

**Exploring the effectiveness of Continuing Medical Education
programs accredited by UAE University on Health care
professional's knowledge: Expectations vs. satisfaction**

استكشاف فعالية برامج التعليم الطبي المستمر المعتمدة من قبل جامعة الإمارات
العربية المتحدة في تحسين المعرفة لمهني الرعاية الصحية. التوقعات في مقابل
الرضى

by

AWAD MANSOUR AWAD AL ESSA

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

at

The British University in Dubai

**Dr. Abdulai Abukari
June 2018**



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Title of the thesis in Arabic

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Abstract

It is common notion that Continuing Medical Education (CME) has positive effects on the knowledge and competencies of health care professionals (HCP), however, this notion has not yet been fully proven in the United Arab Emirates (UAE) health care context as there is very limited research conducted in this area to confirm this notion. The aim of this research study is to investigate the effects of CME on the knowledge and competency of HCP in the UAE based the UAE University (UAEU) accredited postgraduate CME programs in the Emirates of Abu Dhabi for healthcare professionals.

Measuring the effectiveness of educational programs is a consensus by all education theorists, the first two level of Kirkpatrick training evaluation model was used to in this study.

Based on a mixed method approach, quantitative data was collected from 302 health care professionals (doctor, nurse, pharmacist, others) who attended 4 CME accredited programs by UAEU, in Al Ain city and qualitative data were collected from 14 health care professionals using semi structured interviews with participants who agreed to be interviewed.

The research results showed that the UAEU accredited CME programs were effective in terms of exceeding health care professionals learning expectations, the achievement of educational programs learning objectives, and significant increase in HCP knowledge in the topics discussed in these programs. However, the results also indicate that the need for training, patient no compliance and insurance cost were the major barriers to transfer learning from CME experience to their work place; 95% of the participants specified these as barriers.

The study also provides recommendations for improving CME programs. These programs should be designed to meet the special and individual learning needs of HCPs, and the outcomes should be evaluated using professional appraisals. The adoption of multimedia and instructional techniques, such as online CME, videoconferencing, virtual education, and self-directed learning by scientific medical associations and community hospitals, is recommended. Comprehensive evaluation methods should be developed to assess the effectiveness of CME programs.

نبذة مختصرة

من المفهوم الشائع أن التعليم الطبي المستمر (CME) له آثار إيجابية على معارف وكفاءات العاملين في مجال الرعاية الصحية ، ومع ذلك ، لم يتم إثبات هذه الفكرة بشكل كامل في سياق الرعاية الصحية في دولة الإمارات العربية المتحدة . هي أبحاث محدودة للغاية التي أجريت في هذا المجال لتأكيد هذه الفكرة.

تهدف هذه الدراسة البحثية إلى دراسة تأثير التعليم الطبي المستمر CME على معرفة وكفاءة العاملين في مجال الرعاية الصحية في الإمارات العربية المتحدة من خلال تقييم لبرامج التعليمية المعتمدة من جامعة الإمارات العربية المتحدة في دولة الإمارات العربية المتحدة لأخصائيي الرعاية الصحية.

قياس فعالية البرامج التعليمية هو توافق في الآراء من قبل جميع منظري التعليم ، تم استخدام أول مستوى اثنين من نموذج تقييم التدريب كيركباتريك في هذه الدراسة.

واستناداً إلى منهج أسلوب مختلط ، تم جمع البيانات الكمية من 302 من أخصائيي الرعاية الصحية (طبيب ، ممرضة ، صيدلي ، وغيرهم) ممن حضروا 4 برامج معتمدة من التعليم الطبي المستمر من جامعة الإمارات العربية المتحدة ، في مدينة العين ، وتم جمع البيانات النوعية من 14 من أخصائيي الرعاية الصحية باستخدام مقابلات منظمة مع المشاركين الذين وافقوا على إجراء مقابلات معهم.

وأظهرت نتائج البحث أن برامج التعليم الطبي المستمر المعتمدة من جامعة الإمارات العربية المتحدة كانت فعالة من حيث تجاوز توقعات التعلم لمهنيي الرعاية الصحية ، وتحقيق أهداف تعلم البرامج التعليمية ، والزيادة الكبيرة في المعرفة للعاملين في مجال الرعاية الصحية في المواضيع التي تمت مناقشتها في هذه البرامج. ومع ذلك ، تشير النتائج أيضاً إلى أن الحاجة إلى التدريب ، وعدم الامتثال للمرضى وتكلفة التأمين كانت هي العوائق الرئيسية أمام نقل التعلم من تجربة التعليم الطبي المستمر إلى مكان عملهم ؛ حدد 95 ٪ من المشاركين هذه الحواجز.

كما تقدم الدراسة توصيات لتحسين برامج التعليم الطبي المستمر. يجب أن تصمم هذه البرامج لتلبي احتياجات التعلم الخاصة والفردية للعاملين في مجال الرعاية الصحية ، ويجب تقييم النتائج باستخدام التقييم المهني. يوصى باستخدام تقنيات الوسائط المتعددة والتعليم ، مثل CME عبر الإنترنت ، ومؤتمرات الفيديو ، والتعليم الافتراضي ، والتعلم الذاتي التوجيه من قبل الجمعيات الطبية العلمية والمستشفيات المجتمعية. يجب تطوير طرق تقييم شاملة لتقييم فعالية برامج التعليم الطبي المستمر.

Dedication

This PhD research Thesis is dedicated to all members of my family, especially to my kids and my wife, Ahlam, who has been a constant source of support and encouragement during the challenges of study and life. I am truly thankful for having you in my life. This work is also dedicated to my parents, and my brother Sitan who has always loved me unconditionally and whose good examples have taught me to work hard for the things that I aspire to achieve.

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Chapter 1. Introduction

1.1 Introduction:

The work in this thesis is a research study evaluating the effectiveness of continuing medical education (CME) programs accredited by United Arab Emirates (UAE) University (UAEU) in the Emirate of Abu Dhabi. Levels 1 and 2 of Kirkpatrick's training evaluation model were used to assess the effectiveness. Healthcare professionals (HCPs), including physicians, nurses, and pharmacists, who attended the CME programs between November 2016 and January 2017 constituted the study population. In this study, the demographic characteristics of the HCPs were recorded, and the factors determining HCP attendance at the CME programs, learning expectations of the HCPs, and the perceptions of the HCPs regarding the CME program attendance were identified. The study also examined the CME programs in terms of achievement of organiser-stated learning goals, course design, and performance of speakers. Furthermore, the knowledge gained by the HCPs from the programs, changes expected by the HCPs in their workplace management strategies based on their new learning, and the barriers anticipated by the HCPs in implementing their new learning in the workplace were evaluated. In addition, this study assessed the challenges that the HCPs faced in seeking and attending the CME programs and recorded their recommendations for improving general CME practices in the UAE. By assessing the changes in the knowledge of the HCPs, training outcomes, and HCP recommendations, the study investigated whether the current practices involved in the UAEU-accredited CME programs are effective or not.

This introductory chapter discusses the background of the present study. Furthermore, this chapter provides an account of researcher motivation, the problem statement, study aim, research

objectives, research questions and hypotheses, study significance, study limitations, and ethical considerations. This chapter also provides an overview of CME through a brief account of the CME concept, need for CME, transfer of learning through CME programs, the mandatory status of CME, accreditation of CME, effectiveness of CME, and an evaluation of the effectiveness of the UAEU-accredited CME programs. The model used for evaluating the CME programs is briefly described in this chapter; Donald Kirkpatrick originally developed this model for evaluating training programs. This chapter concludes with the description of the current status of CME in the UAE.

1.2 Background of the study and researcher motivations:

HCPs constitute one of the most valuable assets of any healthcare system (Nitro & Mrema, 2003). To ensure that they deliver high-quality care to their patients, HCPs need to update their knowledge regularly. Therefore, they should have access to appropriate learning, knowledge, and information resources. Furthermore, rapid advancements in biomedical science over the past few decades have necessitated continuous up gradation of the clinical competence of HCPs (Garattini et al., 2010). Managers in all healthcare systems are becoming increasingly aware that most of their future employees already work in their health service systems, and a considerable amount of funds may need to be diverted from training new and relatively inexperienced employees towards training and developing their existing ones (Swanwick, 2010 p.13). In response to the need for continuous up gradation, many countries have adopted CME. On its CME website, the Department of Health, UAE, clearly prioritises CME and the professional development of HCPs for ensuring reliable community healthcare in the future (Department of Health in Abu Dhabi, 2017).

CME, as described by the American Medical Association, is a collection of medical educational activities that enable development, maintenance, and improvement of skills, knowledge, and performance of HCPs. In the unified healthcare professionals qualification requirements, the health regulatory authorities in the UAE, which are represented by the Ministry of Health (MOH), Department of health-Abu Dhabi (HAAD), and Dubai Health Authority (DHA), define CME as a range of learning activities through which HCPs maintain and develop their knowledge and skills throughout their careers to ensure that they retain their capacity to practice safely, effectively, and legally within the evolving scope of their practice (DHA, 2014).

The ultimate goal of CME programs is to enhance the quality of available patient care through professional education (Josseran, 2001). CME acts as a medium for improving healthcare systems and promotes skill development in HCPs. For HCPs, the transfer of learning during CME is critical in the medical field because patients' lives depend on the skills and competence of HCPs. Each year, in the USA, medical errors cause the death of 44,000–98,000 patients, resulting in an expenditure of 17–29 billion dollars by hospitals (Kohn et al., 2000). These errors are mainly due to the lack of skills and knowledge among doctors, which may cause delayed diagnosis and treatment, system failure, improper communication, and equipment failure. CME programs on medical tools and techniques are highly effective in retaining and disseminating medical knowledge. Furthermore, critical assessment has revealed that these programs to reduce the gap between practice and medical evidence. The use of new and improved technology in CME programs has increased the effectiveness of instructional design by enhancing skills,

attitudes, clinical practices, knowledge, practice behaviour, and clinical outcomes (Marinopolos, 2007).

CME programs are essential for creating skilled and competent doctors. Learning capabilities acquired by HCPs during CME programs are transferred to the doctors' practice, thus leading to an improvement in their skill and competence. A study conducted in the United States of America (USA) showed that 10% of American physicians who stopped CME became professionally deficient at some point during their careers (Ward, 1998). Moreover, another systematic review revealed that physicians' medical knowledge becomes less factual after practicing for some time, which may result in poor patient outcomes (Bower, 2008).

In some countries, CME is considered an ethical concern and a moral medical obligation, whereas in other countries, CME is semi mandatory; thus, it is not a legal obligation but is required in the medical profession as well as healthcare-related insurance (Peck et al., 2000). In 1971, the first state in the USA to acquire the relicense of CME credits was New Mexico.

