead of one integrated curriculum from beginning to end. This could perhaps be the reason why there is minimum carry over of learned knowledge and skills from taught modules to undergraduate clinical practice. For the students, it may seem that passing each course is the goal, hence integration of learning and practice takes a rough start during clinical placement courses. According to clinical educators, students who were nearing the end of their clinical placements were deemed more versed and skilful in executing the EBP process. Students also mentioned that only during clinical placements did they have a clearer idea of what EBP is for. Considering this, another possible reason for a slow progress in EBP integration to patient cases is the fact that students have learned the EBP mechanics starting from 2.5 years prior to the start of their first clinical placement. This implies that a more suitable placement of clinical courses into the curriculum is needed in order to achieve a better integration of knowledge and skills in EBP and any physiotherapy concept for that matter.

Last from the core facilitators is full-text access to journal articles. A boundless access to full-text research article is believed to facilitate research uptake as compared to being required to pay for each article needed by the student. Pre-requisites to such access were also noted such as internet connection, a space to sit and search during days in the clinics, and students' computer skills.

Challenges towards EBP implementation in undergraduate clinical practice were categorised into factors internal and external to the students to allow creation of specific recommendations targeted to specific stakeholders. From challenges internal to students, weak basics was one of the noted challenges. With weak background knowledge, the clinical educator spends more time revising foundational physiotherapy concepts to the student instead of using this time building higher order thinking skills such as EBP integration to clinical practice. Limited language ability was also noted as a challenge. To use research to inform physiotherapy practice, one has to learn a new set of language (i.e. research and statistics) to be able to execute the EBP process and interpret findings from research evidences. Clinical educators found it hard to speak medical and research jargons when students do not have a wide English and academic vocabulary. Lack of interest, finding EBP as difficult and prioritising case presentation over clinical experience are other challenges perceived by the clinical educators in inculcating EBP to students. Lack of interest could stem from finding the concept of EBP difficult or from thinking that it is not important in practice. Prioritising case presentation preparation over actual clinical experience could be due to a misunderstanding from the part of the students that giving an impressive case presentation at the end of the clinical rotation is the ultimate measurement of their capabilities in undergraduate clinical practice.

With clinical education strategies, this study showed that there are multiple ways on how clinical educators embed EBP practice into students' undergraduate clinical experience. And what is good is that one strategy is not superior in efficacy to another and each strategy can be used on its own or in conjunction with different ones. The variety of clinical education strategies noted in this study pre-empted the possible differences in learning strategies of students. With a multitude of education strategies used by the clinical educators, it was made

sure that regardless of the learning style of the student, they can benefit from improving their EBP implementation from one way or the other.

With regard to management support towards EBP implementation in hospitals and clinics, it was found that different management provide different forms of support to clinical educators. Though the support is mainly directed to clinical educators only, students benefit indirectly by being under the tutelage of their clinical educators. Just as how students imbibe the practices shown by their clinical educators, the clinical educators in turn give importance to practice skills being emphasised by the management at the workplace. Hence, a supportive management towards EBP develops EBP inclined clinical educators which in turn develops EBP inclined physiotherapy students. The same is true with institutional policies. Healthcare system allowing third-party payors who base their treatment coverage on evidence-based health care management to pay for patients' physiotherapy treatment facilitates implementation of evidence-based physiotherapy management, as no improvement of condition from the part of the patient may mean no payment coverage from the health insurance provider. Of course, the opposite occurs with health insurance providers who opt to cover for what is cheap management rather than what is effective and evidence-based physiotherapy treatment.

Having to comply with accreditation standards also pushes hospitals and clinics to keep up to date and evidence-based with their patient care plan. Lastly, autonomy of practice opens up freedom to consult evidences, clinical expertise and patient preference.

5.6 Contribution of the research

5.6.1 Contribution to Literature

This research adds to the body of literature regarding evidence-based physiotherapy practice development among undergraduate students. The students' EBP profile during undergraduate clinical practice including their attitudes, frequency of EBP implementation,

depth of understanding and level of confidence were initially presented quantitatively, but the qualitative dimension of the study substantiated the students' EBP profile in an in-depth manner including what factors effected positive attitudes, good practice, the contribution of clinical educators, and the indirect involvement of management and institutional policies towards students' EBP propensity.

Through the discussion, this study was able to compare and contrast EBP implementation across various contexts such as EBP among undergraduate students, EBP among clinical educators and EBP in an Arab healthcare setting. This study fills the gap of lack of studies related to EBP in physiotherapy conducted within United Arab Emirates, and adds to studies within the Gulf Region.

5.6.2 Contribution to Theory

This study combined the theory of planned behaviour (Ajzen 1985, 2002), the physiotherapy practice interpretive epistemology (Edwards & Richardson 2008) and primary mechanisms used to embed culture in an institution (Schein 2010) into one framework, all towards the purpose of describing the constructs (i.e. attitudes, practices and perceptions) that were assumed by the researcher to be contributory towards developing evidence-based physiotherapy practice among undergraduate students while they are still undertaking training in a yearlong advanced clinical placements. These theories triangulate the phenomenon under study which is evidence-based practice by looking at different personal (i.e. perception and attitude of students), pedagogical (i.e. clinical education) and social (management) aspects that may facilitate or hinder in the implementation of the said phenomenon. Fig. 5.2 shows the resultant framework combining all theoretical frameworks and was expanded to show the specific factors coming from the findings of this study.

5.6.3 Contribution to Methodology

This study adds to the numerous amounts of studies that proved the usefulness of a mixed methods approach in investigating various constructs (i.e. attitudes, practices and perceptions) to describe the factors that facilitate or serve as hindrance towards a certain behaviour or phenomenon (i.e. EBP in undergraduate clinical practice).

This study also utilised triangulation to a wider extent with the application of 4 different types of triangulation: data, theory, methodological and time. Data triangulation considered how students see themselves implement EBP and also the perspective of their clinical educators, which eliminates the possibility of a one-sided bias if only the perspective of the students was considered. Theory triangulation in this study was able to put together Ajzen's (1985, 2002) theory of planned behaviour, Edwards and Richardson's (2008) epistemology of clinical reasoning in physiotherapy practice, and Schein's primary embedding mechanism (2010).

A between-method triangulation and within-method triangulation were applied to this study involving the use of two contrasting research methods (i.e. quantitative survey questionnaire and qualitative interviews) and the use of two different forms of the same research method (i.e. focus group interviews and key-informant interviews which are both qualitative in nature) respectively to answer the research questions.

Lastly, with the longitudinal design of the study, time triangulation was exhibited considering that time is a possible agent of change. A possible change in attitudes, practice and perceptions was investigated by looking at the student participants' one-year advanced clinical placement experience.

5.6.4 Contribution to Practice

From the perspective of physiotherapy undergraduates and their clinical educators, the results of this study described attitudes, practices and perceptions of physiotherapy students towards EBP during an entire academic year of advanced clinical placements. Apart from the aforementioned constructs, facilitators and barriers were also highlighted in the analysis of results. Based on the findings and implications of this study, there are certain recommendations that can be drawn for the students, for curriculum developers, for the clinical placements, and for policies governing health care provision that indirectly affects what and how students learn within the clinical environment.

5.6.4.1 For the students and instructors

Students should be veered away from the concept that once they finish a course module, it has no future use into the physiotherapy program. Students should be given a general orientation of how their courses are built like a scaffold, with higher level courses building on earlier levels. It is not enough that they see a list of course names and course codes and go through their college education like a tick-box approach. They should see the bigger picture of why such courses or modules are provided. College or university instructors are encouraged to employ the iterative process (Miyake 1986) to make students understand the constructive alignment of each course's content to the whole curriculum. This can be done every beginning and end of the semester to show students how the course learning objectives were met by delivering the content of the course and were assessed through the assessment methods of the course. It would also be beneficial for the students to have a deeper understanding of “pre-requisites” and “co-requisites” and its implication to a holistic and coherent physiotherapy program.

Students need to know how to carry over the concept of evidence to practice. Snoljung, Mattsson and Gustafsson (2014) states that being able to derive patient care protocols from scientific findings brings a sense of certainty into ones' clinical decision. It has to be inculcated onto current and future physiotherapists that working in an evidence-based manner should not only be seen as a duty or necessity, but should be seen as a norm, practiced with willingness and self-interest.

5.6.4.2 For the curriculum developers

A recommendation for the curriculum developers is to place the clinical courses in closer proximity with the relevant taught modules so the knowledge is still fresh while students see real patients and apply the hands-on skills. For example, after finishing a year or two semesters of modules regarding musculoskeletal conditions of the upper and lower limbs, students can be directed to a 4- or 5-week clinical placement during the summer term following the two regular semesters. That will constitute one academic year level in the BPT program which will allow students to apply the knowledge and skills right after they have learned them in the College instead of waiting for 1 to 2.5 years before they can see real patients. Moreover, the curriculum becomes more constructively aligned all throughout the program with continuity of subject matters of taught modules and clinical education per year level. Providing real-life experiences or simulated patients to students prior to their clinical placements can enhance the necessary skills needed to navigate their clinical experience (Delany & Bragge 2009).

5.6.4.3 For the clinical placements and clinical educators

Where there is a possibility, the College should periodically provide a venue (e.g. symposium, stakeholders meeting, workshops) for clinical educators of different hospitals and clinics to share and learn from each other regarding strategies they use to enhance EBP knowledge, skills and application of students. This opportunity will also provide a

brainstorming venue on how to manage or minimise the perceived barriers towards EBP such as lack of time. According to Delany & Bragge (2009), taking part in continuing education forums regarding clinical education pedagogies is one of the strategies to facilitate a more student-centric approach to teaching and learning in clinical placements.

One strategy being done by one of the hospitals involved in this study is the use of shared database wherein a collection of select research studies saved by clinicians who found them interesting and applicable to the workplace is accessible to all physiotherapists and clinical educators. In a study in Sweden, this strategy was also used by some of the care units wherein a key group of people was designated to compile research materials and share it with their colleagues. This cut through the time demand of searching and appraising articles and increased the EBP capacity of the group of physiotherapists (Snoljung, Mattsson & Gustafsson 2014).

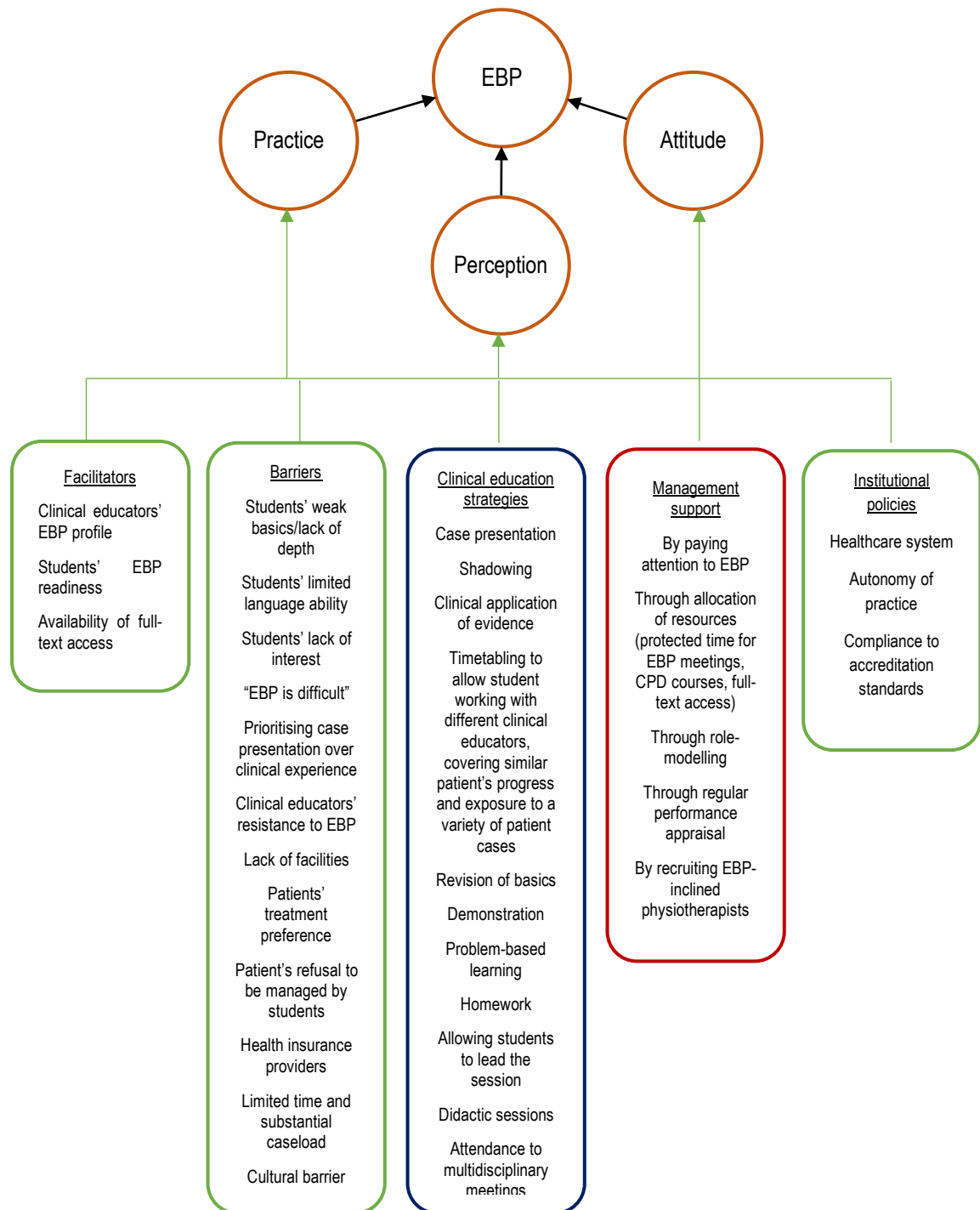


Figure 5.2 Study findings integrated with the framework of the study.

Legend:

Orange circles – based on theory of planned behaviour (Ajzen 1985, 2002); addresses research question 1

Blue box – guided by the physiotherapy practice epistemology (Edwards & Richardson 2008); addresses research question 3

Red box – probed through the 6 primary embedding mechanisms (Schein 2010); addresses research question 3

Green boxes – address research questions 2 and 3

5.7 Recommendations for future studies

The quantitative data did not show any large effect sizes across all domains explored regarding EBP among undergraduate physiotherapy students in Abu Dhabi from baseline to one academic year after advanced clinical placements. While it may be viewed that physiotherapy students did not improve in their inclination towards EBP, it is more likely that the lack of improvement is because students were already in possession of positive attitudes, confidence and implementation of EBP even during the commencement of their advanced clinical placements. Hence, even though the scale was able to discern minute changes in behaviour towards EBP, the effect of a yearlong advanced clinical placement was not statistically significant, showing that the ceiling effect was reached. It is then recommended to consider taking a look at the EBP profile of undergraduate physiotherapy students during their core clinical placements (Fig. 3.3) as well as these may have paved way to EBP exposure prior to advanced clinical placements. It is also recommended to increase the number of participants by recruiting students across year levels to make statistical analyses stronger.

A follow-up EBP profiling can be done after a specific number of years post-graduation to see if students' propensity towards EBP while being undergraduates in clinical placements matches that of their clinical practice post-graduation.

An ethnographic study can also be done to see how EBP is implemented by physiotherapy students in hospitals and clinics during undergraduate clinical practice. An ethnographic approach may provide a wider breadth of data; however, more time is also required to capture the practice of students relevant to the 5-step process of EBP.

Future studies may also look into the perspectives of lecturers to see whether expectations are aligned with those of the clinical educators. A focus group discussion involving lecturers

and clinical educators may produce data that can suggest strategies on how to fill the gap in theory and practice of EBP.

Lastly, patient perspectives can also be looked at in future studies to check on whether patient preference is really sought by students in their application of treatment options from research findings. This will ensure that students do have a holistic approach of EBP, that is the use of scientific evidence, clinical expertise and patient preference in the management of patients.

5.8 Conclusion

This study showed that undergraduate physiotherapy students exhibited positive attitudes towards EBP in their undergraduate clinical experience with good self-perceived skills to perform the first three steps of the 5-step process of EBP with confidence. Although quantitative data showed no significant change in attitudes, practice and perceptions towards EBP early into and after one academic year of advanced clinical placements, students and clinical educators stated changes in level of confidence, improved searching and appraising skills, and a developing ability to apply assessment and treatment protocols to patients based on research findings.