Globally, policy makers in the health sector create special policies to ensure the continuity of learning among staff members. These policies are implemented, according to the required standards, through CME programs, and a number of mandatory CME-accredited hours is fixed by the authorities defining the CME policy (Miller et al., 2015). For instance, in the USA, many states require CME for medical professionals to maintain their licenses. Within the USA, CME for physicians is regulated by the Accreditation Council for Continuing Medical Education (ACCME). In Canada, certification is provided by the Royal College of Physicians and Surgeons of Canada and the College of Family Physicians of Canada (Josseran, 2001).

In the UAE, world-class healthcare through the enhancement of healthcare services and up gradation of medical standards is the most crucial component of the national strategy. In 2017, healthcare and social protection funds amounted to AED 4.2 billion, which accounted for 8.6% of the total UAE Federal Budget. These funds were allocated for programs for developing healthcare systems designed to protect the population of UAE from diseases and as well as for health policy development programs (UAE MOF, 2017). Therefore, health regulatory authorities have adopted mandatory policies to encourage HCPs to acquire adequate numbers of accredited CME activity hours per year for upgrading their knowledge and professional skills in the diagnosis, treatment, and prevention of diseases (UAE Cabinet 2013). The outcomes of CME programs are expected to positively affect healthcare systems and improve patient care, thus improving the health of the population in all countries, including the UAE (Shehab et al., 2012).

Physicians, nurses, and pharmacists require an adequate number of CME activity hours for license renewal, and numerous initiatives and events on health education are organised every year to provide access to CME (Shehab et al., 2012). In the UAE, CME-related activities and meetings organised for knowledge up gradation mainly include review courses, international scientific conferences, and workshops (Sachdeva, 2005). Between 2005 and 2009, HAAD offered approximately 1290 CME programs, and more than 44,000 HCPs from the Emirate of Abu Dhabi and the rest of the UAE enrolled in these programs (Department of Health in Abu Dhabi, 2017). Furthermore, accreditation bodies were recognised, and systems were established by each CME accreditation body (HAAD, DHA, MOH, and UAEU) to maintain the quality standards of the CME programs.

According to Marinopolos (2007), a broad range of CME courses educate practicing physicians by providing up-to-date information of clinical interventions, intervention misuse, therapeutic agents, inadequate use of medical systems, and excessive dosage administered by physicians and diagnostic interventions. Debates have ensued regarding the professional bodies that conduct CME training programs in the UAE. In 2010, Younies et al. reported an article regarding medical conventions titled ‘Several problems in the CME status in the country exposed ’; this article was published in the newspaper ‘Al Bayan’ on 8 December 2007. The article stated that medical conferences in the UAE are a business managed without the knowledge of medical authorities. In the same report, the undersecretary for health reported that some CME programs, which were conducted within a week of each other, addressed the same theme or topic; these programs do not benefit the HCPs. The undersecretary stated that new developments in knowledge within a week were highly unlikely, and such workshops were only scheduled to maximize the number of programs and thus profit (Younies et al., 2010). The head of the Emirates Medical Association made the same conclusion. Moreover, in the same article, a pharmaceutical company manager admitted that his company arranged and supported medical education programs following the release of new products for marketing purposes.

According to Mann (1996:14), the development of training strategies requires considerably large investments; consequently, the primary question has changed from ‘Should we train?’ to ‘Is training worthwhile and effective?’ This view is supported by many scholars and researchers who consider the measurement of the effectiveness of CME programs necessary. Educationalists and policy makers have mainly focused on the provision of CME programs. Many studies have reported consistent results regarding how HCPs learn and acquire skills (Eraut, 2001) and which learning approaches are helpful or effective (Richards, 1998; Grant, 2002). Davis (2009)

suggested that medical education leaders should prioritise research in the topics of CME programs to expand the scope of CME and conduct scientific studies to evaluate the processes and effectiveness of CME. According to Collins et al (2002), studies on CME have increased considerably because of the need to know why and how physicians learn and to determine the contributions of formal and informal education to the medical practice of competent physicians.

Successful research on the evaluation of different aspects of CME programs could improve all aspects of CME (Shvartzman, 2013). Similarly, AACME recommends the measurement of the effectiveness of CME (Weiner, 2009). ACCME has clearly defined the expected evaluation of CME; in elements 2.4 and 2.5, namely the effectiveness of CME activities in meeting identified educational needs and that of the overall CME program. Moreover, improvements to the programs need to be made depending on the results of the evaluation (ACCME, 2011).

Based on these documented facts and concerns, the intended positive effects of CME on HCP knowledge are accepted; however, these positive effects have not been conclusively proven in the context of healthcare in the UAE in the small number of published articles. The study in this thesis focuses on the evaluation of the effectiveness of the UAEU-accredited CME programs attended by postgraduate HCPs in the Emirate of Abu Dhabi. The role of CME in the acquisition of skills and knowledge is well known, and the aforementioned CME programs are expected to improve the understanding of and skills in patient care by HCPs, thus enabling them to save patients' lives. The effectiveness of the CME programs will be measured by evaluating the CME programs in terms of meeting the HCP participants' learning expectations, achieving the CME program goals, satisfaction and knowledge improvement, which are represented as per levels 1

and 2 in Kirkpatrick's evaluation model. In this study, I seek to expand knowledge regarding the approach to CME in the UAE.

My interest in this area is on account of my practical experiences of dissatisfaction among HCPs who attended current CME programs. The HCPs were disappointed because of the failure of the CME programs to meet their learning expectations and requirements, which added to their uncertainty regarding the effectiveness of these programs in improving their knowledge and practical skills. Hence, I perceived a need to evaluate the effectiveness of the UAEU-accredited CME programs offered to HCPs in the UAE. This need was further strengthened because only a few studies on this topic have been published in this region, particularly in the UAE. Previous studies in the UAE have provided measurements of the participants' knowledge before and after the course; detailed evaluations of the courses, interventions, and target audience; suggestions for teaching techniques in future CME programs; and recommendations for future studies on CME (Younies, 2010; Shehab, 2012; Akshar, 2014).

1.3 Problem statement:

In the UAE, claiming CME hours has been made mandatory for all HCPs by the health regulatory authorities. Owing to the requirement for an adequate number of CME activity hours for license renewal, numerous initiatives and events on health education are organised every year. UAEU offers accreditation of the CME programs to maintain the knowledge and professional skills of the HCPs for the diagnosis, treatment, and prevention of diseases (UAE Cabinet, 2013). While most experiences of continuing professional development might be considered a means of introducing or enhancing knowledge, skills, and attitudes, the goals and aims of these programs are not necessarily achieved. Shrestha (2013) and Lawn et al (2010) have

reported that implementation of CME programs for HCPs should be followed by a moderate improvement in the knowledge and practices of HCPs in hospital settings. However, many researchers have argued that the type of professional knowledge being acquired in these programs is not sufficiently relevant to hospital settings (Gitonga, 2014; Marinopoulos, 2007). Although CME programs on various topics have mainly been designed to educate practicing physicians, researchers have found that physicians commonly overuse, underuse, and misuse therapeutic and diagnostic interventions.

The investment of funds and efforts in CME programs in the UAE is enormous. The investment is in the form of the time of regulatory authorities, accreditors, and organisers; registration fees paid by HCPs; and the time spent by the HCPs away from their workplace to attend these programs. Therefore, the effectiveness of the programs must be evaluated. The HCPs' uncertainty regarding the desired learning outcomes and the failure of program planners to assess outcomes properly could cause learners to acquire pseudo knowledge, pseudo skills, pseudo attitudes, and pseudo values (Malan, 2000).

ACCME recommends that the effectiveness of CME should be measured (Weiner, 2009). Evaluating UAEU-accredited CME programs encourages accountability and allows education providers to gain information about their programs, which contributes to continuous program development. Moreover, learners should have an opportunity to evaluate whether the CME learning objectives of the program have been achieved and whether they have experienced an improvement in competence, knowledge, or skill because of the program (Frye, 2012).

The effectiveness of UAEU-accredited CME programs should be evaluated for their role in advancing HCP knowledge. The planning of CME programs should consider the professional

speciality and maintain CME program content level to meet learning needs of the target audience. The evaluation of the CME programs should take into account the characteristics of the attending HCPs and motivation of the HCPs to attend these programs as well as assess whether the CME programs meet the HCPs learning expectations, the CME programs achieve their stated learning objectives, and the strengths and weaknesses of each program. The program design, including the scientific content of the training sessions, speaker's performance, program structure and settings, should also be evaluated. In addition, receiving recommendations from the participating HCPs for strategies to improve CME practices in the UAE is essential for continuous improvement in CME initiatives. Furthermore, CME evaluation will facilitate in bridging the gap between current clinical practices and the required practices by using current evidence (Coulter, 2006).

This study addresses all the aforementioned issues through an evaluation of UAEU-accredited CME programs by using levels 1 and 2 of Kirkpatrick's evaluation model, with particular assessments of the differences in the knowledge gained from the programs by the HCPs, according to their specialty.

1.4 Study aim and objectives:

In this study, by using levels 1 and 2 of Kirkpatrick's evaluation model, the effectiveness of UAEU-accredited CME programs organised by the Internal Medicine Department, College of Medicine and Health Sciences was investigated on the basis of the views of HCPs who had undertaken four UAEU-accredited programs in 2016. These programs were evaluated for the extent to which the learning goals stated by the organisers were achieved, the fulfilment of

HCPs' learning expectations, program design, speakers' performance, and improvement in HCP knowledge. This study expands the knowledge regarding the CME approach in the UAE.

The following are the study objectives:

1. To examine the characteristics of the HCP who attend the UAEU-accredited CME programs (audience).
2. To identify the factors determining the attendance of the CME programs by the HCPs.
3. To explore the viewpoints of the HCPs who attended the CME programs, regarding the desired characteristics of the programs.
4. To assess the perception of the HCPs after attending the CME programs.
5. To assess the extent to which the CME programs met the HCPs' expectations.
6. To investigate whether the CME programs achieved the organiser-stated learning goals, from the viewpoint of HCPs who attended the programs.
7. To evaluate the CME programs in terms of program design and speaker performance.
8. To determine the level of knowledge gained from the CME programs by the HCPs who attended these programs.
9. To assess the expected change in management strategies at the HCPs' workplace based on new knowledge gained by attending UAEU-accredited CME programs.
10. To identify the barriers anticipated by the HCPs in implementing the knowledge newly gained (by attending the CME programs) in their workplace.
11. To identify the challenges that HCPs face in seeking and attending CME programs.
12. To explore the recommendations of HCPs in Abu Dhabi for improving the CME practise in general in the UAE.

1.5 Research questions and hypotheses:

The main research question in this thesis will be: What effect does conducting UAEU accredited CME programs have on the health care professional's knowledge and perception?

The following were used as the research sub-questions to achieve the study objectives:

	Research question	Research objectives
1	To what extent, if at all, have the UAEU-accredited CME programs met the attending HCPs' learning expectations?	5 , 3, 4
2	To what extent, if at all, have the CME programs achieved the learning objectives stated by the organisers?	6
3	Which factors determine the selection and attendance of the CME programs by HCPs?	2, 1
4	To what extent, if at all, are the HCPs who attend the CME programs satisfied with this learning experience in terms of the following domains: program content, program structure, speakers' performance, and program setting?	7
5	To what extent, if at all, have the CME programs changed the HCPs' knowledge about the topics covered in the CME programs?	8, 9
6	What are HCPs' beliefs regarding the role of the CME programs in changing their knowledge (on topics covered in the program) and implementing newly acquired knowledge and skills at their workplaces and what are their recommendations to improve the	3, 9, 10, 11, 12

	CME programs in the UAE?	
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Table 1.1 Research questions with related research objectives

To answer the aforementioned research questions, the following research hypotheses served as guides for data collection and analysis.

- 1 Hypothesis 1 (H1): The perceptions of the HCPs who attended the UAEU-accredited CME programs were at least equal to their expectations.
- 2 Hypothesis 2 (H2): The UAEU-accredited CME programs achieved the learning objectives stated by the organisers
- 3 Hypothesis 3 (H3): The HCPs who attended the CME programs were satisfied with this learning experience with regard to the following domains: program content, program design, speakers' performance, and program setting.
- 4 Hypothesis 4 (H4): The CME programs improved the knowledge of the HCPs, who attended the programs, regarding the topics covered in the program.

1.6 Significance: The value of the study:

In this section, the significance of the study in the context of the UAE is discussed. The primary merit of this study is that it has numerous expected outcomes that may be useful for all CME stakeholders in the UAE, including HCPs and researchers in adult learning.

- HCPs are the most valuable assets in a healthcare system; HCPs include academicians, researchers, and practitioners. This study explores the concept of the UAEU-accredited CME programs and its effectiveness in the UAE healthcare system.

- This research will highlight the importance of learning and acquiring skills for HCPs through CME programs. Simultaneously, this research will facilitate HCPs in acquiring educational development through CME programs.
- These research results will provide HCPs, CME accreditors, health regulatory authorities, and CME organisers with evidence regarding the usefulness of CME programs. The mandatory nature of the CME programs burdens institutions and attendees, starting with the cost of organising these programs, which is either covered by the institution or the HCPs themselves. The time spent by HCPs in attending the programs and the time that speakers spend in preparing these courses are usually deducted from patient care time; these factors cause dissatisfaction among the attending HCPs and raise questions regarding the effectiveness of these programs. Moreover, the lack of content diversity of the course limits its suitability to the workplaces, specialties, and interests of most of the attending physicians.
- This study provided the CME organisers with clear feedback from the HCPs who attended the CME programs about the strengths and weaknesses of the programs as well as suggestions for improvement. This study will provide an opportunity to improve the CME practice in the future to ensure that these programs meet the HCPs' expectations regarding learning objectives.
- Furthermore, this is the first study on the evaluation of CME in the context of healthcare in the UAE because only a few studies on CME and scant academic resources on the concept and practise of CME in the UAE are currently available. The study results can be used as a reference for future studies in this field. Furthermore, the CME-accreditation bodies or the organisers in the UAE have not reached a consensus regarding an

evaluation method that measures the effectiveness of the UAEU-accredited CME programs and the opportunities to improve them. This study provides a tested method that can be modified according to the CME program content.

1.7 Structure of the dissertation:

The scheme of the chapters in this thesis is as follows:

Chapter 1 Introduction: The first chapter is an introductory chapter and provides a basic idea about the concept underlying this study involving HCPs who attended UAEU-accredited CME programs. This chapter covers the rationale of research and background of the study. The chapter also discusses researcher motivations; the problem statement; the study aim; research objectives, questions, and hypothesis; the value and significance of the study, and the structure of this dissertation.

Chapter 2 CME overview, theoretical framework and literature review: This chapter discusses different aspects of CME and describes the model used to evaluate the effectiveness of CME in this study, namely Kirkpatrick's model. The aim of the chapter is to familiarise the reader with various aspects of CME and the factors that determine its effectiveness. The first part of Chapter 2 is organised to provide a detailed account of the concept of CME and an introduction to related terms such as accreditation, transfer of learning, mandatory status, and effectiveness. The second part of the chapter briefly describes the requirements of a model to evaluate the effectiveness of CME. It includes an account of theories related to learning and cognition among different types of learners to presents the theoretical framework of the present study, which consists of a review of relevant theories and concepts. The third part of chapter 2 is an extensive survey of the literature relevant to CME and the evaluation of CME programs using different methods, as well

as a literature review relevant to CME and covers global research as well as that specific to the UAE.

Chapter 3 Research methodology: Describes the methodology used to evaluate the effectiveness of UAEU-accredited CME programs in terms of meeting the expectations of the participating HCPs and exhibiting measurable learning changes. Levels 1 and 2 of Kirkpatrick's evaluation model were used for evaluation. It also describes the research paradigm, research approach, research design, sampling design, data analysis, and interpretation strategies used in this study; elucidates the strategies used to validate the findings; and presents the ethical considerations of this study.

Chapter 4 Results and data analysis: Contains the results of the study for both the quantitative and qualitative data, results organized as per the research questions and displayed through tables and figures for the descriptive and inferential statistics.

Chapter 5 Discussion, conclusion, and recommendations: Discusses the results and explains observed trends. It also considers the results of the present study in the light of previous studies on CME evaluation. The concluding section summarises the overall findings of the study. Limitations and implications of the study were discussed in this chapter. Finally, recommendations to improve the effectiveness of CME have been provided.

Chapter 2. CME overview, theoretical framework and literature review

2.1 Introduction:

The present study evaluates the effectiveness of UAEU-accredited CME programs and investigates the satisfaction of the participating HCPs. This chapter discusses different aspects and theories of CME and describes the model used to evaluate the effectiveness of CME in this study, namely Kirkpatrick's model. The aim of the chapter is to familiarise the reader with various aspects of CME and the factors that determine its effectiveness. This chapter is divided into three main parts: The first part of the chapter is organised to provide a detailed account of the concept of CME and an introduction to related terms such as accreditation, transfer of learning, mandatory status, and effectiveness. Furthermore introducing the CME experience in UAE will be in this part. The second part presents the theoretical framework of the present study, which consists of a review of relevant theories and concepts ending with the conceptual framework in this study. The third part is a literature review relevant to the conceptual framework items and CME which covers global research as well as that specific to the UAE.

2.2 Overview of CME:

Professional development in the context of business is a process that involves improving and increasing the capabilities of staff through access to education and training opportunities at the workplace, either by seeking training from outside the organisation or by watching others perform the job. Professional development contributes to building and maintaining the morale of staff members. Moreover, it potentially attracts high-quality staff to an organisation (Business Dictionary 2018). Lifelong learning is a concept adopted by governments and educational institutions worldwide in response to the need for continuous learning, irrespective of profession

(Siddiqui, 2003). This concept has been demonstrated in all professions, including education, industry, trade, and technology. In the healthcare context, continuous learning is considered an ethical obligation for HCPs and is referred to as continuing professional development (CPD) or CME. The concept of CME and various related aspects, such as the need for CME, transfer of learning in CME, mandatory CME status, CME accreditation, CME effectiveness, evaluation of CME effectiveness by using the dimensions proposed in this thesis, and CME status in the UAE, are discussed in the sections of this chapter.

2.2.1 Concept of CME:

Medical schools provide basic knowledge and skills to HCPs, and this provision continues during residency training and sometimes during subspecialty or fellowship programs. However, formal structured teaching ends at some point, and the methods used by HCPs to continuously update their knowledge and skills after their formal studies are known as CME (Shvartzman, 2013). The concept of CME has been rapidly gaining popularity during the past decades (Thomas et al., 2006). It has been accepted as a standard requirement among international and educational organisations, and it refers to all learning by HCPs, including physicians, nurses, pharmacists, midwives, clinical officers, and public health staff, after the completion of their basic training (Nitro & Mrema, 2003). Researchers in CME appear to have reached a consensus that CME is a systematic attempt to facilitate changes in HCP practice, and the fundamental aim of CME is high-quality and safe healthcare for patients (Fox et al., 1998; O'Brien et al., 2001; Beshyah et al., 2012; Little et al., 2005; Fletcher, 2008).

In their updated CME guidelines, the health authorities in the UAE refer to CPD as a broad term covering different educational programs, including CME. The authorities define CME as a range

of learning activities through which HCPs maintain and develop their knowledge and skills throughout their career to ensure that they retain their capacity to practice safely, effectively, and legally within the evolving scope of their practice (DHA, 2014). Regardless of debates in the literature, CME and CPD are equivalent according to this definition, and CME has been expanded to include subjects such as management, teaching, appraisal, and communication skills; information management; and other topics that extend beyond the scope of conventional medical subjects (Chan, 2002).

Improvements in HCP performance, knowledge, and skills as well as in healthcare outcomes are the types of change that have been the focus of studies on CME (Davis et al., 1992; Fox et al., 1998). Various definitions of CME are available in the literature and have been adopted by HCP societies; the definitions share the following broad perspectives of CME:

- CME is self-driven and individually tailored according to an assessment of needs (Filipe et al., 2014).
- CME programs are designed and implemented to suit the complex working environment of HCPs, such as the multidisciplinary context of patient care (WHO, 2010).
- CME is an ongoing learning process that builds on the basic education of HCPs and ensures their competence in the fulfilment of their duties in the context of current and future work (Filipe et al., 2014).
- The content of CME should not be limited to training programs with a clinical focus. The content should be holistic, and topics such as interpersonal communication skills, ethics, practice management, and professionalism should be covered. Furthermore, venues of

CME programs should be extended to include practice settings instead of being restricted to the classical conference rooms (Zagorski et al., 2006; Davis et al., 2003).

- The evaluation of CME programs should be assessed using a self-evaluation model-reporting form (WHO 2010).
- CME should cause changes in the medical practice behaviour of HCPs, leading to the achievement of a quantifiable improvement in healthcare (Zagorski et al., 2006).

CME was introduced in the USA in the late 1920s when the mediocrity of the initial medical training of practicing physicians was identified. In all healthcare facilities, CME emerged as a definable and distinct activity that supports, develops, and either maintains or increases the skills, knowledge, and performance of HCPs with respect to patient care. CME activities can also assume the form of journal clubs, conferences, ground rounds, radiology meetings, traditional courses, ward teaching rounds, online courses, and workshops as well as computer-aided sessions, chart reviews, audio-visual sessions, self-assessment package programs, and remainders and feedback (Siddiqui, 2003; Rahman 2005).