This study also listed a variety of facilitatory factors towards EBP stemming from clinical educators' work experience profile, their EBP background, the strategies employed during clinical education and the support of the managers of the workplace. Ideally, these facilitatory factors are best maintained within the clinical education programs of each institution so that future physiotherapy students can benefit from such strategies.

Though students' experiences were not uniform from one institution to another, it is notable that clinical educators are the main drivers of integrating evidence into patient assessment and treatment. With consideration of students' learning needs, clinical educators are

the sole decision makers as to how a student navigates the undergraduate clinical experience. A certain hospital or clinic may not be reliant on evidence in providing care for their patients, but it does not mean that the student will not develop any EBP-related skills during her clinical placement in that institution.

Challenges towards EBP inclination were felt from factors considered internal and external to the physiotherapy students. Challenges internal to the students such as weak basics, lack of depth, lack of interest, limited language ability, finding EBP difficult and prioritising case presentation over clinical experience, ought to be addressed by the students themselves with the help of the College prior to undergoing clinical placement courses to better facilitate a more conducive training towards an evidence-based physiotherapy practice. The distant placement of clinical courses from taught modules is the main challenge perceived pertaining to the curriculum and if addressed, can help students eliminate the gap between what was learned from their formal EBP education to hands-on implementation in the clinical placements.

Similarly, challenges stemming from lack of facilities (i.e. full-text access), resistance to EBP of some clinical educators, substantial caseload and therefore lack of time, patients' misguided choices of treatment, and cultural barriers should be slowly addressed at the clinical placement level to allow proliferation of a stronger EBP culture where students can learn as well.

5.9 Limitations

This study used an explanatory sequential mixed method that aimed at collecting rich data for an in-depth interpretation of the answers to the research questions. Though the study did not involve any human experimentation and only gathered insights and opinions of participants, some clinical affiliates were still hesitant to allow data gathering within their institutions. There was no scarcity in the number of clinical educators from clinical affiliates that were willing to

join the study. However, achieving a wider breadth of hospitals and institutions covered by the study was dependent on the gatekeeper's acceptance or rejection of the conditions of the study. This means the generalizability and transferability of the findings is one of the limitations of this study as it was done in one higher education institution with two campuses only and its clinical affiliates within the emirate of Abu Dhabi. The lack of physiotherapy undergraduate students from another academic institution limits the applicability of the findings in this study to physiotherapy programs that have almost the same curricular structure, content and clinical education methods as that of the physiotherapy program from the emirate of Abu Dhabi.

Another limitation of the study is the small number of student participants involved in the baseline and post-ACP for profiling the evidence-based practice of undergraduate physiotherapists. As much as the researcher wanted to do a census survey of the student participants, participants are always entitled to their own decision of whether to participate in a study or not.

The lack of control group in the study is another limitation as there was no opportunity to see if the changes in attitudes, practices and perceptions towards EBP among physiotherapy undergraduates are due to maturation effect or the actual influence of undertaking advanced clinical placements.

Lastly, with the aim of keeping the data secure and only confined to the eyes of the researcher, the researcher opted to do all quantitative data collection procedures, statistical analyses, interviews and audio transcription on her own. This required a massive amount of time to proceed from one process to another.

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Appendix A: Participant Information Sheet (Students)



PARTICIPANT INFORMATION SHEET

Investigating Perceptions, Attitudes and Practices of Undergraduate Physiotherapy Students toward Evidence-Based Practice

Researcher: Marian Grace Gabor
Director of Studies: Dr. Abdulai Abukari

You are invited to participate in this study about perceptions, attitudes and practices of undergraduate physiotherapy students toward evidence-based practice. It is your sole decision to take part in this study or not. You will not be asked to give a reason if you decide not to take part. If you do decide to take part and had a change of mind later, you will not be stopped from pulling out of the study.

This Participant Information Sheet will help you answer possible questions you might have regarding this study including the purpose of the study, possible benefits and risks, what are your rights if you do decide to participate and what happens at the conclusion of the study. This information sheet will help you clarify any doubts you might have regarding this study and will help you decide whether you would want to take part in it or not. This document is three (3) pages long together with the Consent Form. Kindly go through the content of this information sheet and I will address any questions you may have. My contact details are on page 2 of this document. You are not forced to decide right away. You may take the time you need to arrive at a decision.

Once you have decided to take part in this study, you will be asked to sign the attached Consent Form. A copy of the Participant Information Sheet and Consent Form will be provided for you to keep.

What is the purpose of the study?

This study will investigate students' perceptions and propensity to adopt an evidence-based practice. The investigation will involve profiling done prior to and after undergraduate clinical practice in physiotherapy. This study will also probe the aspects of undergraduate clinical practice that contribute or hinder in adopting an evidence-based practice among physiotherapy students in Abu Dhabi.

What will my participation in the study involve?

You are chosen to participate in this study because you are either an undergraduate physiotherapy student who are about to enter (or are currently) on the earlier stage of your clinical internship or an undergraduate physiotherapy student who are nearing the end of (or have finished) your clinical internship. To fulfill the purpose of the study, you will be required to answer a survey using a standardized tool entitled Evidence Based Practice Profile. Depending on the aggregated result of the survey, you and a few other participants may be invited for focus group interview to further explain your propensity toward evidence-based practice. The interview may be audio-recorded. For documentation and data tagging purposes, you will be asked to provide personal information

such as name/initials, age and e-mail address. Any follow-up questions may be sent to you electronically.

What are the possible benefits and risks of this study?

One of the direct benefits of participating in this study is the opportunity to know your evidence-based practice profile. As a participant, you have the right to access the information that you provided in this study. Another benefit is the opportunity given to reflect about your own undergraduate clinical internship.

There are no potential risks or burdens associated with this study.

What if something goes wrong?

This study does not involve any experimentation or intervention involving the human body. You will only be asked to provide your insight on evidence-based practice through a survey and possibly an interview. All the data gathering tools to be used in this study does not pose any risk to you.

Who pays for the study?

You will not incur any costs if you decide to be part of this study. On the other hand, in recognition of your participation, your e-mail address (if provided) will be included in the pool of participants for a chance to receive an incentive as a token of appreciation.

What are my rights? What if I change my mind?

Your participation in this study is completely voluntary. You are free to decline to participate or withdraw at any stage of the study. Your refusal to participate or your withdrawal from the study will not put you at a disadvantage in your studies and will not affect your relationship with the researcher. Your identity will remain anonymous and your participation will be confidential.

What happens after the study?

If you wish to know the results of the study, I am willing to provide you a copy of the data collected in its aggregated form. All collected data will be stored in an encrypted password-protected folder of the researcher's laptop hard drive for the duration of the study and two years afterwards. To add a layer of protection to the online database of survey data collected through an online platform, two-factor authentication and single sign-on features will be activated. Only the principal investigator will have access to the online database and local files. After two years from the end of the study, data wiping (deleting without the possibility of data recovery) will be done to all data related to this research.

Who do I contact for more information or if I have concerns?

Should you have any questions, complaints or concerns about the study at any stage, you may contact:

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Appendix B: Participant Information Sheet (Clinical Educators)



PARTICIPANT INFORMATION SHEET

Investigating Perceptions, Attitudes and Practices of Undergraduate Physiotherapy Students toward Evidence-Based Practice

Researcher: Marian Grace Gabor
Director of Studies: Dr. Abdulai Abukari

You are invited to participate in this study about perceptions, attitudes and practices of undergraduate physiotherapy students toward evidence-based practice (EBP). It is your sole decision to take part in this study or not. You will not be asked to give a reason if you decide not to take part. If you do decide to take part and had a change of mind later, you will not be stopped from pulling out of the study.

This Participant Information Sheet will help you answer possible questions you might have regarding this study including the purpose of the study, possible benefits and risks, what are your rights if you do decide to participate and what happens at the conclusion of the study. This information sheet will help you clarify any doubts you might have regarding this study and will help you decide whether you would want to take part in it or not. This document is three (3) pages long together with the Consent Form. Kindly go through the content of this information sheet and I will address any questions you may have. My contact details are on page 2 of this document. You are not forced to decide right away. You may take the time you need to arrive at a decision.