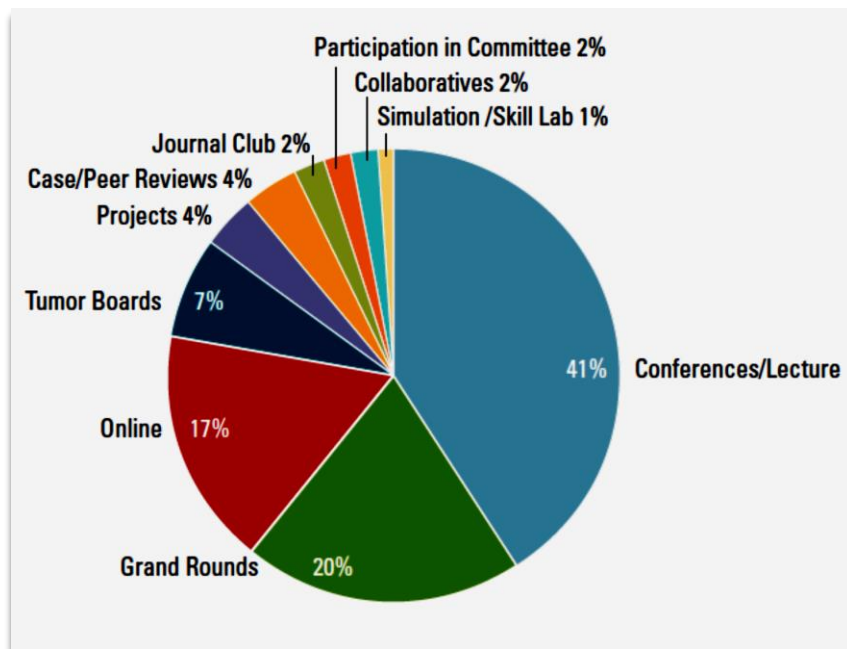


Figure 2.1: Formats of CME programs in the USA. Source: Combes et al., 2014

According to the 2011 AAMC/SACME Harrison Survey (Academic CME, 2013), CME programs have been associated with a considerable improvement in HCP performance (from less than 10% to more than 15%) within 6 years in medical academic centres. The success of CME programs is most strongly associated with the present credentialing requirements, evaluation of physician practice, and various other existing certifications; consequently, the strategic needs of hospitals can be met. CME also assists physicians in meeting the requirements of maintenance of certification or provides CME credits for CME activities that are related to focus professional practice evaluation or ongoing professional practice evaluation.

2.2.2 Need for CME:

Healthcare and its related branches have been emerging at a fast pace, which has resulted in an overwhelming number of new curative modalities. HCPs may encounter difficulties in staying abreast of the most up-to-date developments. Thus, CME programs are designed to provide

HCPs with updates regarding the most recent advancements in various therapies. Accordingly, CME is a prerequisite for the standard renewal of clinical authorisation. Educational institutions, specialised entities, and pharmaceutical firms generally conduct CME programs. Because CME programs provide a platform for the transmission of knowledge, in the case of curative topics, they must offer the most recent information supported by an adequate number of well-structured and well-executed studies (Hashmi & Singh, 2010).

In healthcare systems, CME facilitates continuous improvement and learning and aids physicians in bridging the gaps in professional practise. CME also changes the views of physicians regarding maintenance, license renewal, credentialing, professional society membership, as well as other privileges that they can avail of as HCPs. Currently, many hospitals worldwide offer educational programs consisting of accredited CME activities. Hence, in the USA, hospitals that conduct CME-granting programs constitute a large proportion of CME-conducting institutes.

According to Accreditation Council for Continuing Medication Education (ACCME), in 2013, hospitals in the USA accounted for approximately 35% of the total CME activities conducted and 38% of the credit hours of CME offered in that year, in the same year, these hospitals had received grants exceeding USD 1.5 billion for CME activities (ACCME, 2013). Since its inception, CME has mainly focused on improving the medical knowledge and skills of HCPs rather than on developing the competencies of professionals and upgrading institutional conditions to transform practices, improve outcomes, and improve the effectiveness and efficiency of practices in hospital settings. CME today has rapidly changed the requirements of physicians and hospitals with regard to healthcare delivery, and this change has further increased

the need for CME within the existing mechanism and strengthened its association with healthcare systems (Bower, 2008).

Practitioner knowledge and practice results exhibit a significantly positive correlation. For example, a positive correlation among knowledge-based examination performance, internal medicine, and actual medical presentation was observed. The primary principle of CME is to improve patient outcomes by improving the practitioners' medical performance. Inferences regarding practitioner learning from such programs indicate that participation in CME programs that do not provide knowledge of multiple techniques possibly do not improve patient outcomes significantly. CME programs that require or involve the application of knowledge are considered well-designed programs that enhance professional learning, knowledge, and skills (Bordage et al., 2009).

It also enables them to agree to or refuse the use of new preparations, thereby inducing them to discontinue minimally efficient practices in their present care methods and facilitating them in including recent strategies in their practice. Furthermore, CME content assists HCPs in developing societal skills as well as techniques of healthcare teaching, which are as essential constituents of CME as techniques of quality organisation and proof-based medicine (The German medical community, 2007).

CME offers a potential means to impart medical knowledge, support practitioners, comprehend the correlation between their performance and the healthcare system, and emphasise the demand for system-centred performance and behaviours. Conventionally, the rapidly transforming healthcare system requires practitioners to meet and interact and healthcare centres to collaborate to change the delivery paradigm of healthcare; CME, being an accessible method, can improve

and reinforce these associations. Consistent with all healthcare education, continuous learning promotes superior proficiency. System-centred performance and practice-centred education become prominent through CME at some point after the end of residency teaching (Combes & Arespachoga, 2014).

CPD, the self-directed approach in healthcare education, is similar to CME programs; it is the most crucial tool for the enhancement of healthcare systems. Such CPD programs focus on the learning requirements of individuals throughout their careers in healthcare. Furthermore, quality improvement activities in CME commonly take the form of small interactive meetings, which are primarily conducted to facilitate learning and improve healthcare practices by increasing the degree and types of interaction; participant number; length, nature, and frequency of the meetings; and focus on medical-oriented practices (Obrien, 2007).

CME	CPD
Episodic interventions designed to address the educational needs of groups of learners	Lifelong based on ongoing self-assessments designed to address the educational needs of individuals
Generally teacher centered/driven	Generally learner centered/driven
Principally encompasses the clinical domain	Comprehensive in scope. Encompasses the clinical domain as well as practice management, leadership, administration, education, and an entire spectrum of professional activities
Lecture based format (passive learning)	A variety of learning formats and delivery methods (active learning)
Most often conducted in formal settings such as lecture halls or conference rooms	Conducted in a variety of different venues including locations other than lecture halls and conference rooms
CME: Continuing medical education, CPD: Continuing professional development	

Figure 2.2 Comparison between CME and CPD Source: Filipe et al., 2014

CME agendas efficiently enhance the performance of physicians and improve patient outcomes. As part of a complex approach, across physicians in practice and in training, educational detailing was found to be an efficient mode of improving physician performance and patient outcomes (Van Hoof et al., 2015). Professionals participate in CME and CPD programs for the following reasons (SCFHS, 2009):

- These programs improve confidence in professional service delivery
- They promote competence in medical practice
- They confer eligibility on HCPs for suitable career advancement opportunities
- They improve satisfaction among HCPs regarding their healthcare work role and promote lifelong learning
- They provide support and structure to HCPs to achieve their desired goals

DHA stated in the DHA CME manual (DHA, 2014) that the advantages of engaging professionals in CME activities are as follows:

- Patients treated by HCPs who have undertaken CME activities receive safe, high-quality, and evidence-based service
- The activities improve the confidence of HCPs in delivering professional service
- They (i.e., the CME activities) promote and maintain the competence of HCPs in medical practice
- They improve the satisfaction of HCPs with their work roles
- They promote lifelong learning among HCPs

- They provide a structure that supports HCPs in achieving their intended goals
- They improve the career advancement opportunities of HCPs
- They contribute to the number of meetings conducted in healthcare organisations, thereby increasing the demand for accountability, flexibility, and a skilled and competent workforce
- They improve work-related interactions among professionals in healthcare organisations
- They facilitate the achievement of organisational objectives
- They improve staff motivation and morale
- They contribute to quality assurance in healthcare organisations

2.2.3 Mandatory status of CME:

The first mandatory CME program was initiated in USA in 1934. In 1957, the American Medical Association (AMA) published the first set of guidelines for good medical practice (Josseran et al, 2001). By the late 1960s, mandatory CME was widely accepted although the regulations varied among countries. In the early 1970s, the political predominance of the AMA in CME was questioned by other professional associations (hospitals and medical schools). After considerable discussion and debate, a common association for CME, that is, the ACCME, was created in 1981 (Josseran et al, 2001).

Physicians keep abreast of the new information, knowledge, and competencies by participating in CME programs. General practitioners typically select the CME programs that they want to attend based on their self-evaluation of institutional demand and accessibility, as well as the number of credits associated with CME programs. Considering the speed at which knowledge expands and technology widens, upgrading the knowledge and proficiencies of practitioners and

other HCPs is essential for ensuring that the treatments they offer are predicated on the most recent medical evidence. Consequently, in many countries, CME is obligatory for all working practitioners. Methods based on e-learning in CME are becoming widely accepted (Cook et al., 2008); these methods potentially increase convenience, enhance flexibility, and offer a relatively fast response to people's healthcare requirements on a large scale (Hadadgar, 2017).

Physicians spend a considerable amount of time in CME to retain their medical licenses (Tian, 2007). Accordingly, policy makers in the health sector worldwide have been creating special policies to achieve the continuity of learning among HCPs in their countries. These policies have been implemented according to the required standards as part of CME programs, and a minimum mandatory number of CME hours, accredited by relevant authorities, have been defined in CME policies. (Miller et al., 2015) For instance, in the USA, many states require CME for medical professionals to maintain their licenses. CME for physicians is regulated by the ACCME within the USA. In Canada, certification is provided by the Royal College of Physicians and Surgeons of Canada and the College of Family Physicians Canada (Josseran, 2001).

The formal credit system for CME began first in North America and then extended to Europe (Miller et al., 2015). CME systems are currently present in 26 European countries (96%), but some of these systems do not have a credit-based format (11%). In 15 countries (56%), participation in CME is mandatory. In the remaining countries, participation is voluntary and is based on the assumption that CME is a civic duty, and in some cases, voluntary participation is encouraged using either tax incentives or financial rewards (Saita et al., 2014). In April 2002, Italy's mandatory CME was decentralised and has thereafter been only regulated by the government body that accredits CME activities. CME activities in Italy received support from

scientific referees. In 2003 and 2006, 20 and 50 credits respectively were made mandatory. However, 10,000 CME organisers were registered who organised more than 100,000 medical educational events in 1 year. In countries such as Belgium and Norway, the knowledge enhancement or updating translates as an increase in salary (Braido et al., 2005).

Country	CME system	CME requirement	Credits /year	CME credits (minutes /credit)	Recognised e-learning	CME target
Austria	Present	Compulsory	150/3	45	Yes	All MD
Belgium	Present	Voluntary	60/3	60	Yes	All MD
Bulgaria	Present	Compulsory	150/3	45	Yes	All MD
Cyprus	Present	Voluntary	150/3	60	Yes	All MD
Czech Republic	Present	Compulsory	120/3	45	Yes	All MD
Denmark	Present	Voluntary	200/5	60	Yes	All MD
Estonia	Present	Voluntary	300/5	45	No	All MD
Finland	Absent	Voluntary	NBC	NA	Yes	All MD
France	Present	Compulsory	250/5	45–60	Yes	All MD, DN, and HP
Germany	Present	Compulsory	150/3–250/5	45	Yes	All MD
Greece	Present	Voluntary	100/5	NA	No	All MD
Hungary	Present	Compulsory	250/5	60	Yes	All MD, DN, P, and CP
Ireland	Present	Compulsory	250/5	60	Yes	All MD
Italy	Present	Compulsory	150/3	60	Yes	All HPr
Latvia	Present	Compulsory	250/5	60	Yes	All MD
Lithuania	Present	Compulsory	120/5	NA	Yes	All MD
Luxembourg	Present	Voluntary	NA	NA	Yes	All MD
Malta	Present	Voluntary	NA	NA	Yes	GP
Netherlands	Present	Compulsory	200/5	60	Yes	All MD, P, PY, HPs, MW, N, DN, PsT
Poland	Present	Compulsory	200/5	60	Yes	All MD, DN
Portugal	Present	Compulsory	NBC	-	No	All MD
Romania	Present	Voluntary	200/5	60	Yes	All MD
Slovakia	Present	Voluntary	250/5	60	Yes	All MD, DN, N, MW, A in learning activities
Slovenia	Present	Compulsory	75/7	60	Yes	All MD, DN
Spain	Present	Voluntary	NA	1 ECMEC = 0.12 SACCM E	Yes	All MD
Sweden	Present	Voluntary	NBC		Yes	-
United Kingdom	Present	Compulsory	250/5	60	Yes	All MD

Abbreviations: MD: medical doctors, DN: dentists, HP: hospital pharmacists, HPr: health professionals, HPs: healthcare psychologists, P: pharmacists, CP: clinical psychologists, GP: general practitioners, PY:

physiotherapists, PsT: psychotherapists, MW: midwives, N: nurses, A: assistants, ECMEC: European CME credits, SACCME: Spanish accreditation system for CME, NA: not applicable, NCB: not based on credits

Table 2.1: Comparison of CME systems in 27 European countries on the basis of six fundamental categories. Saita et al., 2014

2.2.3.1 Mandatory status of CME in UAE:

The UAE is similar to other Gulf Cooperation Council (GCC) countries that have large numbers of migrant HCPs; consequently, the healthcare workforce is heterogeneous in terms of education and practice. Therefore, these countries face challenges in maintaining the quality standards of patient safety and healthcare (Srivastava, 2015).

Both the UAE and Kingdom of Saudi Arabia have mandatory CME/CPD activities that are linked to reregistration and relicensing. Therefore, these two countries have an advantage over other countries in the Middle East in attaining and maintaining high standards of healthcare comparable to those in Western countries. In these two countries, completion of 10–50 hours of CME/CPD activities every year is mandatory for HCPs (Srivastava, 2015).

In the UAE, both government and private sections in the healthcare sector are controlled mainly by three authorities, namely the HAAD, DHA, and the UAE Ministry of Health (MOH). The MOH acts as regulatory body for all the Emirates but mainly covers the five Emirates other than Abu Dhabi and Dubai. These three authorities require unified healthcare Professional Qualification Requirements (PQR), which is a milestone in fulfilling the UAE accreditation to improve healthcare services provision across the UAE (MOH, 2014).

HCPs including physicians, nurses, and pharmacists should meet the following requirements to qualify for licensure: an educational qualification with national accreditation, and the

qualification should be issued by a government-recognised college in their home country. The minimum qualification must be a high school certificate. CME policies are designed to provide high-quality CME programs by adopting international standards to ensure a positive effect on the delivery of healthcare services (HAAD, 2015; DHA, 2015; MOH, 2015).

HCPs seeking employment in the UAE should obtain a license to be eligible to practise in the UAE, and the license should be renewed annually. Hence, the renewal depends on completing a specific number of CME credit hours. Since 2000, recruitment agencies recruit medical professionals, paramedical staff, and nurses from major hospitals in the UAE. In 2004, 300 expatriate midwives, nurses, and physicians were recruited to the UAE with advantageous packages, which ensured suitable working conditions, safety, high salaries, and modern amenities (Alotabi, 2007).

CME aims to allow the patient to avail all services in addition to promoting the cooperation within healthcare systems. Physicians from all hospitals are motivated and encouraged to participate in CME activities. The information disseminated to the HCPs through CME programs have changed medical practices because the information is obtained from research and development activities conducted in universities worldwide (AD CME, 2008).

The UAE healthcare authorities require a mandatory number of hours of CME per year to be completed by all HCPs. This hour requirement is mandatory for license renewal. (Younies et al., 2010). The Department of Health, previously known as HAAD, has established Law No. 1 of 2007 with the aim to achieve the highest standards in health, curative, preventive, and medicinal services and health insurance; to advance these services in the health sector; and to follow-up

and monitor the operations of the health sector to achieve an exemplary standard in the provision of health, curative, preventive, and medicinal services and health insurance (HAAD, 2017).

The HCP manual of HAAD, updated in November 2017, clearly states that all licensed HCPs must maintain and continue to develop their professional knowledge and skills so that they, at all times, remain up-to-date and capable of providing safe, effective, and high-quality treatment to patients. In each year of professional practice in Abu Dhabi, HCPs must obtain the required quota of CPD credits. HAAD requires licensed HCPs to obtain a specific number of CPD credit hours each year (HAAD, 2017).

Regarding its policy to secure reliably high standards of health services, the HAAD decided to link renewal of licenses of all HCPs to CME activities in order to ensure their engagement in self-education and development. Since June 2008, license renewal for physicians and dentists working in the government and private health sectors in Abu Dhabi has been linked to CME. By February 2009, pharmacist and nurses were also asked to fulfil the CME requirements when submitting their application for license renewal. CME requirements vary according to the region of the world (Giri, 2012). The UAE uses a credit hour system, with one credit per hour of attendance. The number of credits required varies from 50–100 hours per year.

Licensing category	Minimum CME hours required
Physicians and Dentists	40
Nurses	20
Pharmacists	20
Allied Health	10

Traditional Complementary and Alternative Medicine	10
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Table 2.2: HAAD minimum CME requirements for licensing. Source: HAAD, 2017

The minimum annual CME requirements for license renewal are shown in Table 2.2. The physician and dentists should have a minimum of 40 CME practicing hours, while nurses require 20 hours. HCPs involved with pharmacy, allied health, and traditional complementary and alternative medicine require 20, 10, and 10 hours, respectively.

2.2.4 Accreditation for CME:

Medical practitioners are involved in lifelong learning. Thus, CME contributes to the success of their medical profession and helps them to keep pace with the latest knowledge. Credit hours in CME programs are expected to enable physicians to familiarise themselves with the most recent advancements in their areas of expertise. This would indirectly enhance patient outcomes. When the CME program credit hours practice is correctly enacted by a clinical organisation and becomes well-established, an appraisal of practitioners in healthcare could be conducted every 5–10 years for the renewal of registration (Sukhlecha, 2013).

According to the ACCME guidelines, any entity that conducts regular and recurring CME programs can meet the accreditation requirements; however, it should not have commercial motives for organising these programs. The following types of organisations are accredited by the ACCME: schools of medicine, medical specialty societies, insurance companies, medical education and publishing companies, government agencies, hospitals and health systems, foundations, and other non-profit organisations (ACCME, 2016). Across the USA, each year 2000 accredited CME providers offer more than 138,000 activities, including scheduled series

and live meetings, namely medical journal, performance improvising projects, and ground rounds, to more than 24 million HCPs (ACCME, 2013).

2.2.4.1 Accreditation for CME in UAE:

HAAD defines accreditation as a formal system for evaluating the quality of services as well as the competency of a system, training programs, organisations, and healthcare facilities (HAAD, 2017). The primary aim of accreditation is to assure physicians that they are not being subjected to promotion and marketing messaging. It ensures that CME programs are developed to address an identified need of the profession, and that they are based on valid content, which is relevant to the physicians' practice. Accreditation also indicates that the program has been evaluated for changes in competence, performance, or patient outcomes and is independent of the commercial interests of the organising entity (Griebenow et al., 2017). Health regulatory authorities in the UAE (HAAD, DHA, and MOH) in their CME guidelines, updated on December 2017, listed the following CME accreditation bodies that are recognised within the UAE (HAAD, 2017):

- University of Sharjah
- MOH
- DHA
- HAAD
- College of Medicine and Health Science (CMHS), UAEU

CMHS in UAEU offers accreditation for the CME programs with the aim of increasing medical professional knowledge and skills in the UAE. Thus, as part of an endeavour to spearhead CME in the UAE, CMHS has set the highest standard in the policy of CME accreditation by

engendering continuous improvement in healthcare delivery and quality through CME (Boonyasai et al., 2007).

The CME accreditation body of UAEU recognises the critical contribution of the healthcare system to CME. Hence, guaranteeing unbiased CME is necessary for CME adoption through a balanced approach and to promote cooperation between HCPs and the healthcare system so that HCPs and patients both benefit. CME attempts to preserve the integrity of the medical profession as well as recognise the rights of pharmaceutical and medical equipment industries as business entities. CME accreditation by the UAEU should be clearly differentiated from commercial sessions known as satellite sessions that accompany social events (HAAD, 2011). According to CMHS, (2016) in the UAEU, CPD offers training in improved practices to HCPs so that they remain up-to-date with the CME activities in scientific research as well as medical practices.

The various activities of CME/CPD accredited by the CMHS include international and local conferences, clinic-pathological presentations, critical reviews, research findings, video conferencing, and speciality journal practices. The CMHS is an approved CPD accreditor of healthcare education in UAEU. To obtain UAEU accreditation for a proposed CME program, the event organiser should fill up an online form and provide complete information regarding the planned CME program and upload related documents (such as program agenda, speaker's resume, presentations, certificate template, evaluation, and attendance form). In addition, the organiser is required to pay an accreditation fee based on defined criteria stated clearly on the UAEU CME website.

The following information is required in order to provide for UAEU CME accreditation:

- 1 Who is putting on this activity? Who is involved in the planning? Where and when will the activity be held?
- 2 A statement regarding a needs assessment and how the content for the conference was determined.
- 3 At least 2 or 3 Learner oriented Measurable objectives for the conference.
- 4 Who is the target audience and how many individuals are anticipated will participate in the meeting:
- 5 A copy of the planned program, which includes times of workshops, lectures, etc.
- 6 Names and short summaries of the speakers including their credentials and place of employment:
- 7 A statement regarding sponsorship and the role of the sponsoring companies in developing the program.
- 8 Prepare an evaluation form for use by the participants.
- 9 How will you document attendance? How will attendees be provided with a record of attendance?
- 10 Have you applied to other entities for accreditation? If yes, why?
- 11 Post-conference report that includes: Number of actual participant's Final program, Summary of evaluations and lessons learned for subsequent CME programs. Certificate of attendance
- 12 Any additional information about the conference you wish to communicate.