Once you have decided to take part in this study, you will be asked to sign the attached Consent Form. A copy of the Participant Information Sheet and Consent Form will be provided for you to keep.

What is the purpose of the study?

This study will investigate students' perceptions and propensity to adopt an evidence-based practice. The investigation will involve profiling done prior to and after undergraduate advanced clinical placement in physiotherapy. This study will also probe the aspects of undergraduate clinical practice that contribute or hinder in adopting an evidence-based practice among physiotherapy students in Abu Dhabi.

What will my participation in the study involve?

You are chosen to participate in this study because you are a clinical educator who supervised undergraduate students during their advanced clinical placement. To fulfill the purpose of the study, you will be interviewed about your insights on our students' perceptions, attitudes, readiness and propensity to adopt an evidence-based practice. Interview questions will be based on the aggregated result of a students' EBP profile gathered through online survey. Student participants for EBP profiling are from PT Batch 2018-19 (those who underwent advanced clinical placement in the past two semesters). The interview may be audio-recorded. For documentation and data tagging purposes, you will be asked to provide personal information such as name/initials, age and e-mail address. Any follow-up questions may be sent to you electronically.

What are the possible benefits and risks of this study?

One of the direct benefits of participating in this study is the opportunity to reflect on your students' evidence-based practice profile. As a participant, you have the right to access the information that you provided in this study. There are no potential risks or burdens associated with this study.

What if something goes wrong?

This study does not involve any experimentation or intervention involving the human body. You will only be asked to provide your insight on your students' evidence-based practice profile through an interview. All the data gathering tools to be used in this study does not pose any risk to you.

Who pays for the study?

You will not incur any costs if you decide to be part of this study.

What are my rights? What if I change my mind?

Your participation in this study is completely voluntary. You are free to decline to participate or withdraw at any stage of the study. Your refusal to participate or your withdrawal from the study will not put you at a disadvantage nor affect your relationship with the researcher. Your identity will remain anonymous and your participation will be confidential.

What happens after the study?

If you wish to know the results of the study, I am willing to provide you a copy of the data collected in its aggregated form. All collected data will be stored in an encrypted password-protected folder of the researcher's laptop hard drive for the duration of the study and two years afterwards. Only the principal investigator will have access to the data files. After two years from the end of the study, data wiping (deleting without the possibility of data recovery) will be done to all data related to this research.

Who do I contact for more information or if I have concerns?

Should you have any questions, complaints or concerns about the study at any stage, you may contact:

Marian Grace Gabor (Principal Investigator)
Fatima College of Health Sciences, P.O. Box 3798, Abu Dhabi, UAE
Phone: +971 50 808 8659
E-mail: 2015121159@student.buid.ac.ae

Dr. Abdulai Abukari (Supervisor)
The British University in Dubai, P. O. Box 345015
Phone: +971 4 279 1467

Appendix C: Consent Form (Students)



CONSENT FORM

Investigating Perceptions, Attitudes and Practices of Undergraduate Physiotherapy Students toward Evidence-Based Practice

Researcher: Marian Grace Gabor
Director of Studies: Dr. Abdulai Abukari

I have been given information about the study entitled "Investigating Perceptions, Attitudes and Practices of Undergraduate Physiotherapy Students toward Evidence-Based Practice". By reading the Participant Information Sheet, I have been oriented of the proceedings of this research by Marian Gabor, the author of the research. I have had the opportunity to ask the researcher any questions prior to giving my consent to participate in this study.

I understand that by giving my consent to join this research, I will be part of a study sample during my undergraduate clinical internship. My perceptions, attitudes and practices toward research and evidence-based practice will be investigated. I will be asked to answer survey questions through an online platform and I may expect that follow-up questions may be sent through email, if the researcher needs clarification on the data gathered from my participation. I may also be part of an interview with the aim of expounding my cumulative experience and use of research to inform my clinical practice.

I am aware that my views and inputs will be used as part of the data gathered in this research. However, my identity will remain anonymous and my participation will be confidential. I understand that there are no potential risks or burdens associated with this study.

I am participating in my own volition and I am free to refuse or withdraw my consent at any time. My refusal to participate will not affect my relationship with the researcher. If I have any enquiries about the research, I may contact Marian Gabor (+971 50 808 8659 or 2015121159@student.buid.ac.ae).

By signing below, I am indicating my consent to participate in this research.

Signed

Date

..... / /

Name (please print)

.....

Appendix D: Consent Form (Clinical Educators)



CONSENT FORM

Investigating Perceptions, Attitudes and Practices of Undergraduate Physiotherapy Students toward Evidence-Based Practice

Researcher: Marian Grace Gabor
Director of Studies: Dr. Abdulai Abukari

I have been given information about the study entitled "Investigating Perceptions, Attitudes and Practices of Undergraduate Physiotherapy Students toward Evidence-Based Practice". By reading the Participant Information Sheet, I have been oriented of the proceedings of this research by Marian Gabor, the author of the research. I have had the opportunity to ask the researcher any questions prior to giving my consent to participate in this study.

I understand that by giving my consent to join this research, I will be part of a sample of physiotherapy clinical educators who supervised undergraduate clinical placements of FCHS students. My insights regarding my students' perceptions, attitudes, readiness and propensity toward evidence-based practice will be investigated. I will be asked to answer questions through a semi-structured interview that will be audio-recorded. I may expect that follow-up questions may be sent through email, if the researcher needs clarification on the data gathered from my participation.

I am aware that my views and inputs will be used as part of the data gathered in this research. However, my identity will remain anonymous and my participation will be confidential. I understand that there are no potential risks or burdens associated with this study.

I am participating in my own volition and I am free to refuse or withdraw my consent at any time. My refusal to participate will not affect my relationship with the researcher. If I have any enquiries about the research, I may contact Marian Gabor (+971 50 808 8659 or 2015121159@student.buid.ac.ae).

By signing below, I am indicating my consent to participate in this research.

Signed

Date

..... / /

Name (please print)

.....

Appendix E: Evidence-Based Practice Profile Questionnaire



UNIVERSITY OF SOUTH AUSTRALIA

Evidence-Based Practice Profile Questionnaire

The aim of this questionnaire is to collect data on evidence-based practice (EBP) knowledge, behaviours and attitudes

Survey instructions

We would be very appreciative if you could please take some time to complete this survey.

It will take 10-12 minutes to complete.

Please circle one number in each line or tick/answer as requested.

Comment on your responses as appropriate in the areas provided

Thank you for your time in completing this questionnaire

Rate your RESPONSE to the following statements:

	Not at all true	Not really true	Possibly true	Quite likely true	Very true
1. I understand what is meant by the term evidence-based practice (EBP)	1	2	3	4	5
2. I am aware of EBP in my profession	1	2	3	4	5
3. My profession uses EBP as a framework	1	2	3	4	5
4. I am aware of current developments in EBP in my profession	1	2	3	4	5

Do you have any comments about your responses?

Rate your RESPONSE to the following statements:

	No intention at all	Unlikely to consider doing it	Could consider doing it	Highly likely to consider doing it	Absolutely intend to do it/keep doing it
5. I intend to develop knowledge about EBP	1	2	3	4	5
6. I intend to develop skills in accessing, acquiring and appraising evidence relevant to my area of practice	1	2	3	4	5
7. I intend to read relevant literature to update knowledge	1	2	3	4	5
8. I intend to apply best available evidence findings to improve practice	1	2	3	4	5

Do you have any comments about your responses?

Rate your RESPONSE to the following statements:

	Strongly Disagree	Disagree	Neutral	Agree	Strongly agree
9. Application of EBP is necessary in my clinical placement	1	2	3	4	5
10. Literature and research findings are useful in my day-to-day clinical placement	1	2	3	4	5
11. I need to increase the use of evidence in my daily clinical placement	1	2	3	4	5
12. I am interested in learning or improving the skills necessary to incorporate EBP into my clinical placement	1	2	3	4	5
13. EBP improves the quality of my clinical placement	1	2	3	4	5
14. EBP helps me make decisions about clients in my clinical placement	1	2	3	4	5
15. EBP does not take into account the limitations of my day-to-day clinical placement	1	2	3	4	5
16. There isn't much point in doing EBP because there is a lack of strong evidence to support most of the cases I do	1	2	3	4	5
17. EBP does not take into account my clients' preferences	1	2	3	4	5
18. In making decisions about the cases in my clinical placement, I value clinical/field experience more than scientific studies	1	2	3	4	5
19. Workplace experience is the most reliable way to know what really works	1	2	3	4	5
20. Critical appraisal of the literature and its relevance to the client is not very practical in the real world of my profession	1	2	3	4	5
21. Seeking relevant evidence from scientific studies is not very practical in the real world	1	2	3	4	5

Do you have any comments about your responses?