Figure 2.3 Summary for the requirements to apply for UAEU CME accreditation. Source: UAEU CME website (<http://www.uaeu-cme.com/Guidlines.asp>)

Most of the listed requirements are needed to ensure the rigour and transparency of the accreditation process. The requirement of stating measurable learner-oriented objectives seems appropriate because meeting this requirement accurately will facilitate the organisers to evaluate the effectiveness of their CME programs. The organisers may face problems in estimating the attendance of participants because attendance is likely to be affected by the number of credits assigned to the CME program after accreditation.

The CME program is developed by the internal medicine CPD committee in UAEU. At a conference in 2009, rapid review courses (RRCs) were redelivered at Al Ain; thus, the CPD committee meets once a month for developing the CME activities according to the needs and assessments of speakers. The goal of the CPD is to create high-level educational programs in medicine to ensure that CME activities enrich HCPs and to transform the healthcare system into a highly technology-based innovative structure. The targets of the CME activities with respect to a technological medical system are residents, medical students, pharmacists, nurses and, most importantly, physicians. The CPD committee strongly adheres to the requirements of accreditation in the UAE (Shehab et al., 2012). Each CME program is revised by a panel of experts and validated for terms and conditions. The committee ensures that the content of the program is appropriate and compares it with course benchmarks in the USA and Europe. Hence, each course is delivered as an event that spans an entire day. Each and every event is accredited by CME accreditation bodies in the UAE. Each RRC is delivered by professors from the UAEU and consultant physicians from across hospitals across the UAE (Shehab et al., 2012)

Providing CME programs cannot ensure that HCPs have learned what they should from these programs. They may obtain CME credits for a conference without paying attention to the content (Paul, 2016); hence, crucial questions regarding the effectiveness of CME programs remain. What do we mean by effectiveness of CME programs? How will effectiveness be reflected and evaluated in this study? The next part of this thesis will discuss about the effectiveness of CME.

2.2.5 CME status in UAE:

The UAE is a constitutional federation of the following seven Emirates: Abu Dhabi, which is the capital of the UAE (Al Ain is part of Abu Dhabi), Dubai, Ajman, Sharjah, Fujairah, Ras Al

Khaimah, and Umm Al Quwain. According to the Federal Competitiveness and Statistics Authority 2016 statistics, as on 31 December 2016, the total population in the UAE was 9,121,167, including 947,997 UAE nationals. People of more than 200 nationalities live and work in the UAE. The expatriate population exceeds that of UAE nationals. Indian nationals constitute the largest foreign community in the UAE, followed by Pakistani and Bangladeshi nationals and people from other Asian countries. European and African populations also reside in the UAE. The official language of the UAE is Arabic. Other widely spoken languages include Bengali, English, Farsi, Hindi, Malayalam, Mandarin, Nepali, Russian, Sinhalese, Tagalog, and Urdu.

Indicator	2012	2013	2014	2015	2016
Total Population estimate	2,314,819	2,492,518	2,656,448	2,784,490	2,908,173
Population growth rate	7.1	7.7	6.6	4.8	4.4
Population density estimate	39	42	45	47	n.a

Table 2.3: Estimated population, growth rate, and density of the Emirate of Abu Dhabi 2012–2016. Source: Statistics Centre–Abu Dhabi (SCAD), <https://www.scad.ae/en/pages/default.aspx>

The UAE is considered one of the richest countries in the world in terms of per capita gross domestic product (IMF world economic outlook reports list, 2016). The provision of world-class healthcare by enhancing healthcare services and upgrading health standards is a major component of the national strategy in the UAE (Shehab et al., 2012). Relatively few published academic articles describe the status of CME in UAE; therefore, most of the information provided in this thesis has been obtained from reports published by the government and authorities as well as from my own experience.

Health services in Abu Dhabi have undergone remarkable expansion and transformation over the past years. This is most evident from the considerable increase in the number of hospitals and other health facilities over this period. In 2015, the number of hospitals increased to 51, which includes newly opened private hospitals in Abu Dhabi. In general, the Emirate has also witnessed a remarkable increase in the number of health centres and clinics (SCAD, 2017).

Indicator	2012	2013	2014	2015
Hospital beds	2,457	2,583	2,507	2,952
Cancer death rate (per 1000 population)	18	16	15	15
Registered nurses	12,458	14,235	16,577	21,733
Hospital	39	41	45	51
Inpatients	163,859	193,996	212,077	225,652
Physicians	5,551	6,864	7,516	8,460

Table 2.4: Health statistics for the Emirate of Abu Dhabi 2012–2016. Source: Statistics Centre – Abu Dhabi (SCAD), <https://www.scad.ae/en/pages/default.aspx>

The government of the UAE, which is represented by the health authorities in all the Emirates, has provided considerable financial support for improving healthcare services. To obtain the maximum benefits from this investment, these authorities aim to continually improve HCP performance in order to enhance the quality of healthcare services provided to patients and improve the level of achievement in this sector. CME policies have been established and implemented by all health authorities in the UAE through an online system linking the licensing and relicensing of HCPs, including physicians, with their educational achievements (in CME programs) over a period. Therefore, many educational programs are organised all over the UAE targeting HCPs implicitly and explicitly. For instance, between 2005 and 2009, HAAD offered

approximately 1290 programs; more than 44,000 HCPs from Abu Dhabi and other parts of the UAE enrolled in these CME programs (HAAD, 2014).

Organising and attending CME programs burdens the institutions and the attendees, in terms of the program fees, which are either covered by the institution or the physicians themselves; time the physicians spent in attending the courses, which is usually deducted from patient care time; and the time speakers spend in preparing for these courses. These burdens result in unsatisfactory attendance by the trainees and raise questions about the practicality of these programs. Moreover, the diversity of the programs is insufficient to cater to the workplaces, specialities, and interests of attending physicians.

Malan (2000) discussed the effect of learners' uncertainty about obtaining the desired learning outcomes and the failure of program planners to assess outcomes correctly. Such shortcomings might cause learners to obtain pseudo knowledge, skills, attitudes, and values. At the end of the CME programs, they automatically obtain certificates without having developed any competencies. A high level of learners' uncertainty was noted by the researcher while organising the UAEU-accredited CME programs in Abu Dhabi. Many physicians attend these courses only to claim their CME credit hours, which are required for the renewal of their licenses and maintenance of their jobs. The physicians return to their workplace after attending the CME programs, but the outcomes of these CME programs are neither assessed nor recorded. This causes a mismatch between the enormous input of efforts and resources on the accredited CME programs and the outcomes.

In a recent study (Younies et al., 2010), several personal interviews were conducted with practitioners in the healthcare system. Physicians in the UAE reported several problems that they

encountered while attending the UAEU-accredited CME programs. These problems are similar to those cited in the literature. The conclusion of the study show that HCPs in the UAE agreed that CME programs are necessary for and relevant to the development of their profession; however, additional studies are needed to investigate other issues related to CME, such as its effects on the competency and efficiency of healthcare workers. Some of the issues related to the CME programs that have been previously reported are as follows:

- Financial burden: HCPs complained regarding the cost of attending CME programs and stated that they usually approach pharmaceutical companies to cover this cost. Notably, more than 60% of CME programs in the USA are funded by pharmaceutical companies (Marlow, 2004). Similarly, in Canada, many government bodies have taken concrete measures to reduce this burden and eliminate commercial bias in CME sessions organised by pharmaceutical companies. The Canadian government provides financial assistance by sponsoring various CME conferences (Noyek, 2005). The findings of a study on the opinions of German ambulatory physicians regarding CME indicated that physicians wanted other parties (insurance companies or the government) to share the financial responsibility of CME programs (Kempkens, 2009).
- Time limitation: HCPs complained regarding the unavailability of time to attend CME programs (Younies, 2010).
- Effectiveness of CME programs: CME programs were effective in improving the knowledge of HCPs.
- Lack of interest among the attendees: The relevance of the material and the seriousness of the sessions were debatable because participants can obtain the required credits by paying

for the sessions although they did not attend most of them. (Kempkens, 2009; Younies, 2010).

Although the HCPs attended UAEU-accredited CME programs, to my knowledge, neither have public reports been released nor has research been conducted to evaluate the effectiveness of these programs. Furthermore, no consensus has been reached by the accreditation bodies or the organisers regarding an evaluation method that assesses the effectiveness of these programs and provides opportunities to improve it.

The present study is an attempt to provide a method to evaluate the effectiveness of the UAEU-accredited CME programs based on the responses and feedback of the HCPs who attended the programs. The HCPs provided responses before and after the programs. Collecting and examining data from the pre- and post-CME surveys provided insights regarding the differences in the knowledge of HCPs before and after the CME program as well as in patient outcomes, which is a reliable indicator of the effectiveness of the program, particularly in terms at level 2 of Kirkpatrick's evaluation model.

Data such as the satisfaction of the HCPs with the program and speakers were used in level 1 of the model. The study also collected data that indicated the reasons underlying the decision of HCPs to attend the UAEU-accredited programs. All these data are crucial in assessing whether the programs are actually achieving the aim of improving the overall standard of healthcare in the UAE, which is of high priority for the national strategy of the UAE, or require modifications to improve the balance between the input (i.e., time and resources) and output (i.e., high-quality healthcare), and consequently, an increase in income from the healthcare sector. Furthermore, some measures may be implemented to address the issues, such as time and financial constraints,

of attending HCPs. Financial constraints can be reduced by partial provision of CME program fees.

Furthermore, CME credits can be completely dissociated from hours of attendance, and the number of credits should be assigned to a CME program according to the results of an evaluation of the expected outcome or impact of the program and the quality of the program content. These measures may facilitate the mitigation of these issues to some extent. CME credits may be assigned to a program based primarily on the competency of the training program, merit of the course design, and expected quality of output, as decided by the accreditation authority.

2.3 Review of theories and theoretical framework:

To understand CME as a concept, one needs to examine education and learning theories. The learning theories, which are applicable to the CME context, explain how HCPs as adult learners react and interact with CME experience. Andragogy, the theory of adult learning, will facilitate the understanding of all phases of the process through which HCPs learn from CME programs as well as how to maximise the outcomes of these programs. Age theory, stage theory, cognitive development theory, and functional theory are the learning theories that will be discussed in this theoretical framework. Furthermore, because CME is a professional development program that aims to improve the physician's careers, discussing the main adult professional development theories related to CME is an essential demand in this review. This review will include a discussion on transformative learning theory and the transfer of learning theory. Finally, theories related to measuring the effectiveness of CME programs are discussed in this chapter.

The literature relevant to various aspects of teaching, learning, and evaluation was surveyed extensively for this study because the concept of CME has multiple facets. Primarily, CME

involves HCPs. Therefore, theories relevant to adult learning are included in the review. CME programs are expected to improve the knowledge, confidence, and performance of HCPs. Learning in HCPs involves cognitive as well as behavioural aspects; accordingly, the literature regarding reflection during an assigned task or in retrospect was reviewed. Moreover, different aspects of learning, such as knowledge, comprehension, application, analysis, synthesis, and evaluation were explored briefly. As described in sociocultural theories of cognitive development, adult learners tend to use internal rather than external standards to assess their gain from learning programs; consequently, satisfaction of the learners with the content, design, and relevance of CME programs is crucial for evaluating the effectiveness of the programs. HCPs are likely to evaluate a CME program depending on whether it meets their learning expectations and achieves its specific objectives; thus, objective-oriented evaluation of these programs is crucial. The transfer of learning from the CME programs is a reliable measure of the effectiveness. Therefore, the literature relevant to evaluation of training programs and transfer of learning was reviewed for the present study.

2.3.1 CME and learning theories:

Learning theories are usually applicable to all educational and training activities (Halim & Ali, 1997). Behaviourists, cognitivists, and humanists have introduced different aspects of the processes of teaching and learning in their approaches. While behaviourists consider external conditions (environment) that affect learning and result in measurable changes in behaviour, cognitivists focus on mental processes and memory. Humanists consider emotions and attitudes as human behaviours that may influence learning (Chowdhury, 2006). In continuing education systems, such as CME, effective training must simultaneously modify the actions, beliefs, and knowledge of trainees (Halim & Ali, 1997). In the context of the present study, two main

theories related to adult learning are relevant, namely age theory and stage theory. Schön (1983) emphasised the difference between reflecting on an incident during the incident or ‘reflection-in-action’ and ‘reflection-on-action’, which refers to reflecting on how practice can be changed or developed to improve suitability for use in an incident after the incident has occurred. Reflection-in-action enables people to decide the most suitable course of action for the present, unique situation without ‘knowing-in-action’ or using knowledge from similar situations. HCPs often encounter unique situations that may require ‘reflection-in-action’. Appropriately designed CME programs that strike a balance between the two types of reflections are most likely to improve patient outcomes.

The effectiveness of continuing education programs depends on whether the programs consist of the following components: a stated reason for undertaking the program, for example, the need to develop a specific skill, general updating of workforce, and training for new services for patients; a formal or informal method of learning; and follow-up after the training for the reinforcement and demonstration of the benefits of the training, for example, reporting back to colleagues or demonstrating skills (Eraut, 2001). In the context of the present study, the effectiveness of the UAEU-accredited programs was assessed on the basis of multiple factors, including the achievement of objectives or stated goals of the program, improvement in the knowledge of HCPs, and HCP satisfaction with the program.

2.3.1.1 Age theory and stage theory:

The theory of cognitive development propounded by Piaget (1936) explores the methods by which children learn about the world around them. According to this theory, children create a mental model of the world. This theory qualitatively assesses learning at different stages of

development. Because this theory is centred on development rather than on learning, it does not involve spelling and counting.

The age theory has been adopted and discussed mainly by Bents and Richard (1981), Sheehy (1976), Levinson (1986), and Daloz (1986). According to this theory, people keep learning as their age progresses, and they become increasingly oriented about their profession. Hence, professional development programs should include the reflections of the professionals during discussions or through journaling, which helps professionals to express themselves (Trotter, 2006).

Some researchers consider Piaget as the father of stage theory. He believed that adults and children pass through distinct stages of constructing the experiences in their lives (Trotter, 2006). These theories facilitate the understanding of the differences in the learning needs of HCPs, who are adults, and those of children. Furthermore, it will facilitate CME course designers to identify the methods by which adults accept new ideas and implement them in their workplace. In addition, understanding the stages of development will enable education planners to provide physicians with suitable education programs to broaden the range of their skills as well as methods to meet the demands of both patients and standards satisfactorily (Trotter, 2006).

2.3.1.2 Cognitive development theory:

Vygotsky's social development theory, which was propounded in 1934, presents two major principles: (1) an individual's cognitive development at any given age is limited to a certain extent and (2) complete cognitive development of an individual requires social interaction. Vygotsky believed that development follows social learning, which is accomplished when the individual interacts, reaches out, and connects with other individuals. (Vygotsky, 1987).

Hunt (2009) described cognitive development as conceptual levels with degrees in abstractness and interpersonal maturity; he defined the following four levels of cognitive developments: concrete negativism and over generalisation; categorical judgments and acceptance of a single rule and reliance on external standards; awareness of alternatives and sensitivity to personal feelings; and reliance on internal rather than external standards, working with others, and seeing events from multiple viewpoints (Trotter, 2006). According to cognitive theories, the cognitive and intellectual development of adults goes through stages of internal rather than external standards; consequently, CME programs should distinguish between the learning needs of target audiences and meeting their expectations to ensure that development is meaningful and transferable to the workplace.

2.3.1.3 Functional theory:

Between 1960 and 1985, theorists attempted to identify the characteristics of adult learners to aid practice (Braokfield, 1986). Dewey (1966) emphasised the importance of creating the desire to grow as a measure of learning. Gibb (1960) developed a functional theory of adult learning. According to Gibb, learning that is based on problems that learners face and relies on experience is meaningful to and fruitful for the learner. Subsequently, Knox (1977) stated that adult adjustment to changing life conditions makes them continuous learners. Both these theorists considered adult experience as a crucial factor in learning and agreed that the success of learning is associated with the situation that motivates learners to learn voluntarily (Trotter, 2006). Smith (1982) identified that adult learning is lifelong, is personal, involves change, is part of human development, involves experience, and is partly intuitive.

The aforementioned claims were supported by Bloom's taxonomy, which was created in 1956 by the educational psychologist Benjamin Bloom, to promote thinking in education. Bloom's taxonomy is mostly used while designing instructions and programs for learning processes. This taxonomy defines three domains for educational functional activities, namely cognitive, affective, and psychomotor. The cognitive domain focuses on mental skills, which are represented by knowledge. The affective domain focuses on the learner's growth in feelings or emotional areas, which are represented by attitude or self. The psychomotor domain concentrates on manual or physical skills that learners obtain from training programs (Bloom & Engelhart, 1956). A commonly used representation of Bloom's Taxonomy is the Bloom's rose that has six categories of educational goals, namely knowledge, comprehension, application, analysis, synthesis, and evaluation.

Bloom's Taxonomy has been applied to adult education programs, such as CME programs conducted by the National Kidney Foundation (NKF) in the USA (NKF, 2016). The learning objectives of the NKF CME program were defined using the six categories of educational goals listed in Bloom's framework. Accordingly, the educational goals of the program were classified as knowledge-based (knowledge and comprehension), application-based (application and analysis), and practice-based (synthesis and evaluation).

Some researchers have conducted surveys to test the applicability of some of the assumptions of theories of adult learning. One such study involving family physicians who attended a CME program indicated that the participating physicians agreed that experience is an extremely rich learning resource. However, the physicians disagreed that adults are primarily interested in problem-centred and not subject-centred approaches to learning (Dankyau, 2016).

2.3.2 CME and adult professional development theories:

Knowles (1990) in his book, *The adult learner: The neglected species*, listed five assumptions related to adult learners, namely self-concept, experience, readiness to learn, orientation to learn, and motivation to learn. The characteristics of adult learners are assumed to be different from those of child learners. Adult learners are mature and have the concept of being self-directed individuals instead of dependent personalities (self-concept). Growth leads to accumulation of experience, which is a crucial learning resource (experience). As individuals mature, they become increasingly inclined towards acquiring skills suited to their social roles (readiness to learn). As people mature, the immediate application of knowledge is preferred over delayed application; consequently, subject-centred learning is replaced by problem-centred learning (orientation to learning). Adults depend on internal rather than external motivation to learn. According to Knowles, adults are more motivated to learn if they experience need and felt interested. Their learning is lifelong, relied mainly on experience, and was self-directed; the individual differences increased with age. Reflection-on-action, suggested by Schön (1983), is a means through which adults accumulate experience, which becomes a valuable learning resource for future. Reflection-in-action requires application of acquired knowledge and skills; consequently, it is related to the application category of Bloom's learning objectives because reflective activities should enable learners to progress from reflection to application (Ménard & Ratnapalan, 2013).

Daloz (1986) stated that the primary aim of education is to promote significant learning. Significant learning engenders development. Development refers to asking successively broader questions and building an increasingly deeper relationship between oneself and the world (Daloz, 1999). Thus, education should promote development and motivate learners to grow as they gain

knowledge and skills that support their career development. Therefore, HCPs use their experience as a resource and need to plan their own educational paths according to their interests and workplaces. Therefore, the objective of adult education is promoting individual development by encouraging reflection and inquiry (Lombardi, 2007).

A study on adult development by Oji and Nodie (1980) reported adult learning in service education and defined the key ingredients of successful adult learning programs, namely using experience, supervising and advising continuously, encouraging new and complex roles, and using feedback for new techniques,. These results led to the assumptions that HCPs want learning experiences that they can immediately practice in their workplace. Furthermore, they discuss with their colleagues their practices and the methods they used to solve the problems that they face. Thus, interactive sessions enable the HCPs to reflect, grow, and adapt throughout their healthcare careers.

2.3.2.1 Transfer of learning in CME:

Transfer of learning has been described as the effective and continuing application of knowledge, skills, and attitudes learned or acquired from training on the job; generalisation; and the subsequent maintenance of these attributes over a period (Baldwin & Ford, 1988; Broad, 1997; Ford & Weissbein, 1997; Xiao, 1996). Transfer of learning must be a major concern for all those engaged in the planning, teaching, evaluation, attendance, and support aspects of training programs (Otto, 1994).

In the healthcare industry, HCPs are expected to update their skills and knowledge regularly through CME to improve the quality of healthcare they provide. In CME programs, new capabilities acquired through the programs should be transferred to the physicians' practice. In

addition, transfer of learning is particularly critical because human lives depend on the accuracy of learning. Medical errors due to failure or delay in diagnosis, selection, or administration of treatment can be prevented (Leape et al., 1991). If transfer of learning does not occur in CME programs, then the resources and efforts invested in developing and implementing CME activities are futile and patients' lives may be lost. However, research has shown that the skills and knowledge newly acquired by the HCPs through CME may not necessarily be implemented in practice (Gitonga, 2007).

The CME process involves four stakeholders, namely the program planner or designer, trainer or instructor, learner or trainee, and organisational management. All the stakeholders want and expect CME programs to lead to transfer of learning to practice (Caffarella & Daffron, 2013). Several models have been developed to explain the nature of transfer of learning. Baldwin and Ford (1988) proposed the 'transfer of training' model to determine the factors affecting the outcomes of training programs.