Rate your UNDERSTANDING of the following terms:

	Never heard the term	Have heard it but don't understand	Have some understanding	Understand quite well	Understand and could explain to others
22. Relative risk	1	2	3	4	5
23. Absolute risk	1	2	3	4	5
24. Systematic review	1	2	3	4	5
25. Odds ratio	1	2	3	4	5
26. Meta analysis	1	2	3	4	5
27. Number needed to treat	1	2	3	4	5
28. Confidence interval	1	2	3	4	5
29. Publication bias	1	2	3	4	5
30. Forest plot	1	2	3	4	5
31. Intention to treat	1	2	3	4	5
32. Statistical significance	1	2	3	4	5
33. Minimum clinically worthwhile effect	1	2	3	4	5
34. Clinical importance	1	2	3	4	5
35. Randomised controlled trial (RCT)	1	2	3	4	5
36. Dichotomous outcomes	1	2	3	4	5
37. Continuous outcomes	1	2	3	4	5
38. Treatment effect size	1	2	3	4	5

Do you have any comments about your responses?

IN THE PAST YEAR HOW OFTEN have you:

	Never	Monthly or less	Fortnightly	Weekly	Daily
39. Formulated a clearly answerable question that defines the client or problem, the intervention and outcome(s) of interest	1	2	3	4	5
40. Tracked down the relevant evidence once you have formulated the question	1	2	3	4	5
41. Searched an electronic database	1	2	3	4	5
42. Critically appraised any literature you have discovered to determine the methodological quality	1	2	3	4	5
43. Integrated research evidence with your clinical placement	1	2	3	4	5
44. Considered your clients' preferences when making clinical/professional decisions	1	2	3	4	5
45. Read published research reports	1	2	3	4	5
46. Informally shared and discussed literature/research findings with others in your clinical placement	1	2	3	4	5
47. Formally shared and discussed literature/research findings with others in your department/practice (eg journal club, in-service presentation)	1	2	3	4	5

Do you have any comments about your responses?

Rate your CONFIDENCE in the following EBP activities:

	Not at all confident	A little confident	Reasonably confident	Quite confident	Very confident
48. Research Skills	1	2	3	4	5
49. Computer skills	1	2	3	4	5
50. Ability to identify gaps in your knowledge	1	2	3	4	5
51. Ability to convert your information needs into clearly answerable questions	1	2	3	4	5
52. Awareness of major information types and sources	1	2	3	4	5
53. Ability to search an electronic database	1	2	3	4	5
54. Ability to access evidence (get copies of articles or reports)	1	2	3	4	5
55. Ability to critically analyse evidence against set standards ie quality scoring	1	2	3	4	5
56. Ability to determine how valid (close to the truth) the material is	1	2	3	4	5
57. Ability to determine how useful (clinically applicable) the material is	1	2	3	4	5
58. Ability to apply information to individual cases (ie integrate research evidence with personal preferences, values, concerns, expectations)	1	2	3	4	5

Do you have any comments about your responses?

Rate your RESPONSE to the following statements:

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
59. I want to learn new information	1	2	3	4	5
60. I critically evaluate new ideas	1	2	3	4	5
61. I have good management skills	1	2	3	4	5
62. I solve problems using a plan	1	2	3	4	5
63. I enjoy studying	1	2	3	4	5
64. In my organisation, leaders continually look for opportunities to learn	1	2	3	4	5
65. I make time to read research	1	2	3	4	5
66. Insufficient time is one of the greatest barriers to the use of EBP in my clinical placement	1	2	3	4	5
67. My workload is too great for me to keep up to date with all the new evidence	1	2	3	4	5
68. The cost of information resources limits my use of EBP in my clinical placement	1	2	3	4	5
69. Easy access to computers dictates whether or not I practise EBP	1	2	3	4	5
70. The resources available to me are adequate to undertake EBP	1	2	3	4	5
71. Collective support amongst my colleagues and clinical educators is one of the greatest facilitators to my use of EBP in clinical placement	1	2	3	4	5
72. Support from management is one of the greatest facilitators to my use of EBP in clinical placement	1	2	3	4	5
73. My clinical educator requires me to use EBP	1	2	3	4	5
74. I've just had a gutful of EBP	1	2	3	4	5

Do you have any comments about your responses?

Demographics

75. What is your age? _____

76. Sex: ☐ Female ☐ Male

77. Country of residence: _____

78. How many months of clinical placements have you finished? _____

79. Which of the following areas have you covered in your clinical placements? Tick all that applies:

☐ Musculoskeletal

☐ Neurology

☐ Paediatrics

☐ Cardiopulmonary

☐ Burns

☐ Amputation

☐ Women's Health

☐ None yet, I am just about to start

☐ Others: _____

80. On average, how many patients do you see each day? _____

81. Have you formally undertaken any training in EBP? NO ☐ YES ☐

If YES: choose longest completed course if you have done more than one

☐ EBP course as part of University education (Bachelor, Masters etc) >20 hrs

☐ Short course 10 - 20 hours

☐ Weekend course 3 - 10 hrs

☐ Single lecture 1- 3 hrs

82. Is English your first language? ☐ YES ☐ NO

83. Email address (This will be for follow-up purposes only. Your identity will remain confidential.)

Appendix F: Interview Protocol – Focus Group Interview (Students)

Semi-structured Interview Questionnaire for Physiotherapy Students

Time of interview: Start:.....End.....

Date:

Place:

Interviewer:

Interviewee:

Position of Interviewee:

Brief of the interview (not recorded)

Greetings. You have been invited into this focus group interview because you were part of the first 2 stages of this study which involved answering an evidence-based practice profile questionnaire. This interview is a follow-up stage of the survey.

This interview will take more or less 60 minutes and will be audio-recorded.

Do you have any questions?

If you are okay to proceed, could you please sign this consent form?

[Have the interviewee read and sign the consent form.]

[Turn on the tape recorder and test it.]

1. Please state your name.
2. How many clinical placement courses have you finished?

Taught modules

3. Do you still remember your EBP modules in the undergraduate?
4. Did you know that your IEBP modules are courses designed to hone your EBP skills?
5. The EBP process involves 5As: ask, access, acquire, appraise, apply. What lessons in your IEBP modules do you remember that taught you these 5 steps?
6. Do you think you were prepared well enough for adopting EBP in your college modules prior to clinical placement?

Clinical placements

7. Did your clinical placements give enough opportunity for you to apply research in your practice?
8. Which of your clinical placements facilitated your evidence-based practice knowledge and skills?
9. What activities in your clinical placements required you to use research evidences?

Investigating Perceptions, Attitudes and Practices of Undergraduate Physiotherapy Students toward Evidence-Based Practice

Marian Grace Gabor - 2015121159

The British University in Dubai

Appendix G: Interview Protocol – Key-informant Interview (Clinical Educators)

Semi-Structured Interview Protocol for Physiotherapy Clinical Educators

Time of interview: Start:.....End:.....

Date:

Place:

Interviewer:

Interviewee:

Position of Interviewee:

Brief of the interview (not recorded)

Hi, my name is Marian. I am one of the physiotherapy teaching staff in **Patima College of Health Sciences**. In the past 4 years, I have been pursuing PhD studies in the British University in Dubai (BUiD). I am currently in the process of collecting data for my thesis. My study is centered on evidence-based practice (EBP) of undergraduate physiotherapy students. My study has been granted ethical approval by the Research Ethics Committees of BUiD and **Patima College of Health Sciences**.

[Gesture to show the printed ethical approval if interviewee would like to see them.]

Part of my data collection is an interview that involves taking the insight, opinions and perception of clinical educators regarding the performance of **Patima College of Health Sciences** students in using research evidence to inform their practice during clinical placement. Your insights are very important for me to see a wider perspective of the students' readiness toward evidence-based practice and the factors that lead into developing an evidence-based practitioner among our students. Rest assured that all your inputs will be taken under full confidence and all data collected during this interview will be handled with utmost confidentiality.

This interview will take more or less 30 minutes and will be audio-recorded.

Do you have any questions?

If you are okay to proceed, could you please sign this consent form?

[Have the interviewee read and sign the consent form.]

[Turn on the tape recorder and test it.]

Questions:

Questions regarding the clinical educator

1. How many years have you been practicing as a physiotherapy clinician?
Qualifications?
2. How many years have you been supervising students for undergraduate clinical practice?
3. Briefly describe in general, your day-to-day clinical practice here in _____.
4. What does your contact hours for supervising students' clinical practice usually involve?

Investigating Perceptions, Attitudes and Practices of Undergraduate Physiotherapy Students toward Evidence-Based Practice

Marian Grace Gabor - 2015121159
The British University in Dubai

5. What sources of evidence do you use to inform your practice as a clinician?
6. In what ways does research evidences inform your practice as a clinician?

Questions regarding students

1. Do you have any strategy you use to determine that physiotherapy students are ready for evidence-based practice? If yes, how does/do this/these strategy/ies work?
 - a. What are the qualities that you look for in a student to say that she is drawn toward an evidence-based practice?
2. Did you see any changes in EBP approaches among students whom you have supervised twice during the September to April clinical placement of the senior cohort?
 - a. Could you please specify the changes observed?
3. What activities during the students' clinical placement with you do you think contributed to their evidence-based practice?
4. What are the factors considered as challenges into adopting an evidence-based practice for your clinical students?
5. How can students' perception, attitude and practice be positively enhanced toward EBP?

Workplace and leadership questions

1. Do leaders of your workplace pay attention to EBP?
 - a. How do they measure your or your team's EBP implementation?

2. How do leaders of your department or institution react to incidents of non-compliance to EBP?
3. What support and resources do you get from your workplace to implement EBP?
4. Do you have a role model within your workplace who constantly engages you, teaches and coaches you on evidence-based practice?
5. How does your workplace allocate rewards and/or status toward those who implement evidence-based practice?
6. Does your workplace require 'evidence-based practice' as one of the professional qualities during recruitment or selection of new staff?

Appendix H: Ethical Approval – The British University in Dubai



Research Research Ethics Form (Low Risk Research)

To be completed by the researcher and submitted to the Dean's nominated faculty representative
on the Research Ethics Committee

i. Applicants/Researcher's information:

Name of Researcher /student	Marian Grace Gabor
Contact telephone No.	0508088659
Email address	2015121159@student.buid.ac.ae
Date	September 30, 2017

ii. Summary of Proposed Research:

BRIEF OUTLINE OF PROJECT (100-250 words; this may be attached separately. You may prefer to use the abstract from the original bid):	Background: Evidence-based practice (EBP) is the use of available literature obtained through a systematic search and applying the evidence as guide to clinical decision making in the care of patients (Dawes et al. 2005). Allied health care undergraduate students are expected to adopt an evidence-based practice (EBP) upon entry to the professional practice after they graduate (Olsen et al. 2013). None of the available published literature was written about physiotherapy students' propensity to adopt EBP in the undergraduate clinical practice within the United Arab Emirates (UAE) or the Gulf region. Purpose: The purpose of this study is to investigate physiotherapy students' perceptions, attitudes and practices towards evidence-based practice prior to and after one year of undergraduate clinical practice. This study will investigate whether exposure to different elements of clinical practice changed the students' perceptions, attitudes and practices. Methods: A mixed-methods
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	<p>approach will be done in a convergent parallel design. For quantitative data gathering, a survey using a validated tool will be provided to student participants to establish their EBP profile before and after one year of clinical placement. Based on the results of the pre- and post-test, qualitative interview will be conducted with students and their clinical educators to further expound on the factors that lead to students' change (or retained) level of propensity towards EBP. Sites and samples: Consenting physiotherapy students of health science education institutions in the Emirate of Abu Dhabi and their clinical educators from SEHA and private clinics will be part of the study.</p>
<p>MAIN ETHICAL CONSIDERATION(S) OF THE PROJECT</p> <p>(e.g. working with vulnerable adults; children with disabilities; photographs of participants; material that could give offence etc...):</p>	<p>The researcher will conduct data collection that involves survey and interview of her own physiotherapy students aged 20 years and above. The study will also involve interview of clinical educators. In the process, personal details such as name, demographics, perceptions on a subject matter and audio-recording of interviews will be collected and will be stored securely throughout the duration of the study and two years thereafter to protect the identity of the participants and to abide by the confidentiality clause of the consent form. A brief and integrated participant information sheet and consent form has been prepared and will be disseminated to target participants prior to data collection. Only consenting students and clinical educators will be included in the study.</p>
<p>DURATION OF PROPOSED PROJECT (please provide dates as</p>	<p>December 2017 to December 2018</p>

month/year):	
Date you wish to start Data Collection:	December 2017
Date for issue of consent forms:	November 2017

iii. Declaration by the Researcher:

I have read the University's policies for Research and the information contained herein, to the best of my knowledge and belief, accurate.

I am satisfied that I have attempted to identify all risks related to the research that may arise in conducting this research and acknowledge my obligations as researcher and the rights of participants. I am satisfied that members of staff (including myself) working on the project have the appropriate qualifications, experience and facilities to conduct the research set out in the attached document and that I, as researcher take full responsibility for the ethical conduct of the research in accordance with subject-specific and University Research Policy (9.3 Policies and Procedures Manual), as well as any other condition laid down by the BUIID Ethics Committee. I am fully aware of the timelines and content for participant's information and consent.

Print name: Marian Grace Gabor

Signature:  Date: September 30, 2017

If the research is confirmed as not medium or high risk, it is endorsed HERE by the Faculty's Research Ethics Committee member (following discussion and clarification of any issues or concerns) John McKenny and forwarded to the Research Office to be recorded.*

Approved: Prof. Ashly H. Pinnington 24 Jan 18

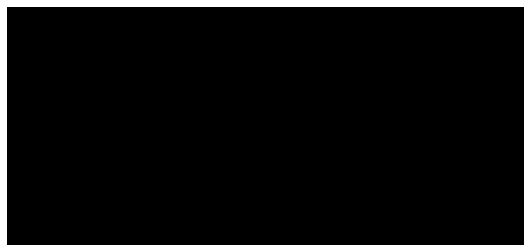
I confirm that this project fits within the University's Research Policy (9.3 Policies and Procedures Manual) and I approve the proposal on behalf of BUIID's Research Ethics Committee.

Name and signature of nominated Faculty Representative: JOHN MCKENNY

Signature:  Date: 24 JAN 2018

iv. If the Faculty's Research Ethics Committee member or the Vice Chancellor considers the research of medium or high risk, it is forwarded to the Research Ethics Officer to follow the higher-level procedures.

Appendix I: Ethical Approval – The College



14th May 2018

Ms Marian Gabor
Physiotherapy department



Dear Ms Marian

Re: Ethics approval for research – Research Ethics application [REDACTED] /RECA/004/2016-17

Study Title:	Investigating Perceptions, Attitudes and Practices of Abu Dhabi Undergraduate Physiotherapy Students towards Evidence-Based Practice
REC reference:	[REDACTED] CA/004/2017-18
Application submission Number:	1
Approval date	14 th May 2018
Expiry date	14 th May 2021
FCHS REC Decision	APPROVED

The FCHS Research Ethics committee members reviewed the above application.

The following documents were received electronically:

1. Application for Ethical approval (REC version [REDACTED]-APF-001-2016-17)
2. Full research proposal of study
3. Information sheet for research
4. Participant consent form

The Committee reviewed the application and on the basis of the information described in the application form and the accompanying documents, the members agreed that your research application meets the requirements and that full ethical approval be granted.

This approval is based on the information provided and should any substantial amendments to any aspect of the study change, then it is incumbent on the investigators to notify the [REDACTED]

Statement of compliance

The Committee (Directive Number 06/2017) is constituted in accordance with the [redacted] director arrangements (6th December 2017) and the Terms of Reference for Research Ethics Committees (March 2017). The REC complies fully with the Research Policy, Section 13 of the [redacted] Policies and Procedures Manual, Version: REV-0, August 1st, 2016, Sections 13) and the international and local standards for research involving human subjects.

After ethical review

Now that you have completed the application process please familiarize yourself with the Research Policy, Section 13 of [redacted] Policies and Procedures Manual, Version: REV-0, August 1st, 2016, Section 13.

Please quote this number in all correspondence [redacted] RECA/004/2017-18

With the Committee's best wishes for the success of this project.

[redacted]

Yours sincerely



.....
Dr Dhayaneethie Perumal

[redacted] Research Ethics Committee

Appendix J: Sample Transcription

M: Once again, good morning.

CE8: Good morning.

M: My name is Marian. For the record, could you please state your name.

CE8: [REDACTED]

M: Hi, [REDACTED]. My questionnaire has 3 parts. The first part is about you as a clinician, the second part is about the students and the third part is about the workplace in general. So, first question is, [REDACTED], how many years have you been practicing as a physiotherapy clinician?

CE8: Twenty-four years.

M: Twenty-four years?! Very long, and you don't even look like. Okay. Very long. And this, you've been practicing in Cleveland Clinic for how many years.

CE8: For 14 months.

M: Fourteen months. Fairly new.

CE8: Yes.

M: Within these 24 years of practice, how long have you been supervising undergraduate students?

CE8: I would say maybe 18 years.

M: And when you are handling students, is it a one-to-one setup or...

CE8: Yeah, yeah. I have always just seen one-to-one.

M: Your clinical practice, you have been through different fields, like MSK, and then cardio, or paediatrics or do you have a particular field that you just...

CE8: I am MSK. So for my first two years, I did rotations but then I specialized from there so I have always been MSK after that.

M: Could you briefly describe your general day-to-day practice here in Cleveland like how does your day start, and how does it end?

CE8: So, I pretty much, mostly clinical. So, my day will start at 8 am, and my first patient will be at 8am, and I am just seeing patients generally one every half an hour and that will run through until half past 4. Of course, I stop for a break. Most of my time is spent one-to-one with patients, but I also run some ladies' classes which I do sometimes, a couple of times a week during my working day. Other than that, interspersed in the week, we have our weekly team meeting which is mostly case studies or discussions on paper we might have read. Something like that. And then we have a couple of times a month, we might have best practice clinic where we come together to discuss an issue around best practice and we

have a unit-based counsel where we would meet together and talk about things that are going on within our area.

M: That's pretty packed. For your 8-430pm clinic hours in a day, what is your contact hours for supervising students usually entail?

CE8: So, the day, they would spend the whole day with me. They will take usually an hour for lunch and then they might take a little bit of time if they want to break for prayers. But generally they would be with me the whole time.

M: And the patients would allow them during treatment time?

CE8: Yeah. I have never had anybody, at Cleveland yet, say no thank you to a student. So, it will either be me and with the student, but if the student is quite competent and perhaps getting to the end of their placement, then perhaps I would leave the student alone with the patients and I would be outside so that they can come and report intermittently in between and how they are getting on.

M: That's nice. That gives a lot of exposure to the students.

CE8: Yeah.

M: For your... you have mentioned about best practice and discussion of evidence and this and that earlier. So, what sources personally do you use. What sources of evidence you use to inform your practice.

CE8: I use, I read a lot of papers. So, sometime usually I generally have a plan about something that I want to look at particularly. At the moment I have been focusing on plantar fasciitis. So I would maybe have a plan for the month of something I want to look at. If I know a patient is not coming, then I can do a literature search or I might, I listen to quite a lot of podcasts. Mostly, from the UK, some from Australia. That's, the podcasts that I usually listen to are researchers themselves, talking about their research projects and the implications it has for practice. So, I try and keep up that way and then I put everything together and then maybe after that, I would present it in one of our team meetings, so I let the rest of the team know if there is anything that is really good that I have learned. And also we have a database on the computer on our shared drive, so if we have a good paper, we would share it with the rest of the team and then we would put it on the shared drive. So we always seem to have quite a lot of evidence-based work ready just in case, you know, you have time and you have time to look. Which is quite good for students because if there's a particular thing that they want to look at, we generally usually have some quite up-to-date literature ready for them to look at.

M: Fantastic. This database, this is only accessible for the staff, right?

CE8: Yeah.

M: When you do don't... during those times that you don't have a patient and you've mentioned about, you've planned out what to use that time for like updating yourself, what does the student generally do?

CE8: If the student is with me, then what we would do is maybe, we would discuss, perhaps if we have a case that is interesting or maybe a little bit challenging, we would discuss that case and maybe the things that we need to look up or the things that we need to find some

more information about. And perhaps I would task the students to look it up overnight. And I would also look it up and then we would come together if we had a clear slot, we would come together in the day and we would both discuss what we learned and then maybe if there's practical applications, we would perhaps practice. But usually if I have a student with me, what I would do is if we have time while we don't have a patient, we would be maybe practice something. So, we would say okay we will do, dermatomes and myotomes today. Or, tomorrow you know, if we get a free slot we might look at practicing reflexes, so I give them some plan about what we might do the next day so that they can do a little bit of reading or a little bit of preparation and then we'll practice. But mostly if I have a student with me, we would do practical stuff. Because that's where they get their most learning.

M: So, in this practical stuff, you act as a patient and then they will do it to you?

CE8: Yeah. Or I might usually, if Christina is free, or someone is free, we might talk about something. I might show them on themselves, then I get them to practice on me. And maybe we would bring in one of the other team, and we would practice on them. And then when the patient comes, you know, we're ready. So, maybe I would leave it to them and I would just supervise them as we go. And quite often, patients are very, very happy with it. What I would do is maybe, if I was mobilizing maybe a shoulder, I would mobilize start it, and then the student is going to take over now and I want you to tell me if it feels the same, if it feels different. Is she doing it as strongly as I am doing it. Or is she pushing it further than I was doing it. So we get some good feedback from the patient about how they feel. And usually the patient you know, is very happy to do it.

M: I appreciate that your patients are very game to give the students the experience.

CE8: Yeah they are.

M: Because in some situations, I have heard that they're very hesitant for students to actually be with them in the room. So, this place actually has a better you know exposure for...

CE8: I think it helps if you're sitting in the room, if they can see that you're here and that you're watching them, and that you're confident with them, and often I'll say to the patient, you know, she's been here with me for 2 weeks, she's excellent, I'm really happy with her. You know, just really try and build some confidence in the patient because the student, you're watching them the whole time so they're not going to do anything unsafe. So, you know I try and make sure that the patient feels confident and I think I find that because the patients here are local and the students are generally local, they seem to build up a good rapport and so they seem very happy to let the students mobilize them and treat them and progress them and do everything which is really great.

M: That's good. I'm very happy to know that. You've mentioned a lot of activities that you do with the students to enhance their evidence-based practice inclination like the case discussion, or you practicing some things with them, or with other, with some of your teammates. Do you have any particular strategy to determine whether these students are ready for EBP?

CE8: Yes, we also have, they will also do a presentation in the last week. So, they would take a case. In the first couple of weeks, they would try and find an interesting case and then we ask them to go away and look at the latest evidence for it. And if they're struggling, we'll help them, show them how they can look or if they're struggling to understand the paper, we might go through it with them, with the idea that they're looking at the evidence on how to treat and progress them. So, then we would sit down and formulate a plan for the patient

next treatment, and then they would present it. So in the 4th week, they may have seen that patient 3x. so, hopefully they can present it, they can present the evidence that they picked up on, and the evidence that they used to try and plan and guide their treatment, and then they'd present it to their peers, and usually their college lecturer comes and we try to get as many of the clinicians who are free at that time to come and listen as well. So, it's a good way of getting the students used to incorporating evidence-based practice actually into the treatment of patients.

M: That's good. So, that's the strategy. But what qualities do you actually look for in a student to actually say that she is drawn towards an evidence-based practice?

CE8: So, I would look at the, being able to, so maybe I would ask them if we had this certain condition, I would say you know "how would you treat them?" and then they might tell me, I said "but how would you know that that's better than anything else?" or I might say "what about electrotherapy? What evidence do you have that your choice of treatment is better than this choice of treatment?" so we try and get the student to weigh up different kinds of treatments. We would perhaps ask them what paper they have read or you know where is it that you got this information from. And we see whether they are actually applying what they have read and they reply in practical terms. So something like, say for instance, lateral hip pain takes a very long time to settle down. So you're looking at about 12 weeks or so. So you read the papers and it tells you that. And then what I will be looking at is when the students educating the patients, are they telling them, you know, I'm not expecting you to be better by next week, this takes a long time to settle down, so I'm looking to see whether that student understood the paper and then relays it in a correct way back to the patient. So, it's making sure that what they read and actually what they do marry together.

M: Yes, yes. And it's actually a very good, a very holistic coverage definition of evidence-based practice which we all know is that it's based on research evidences, based on clinical experience and at the same time, considering patient preference. Did you see any particular changes in their approach to patient, to practice, to reading evidences, from the first week to the fourth week.

CE8: Yeah, you see a massive change. You see a big change because some of them haven't been on placements before, not outpatient ones. Some of them they have, but they seem to have done more shadowing rather than actual treating, so we try and right from the beginning, get them to organize their learning and we try to get them to understand, we're expecting evidence-based practice, so when they're doing anything, they have to qualify it. So, we're always going to be asking them why are you doing it this way, why are you not doing it that way. So, after the first week, they start to understand that anything that they do, they have to be able to explain why they are doing it in a certain way. And also that experience with patients, the way that they explain things, the way that they approach it with patients, it really matures over 4 weeks. So the way that they even might teach an exercise for a patient at the beginning of the week is completely different to how they do it at the end of the month. Just because they have that learning base behind it, and they're thinking with a bit more depth behind what they're doing.

M: Very, very nice. So basically, to summarize the qualities you're looking for is that their, they can, they have this clinical reasoning, that they have an in-depth understanding of they're doing and that they have a better approach to the patient when they do this application of the evidence-based.

CE8: And also that they are organized, they have organized their learning. They are not just pulling this from here and this from here. They have a clear plan and they kind of build on it.

M: Okay. Amazing. What... we have been talking a lot about positive side of their training here in and the factors, the activities that have actually uplifted or enhanced their evidence-based practice skills. Are there any challenges that you encountered along the way?

CE8: Yes, I think with some students, some students find the presentation at the end, although it is very useful, I find, they find it really daunting. I don't know if it's the public speaking or if it's presenting in front of your peers or if it's the whole evidence-based thing, but for some students, they find it a very big thing and it becomes quite distracting so, maybe you might have a patient in the 2nd week and they'll be saying, "oh but I want to work on my presentation, can I not see this patient?" and go on work on the computer. So, it's not, you know, I find that some students that they've become such a big thing that they forget that they're here for the clinical. And then students who have done the presentation, they're back on concentrating hard on the clinical. I think for some people, it's a really big thing, and it becomes a bit of a distraction. So, I think with my next student, I'm gonna try and play it down a little bit, try not to make it such a big part of placement because I think it can distract them from their hands-on treatments.

M: Is it, do you think it's because they cannot compartmentalize the fact that you know, this is just one aspect of the, the case presentation is just one aspect of the whole 4 weeks.

CE8: Yeah. I think they think that it's kind of the apex, it's what you're leading up to. This is the whole experience is in that 10-minute presentation, whereas actually it's many other things. But I think it's finding the paper, it's reading the paper, it's understanding, it's choosing the patient, you know, the whole thing sometimes can turn into quite a big project. And it's not supposed to be quite that way.

M: If that's the case, how can we positively enhance their perception towards an evidence-based practice. Because we don't want them to keep that idea that it's daunting, it's you know. Is there a particular way that you can suggest to, how we can positively enhance.

CE8: I think it's maybe, it's maybe trying to just make it part of your everyday clinical life. I mean, lots of us we do it in different ways but for me, I would make a plan and I would have a podcast ready so if I don't have a patient I can you know, I can spend a quick 20-minute doing that. So, it's trying to find a way for the students that they, that it's comfortable with them, that they can adopt evidence-based practice. So, it might just be you know, they prefer to print off a paper and read it and highlight it. Some people like to listen to something. But it's finding all the different ways that you can incorporate evidence-based practice into clinical life and then trying to choose the one that works best for you. Some people like to come together in a team and discuss it more. Some people like to work personally and do it by themselves. So I think it may be presenting all the different ways you could approach evidence-based practice and then let the student just find which suits them better.

M: Until it becomes a norm for them.

CE8: Yeah. Exactly.

M: From your answers in the previous questions, actually you've given me a lot of insight about the workplace, that the workplace and the leaders of the workplace are really paying attention to evidence-based practice and that they are really supportive given that they have provided you resources and, and there's an actual time wherein you can actually discuss

updates and best practices. In case of non-compliance, do they have any issues like that here, or do they do something about it, the leaders of the workplace?

CE8: Non-compliance with EBP? I think, it's encouraged in everybody. I think it's probably in interview, it's probably discussed a lot to make sure that people are, they are using evidence-based learning and I think there are appraisals, mid-year appraisals. I think that's always discussed. You know, what projects are you looking at, what are you learning. Everybody in the team will be expected to present a case study with some evidence behind it. So I don't think anybody can get away with non-compliance because it just wouldn't happen here, because it is expected. It's just part of, this is what you do as a physiotherapist here.

M: Since, it is expected, is there a reward system for it?

CE8: We have in our appraisal, we have a certain, you're given certain points out of 5. And if you want to be higher upon the point scale, you have to be showing that you're looking at evidence-based learning and that kind of thing. So I think it's kind of acknowledged and it's discussed in your appraisal, you know, how much are you doing? Are you doing it, are you letting the team know what you're learning. So that kind of thing, so. Although there's no kind of monetary reward or that kind of thing, there is that recognition, you know, we're really happy that you know, you've helped us out with this, and so I think that, you can see as a team that we grow, and we learn together. And I think that that's the way you get the reward from.

M: So, I'm guessing also upon recruitment of new staff, that evidence-based practice is one of the qualities that they're looking for.

CE8: Definitely.

M: Do you have a role-model, or are you the role-model in the department? The one who constantly engages, and teaches and you know, or coaches staff about evidence-based practice?

CE8: I think that because we are all encouraged to do it, I think we're all, the strengths of our team is that we're all from diverse parts of the world, we all have a different approach to learning, we all have a different skills, so I think you know, we're a really great team because we can mix together, so I think, everyone of us can teach each other new things. So, I think you know, for me, I like it when the whole team comes together and we discuss cases and people give their different opinions and different ideas. And it's a really lovely way of trying to stimulate some evidence-based conversation. And of course, I think for me, what I do is I find the person who's got the skills that match the issue that I have. So if I have a patient who's also got Parkinson's, I might go and speak to the person who is more into neurological outpatients to help me out. So, I think I don't have a particular role model because we're all enthusiastic and we all do it, but I pick out particular skills for particular people to ask that help me out.

M: That's very nice. Other than these whole scheme of recognizing who are implementing evidence-based practice, that the whole team is very into it. What other support and resources do you get from the workplace to implement EBP?

CE8: Well, we have access to the online library. So if you're looking for a particular paper, you can generally find it there and if you can't, you can request it. And it will to you. So that's good. We also have a research council which meets, I think it meets once every month and it's usually a lunchtime meeting, and what we would do is take a paper and we try to make it

applicable to a wider range of professions as possible. And then what we would do is we would critique it and we would have the research specialist critique it with us and then we would present it. We would send it out maybe a couple of weeks before the meeting to give the people that are interested a chance to read it and then we come together at the meeting and we discuss why it's a good paper, what are the strengths, what are the weaknesses. And it's a really nice way of learning how to look at different papers so we might choose one that's really statistically challenging, we might choose a qualitative study. You know, we go through all the different kinds, and that's open to anybody in the hospital who wants to come and learn about how to read papers and how to understand them. So I think I'm going to present one this, next month. And that's a really good way of people getting together who are interest in research.

M: That's nice. Actually we've answered all the other questions. Basically everything. Is there anything you want to add?

CE8: Nope.

M: Okay. I'm just going to turn this off. It took us 23 minutes.

CE8: Oh great.