Baldwin and Ford model has been used by several researchers to study training transfer in various contexts and professional fields. According to this model, transfer of learning depends on three inputs, namely trainee characteristics, training design, and work environment. Training outputs are learning and retention, and the conditions for transfer are generalisation and maintenance. In this model, trainee characteristics and work environment directly affect the outcome, which is transfer of learning; however, the effects of training design on the outcome depend on the levels of learning and retention of the trainees. The input 'trainee characteristics' consists of the ability, personality, and motivation of the trainees. The input 'training design' includes learning principles, learning sequence, and training content. The input 'work

environment' consists of support from peers and senior colleagues as well as infrastructure and opportunities to use newly acquired knowledge. This model is widely used because the effect of each input and every factor under each input can be individually assessed using its framework; consequently, the factors may be optimised to obtain a desired outcome.

Gitonga (2007) developed a conceptual model to explore the transfer of learning in CME by using Baldwin and Ford's model. The main objective of Gitonga's model was to identify the factors that should be considered to ensure the transfer of learning in the context of CME. This model focused on physicians; three types of transfer factors in the physician education system were identified, namely learner characteristics, CME design, and work environment. The factors related to learner characteristics include: transfer-ready physician learner profile, readiness to change, and readiness to learn and apply new knowledge. Gitonga emphasises the importance of motivation to improve work through learning, learning agility, resistance to change, and identification of physician learning needs.

The CME design factors in Gitonga's model are far transfer, tool-based assessment needs, place transfer, responsibility of the physician learner, reflective practice, and self-directed learning, and physician's gain. Designing an optimal CME program after considering these factors will facilitate the development of activities and content that meets the learning needs of physicians. The learning methods and resources of CME programs can be selected specifically for improving the knowledge, skills, and attitudes that physicians require in their profession and patient outcomes (Bennett et al., 2000). The use of transfer management tools, such as action plans, will enable physicians to undertake responsibility for transfer of learning. Combining management tools with the ability to apply newly acquired knowledge in similar or different clinical situations

in the CME design will facilitate the recall process in the physicians' work environment by using reflection-on-action for their progress and development (Campbell et al., 2010).

The third group of factors in Gitonga's model is related to the physicians' work environment; it includes transfer partnership and an analysis of the work environment for the factors facilitating or impeding transfer of learning in CME. Transfer partnership factors involve the factors affecting the interaction between trainee managers and trainers before, during, and after training programs to enhance accountability and transfer in CME. Analysing the work environment enables the identification of the change forces and barriers to change affecting physicians. The change forces that affect physicians are patients, colleagues, and management pressure; personal life; competence; aspirations; curiosity; practice settings; and sense of personal and financial well-being (Fox & Bennett, 1998), while the barriers to change are low motivation, time constraints, and shortage of necessary equipment in the workplace (Mazmanian & Davis, 2002). Incorporation of this information into the design of CME programs will ensure that the content of the programs is sufficiently relevant to physicians and that they can apply the newly obtained knowledge in their practice.

According to Gitonga's model, CME outcomes depend on several factors including improved patient outcomes and changes in physician behaviour. Other conditions of transfer in CME programs include the maintenance of accountability in the workplace through various structural elements to record transfer of learning and practise change, integration between learning and practice based on learning needs, and understanding transfer in CME as a meaning-making process. Incorporating new knowledge is a recursive and transformative process rather than a direct transfer of information from one context to another (Gitonga, 2007).

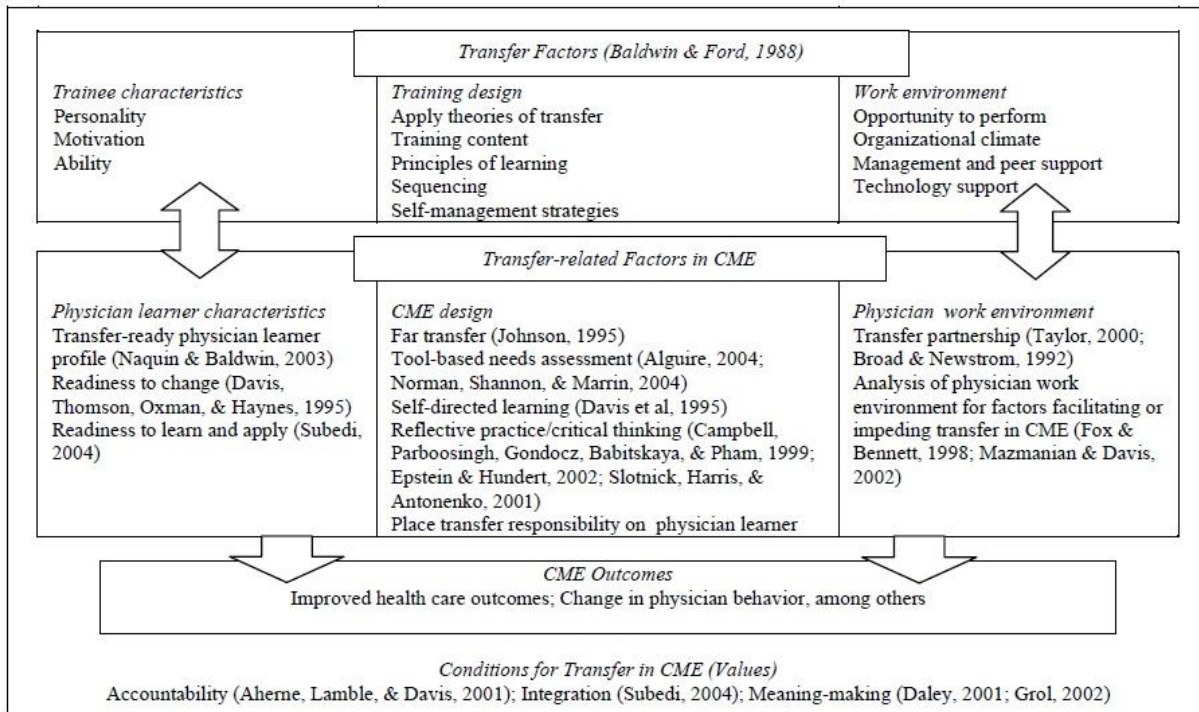


Figure 2.4: Application of the transfer of learning conceptual model to CME. Source: Gitonga, 2007.

Relatively few studies have evaluated the effectiveness or outcomes of CME programs in the UAE (Younies, 2010; Shehab, 2012; Akshar, 2014). These studies may be viewed in the framework of the ‘transfer of training’ model. Accordingly, the demographic data, pretest knowledge, and motivation of the participants can represent the input ‘trainee characteristics’, while course content, presentation, interaction, approach, and convenience can represent the input ‘training design’. Organisational support, particularly in terms of technology and equipment, can represent the input ‘work environment’. The improvement in knowledge and awareness after the CME programs can represent training output, while active self-monitoring and participation in individual- or group-learning activities can represent the ‘conditions for learning’, which is classified under the input ‘training design’.

2.3.2.2 Transformative learning:

Transformative learning is another learning theory that is fundamental to the exploration of how CPD can change practice. Transformative learning is a practice in education that is based on the notion that students are seriously challenged to assess their value system and worldview, which are subsequently modified by experience (Quinnan, 1997, p. 42). Transformative learning distinguishes between instrumental and communicative learning. In instrumental learning, learners empirically test their beliefs, whereas in communicative learning, learners validate or justify their beliefs through discourse, which involves critical reflection and thinking to arrive at the most appropriate tentative judgment (Closs & Antonello, 2011). Transformative learning in CME practise is a key component of the learning process. If HCPs are the target learners in CME programs, educators and trainers from the same speciality are required to train, share their own experience with, and update the knowledge of their colleagues in their areas of speciality or expertise.

2.3.2.3 Motivational learning design:

Keller explored the application of motivation to learning design. Keller's model states that motivational design is composed of four elements, namely attention, relevance, confidence, and satisfaction (ARCS); hence, Keller's model is also known as the ARCS model (Keller, 1999b.78). The application of Keller's model to the context of CME revealed that the motivation of HCPs to learn from CME programs depends on whether the ARCS requirements are met. The requirement of attention, which represents the HCPs interest in learning, can be met by incorporating questions or problems from case studies, such as patient scenarios, in the program content. These items require active HCP participation; hence, they are useful in gaining and sustaining the attention of HCPs. The requirement of relevance refers to the extent to which the

CME instructions are related to the HCPs' needs or goals. This requirement can be met by including examples that are linked with HCPs' past experiences. Confidence refers to the HCPs' perception of the likelihood of achieving success. This requirement can be met if the participating HCPs believe that CME programs will provide them with skills that can be transferred and applied in their workplace. Finally, the requirement of satisfaction refers to the positive rewards needed to reinforce the CME program content. CME learner satisfaction can be increased by allowing the HCPs to practice and apply their newly acquired skills and knowledge, respectively, gained from the CME program in a live setting (Keller, 1999).

2.3.3 CME effectiveness evaluation theories:

Effectiveness in the education context is the extent to which an activity fulfils its intended purpose or function. Fraser (1994, p. 104) defined effectiveness as the extent to which the achieved goals match with the stated goals, assuming that achieving easy or low-standard goals is always possible. Erlendsson (2002) agreed with this definition and concluded that effectiveness is the extent to which objectives are met and described effectiveness as 'doing the right things'. Descy and Westphalen (1998) defined effectiveness more precisely as meeting the program objectives defined by its funding body. Wojtczak (2002) defined effectiveness in the context of medical education as a measure of the extent to which a specific intervention, procedure, regimen, or service, deployed in the field in routine circumstances, does what it is intended to do for a specified population.

The effectiveness of CME programs was previously assessed on the basis of physician performance and patient outcomes, which were classified as positive, negative, or inconclusive (Davis, 1992). The effectiveness of CPD is related to the effect on knowledge, proficiencies,

principles, attitudes, behaviours, and transformations in practice at the workplace. (Schostak et al., 2010). The American College of Chest Physicians (ACCP) measured CME effectiveness in terms of impact on knowledge, attitudes, skills, practice behaviour, and clinical practice outcomes. (Cervero, 2015).

Evaluation methods are widely used to measure the effectiveness of educational programs (Rossett & Sheldon, 2001). Educationalists and researchers in other fields have been critically investigating the provision of CME; a rising consensus has been observed on how HCPs learn (Eraut, 2001). Consequently, evaluating the effectiveness of any continuing educational activity has gained considerable importance over the past few years. (Punia, 2013). CME developers are increasingly attempting to evaluate the effectiveness of CME activities at the highest possible level, which involves encountering outcomes at the level of practice (Moore et al, 2009).

Several researchers have evaluated the effectiveness of training programs, but Kirkpatrick (1976) was the pioneer who proposed a four-level method of training evaluation; the criteria or levels of the model are reaction, learning, behaviour, and results (Punia, 2013). Kirkpatrick's model as well as other evaluation models will be discussed in detail in this chapter. Noe (1986) summarised Kirkpatrick's model along with the model of training motivation. Noe considered 'motivation' itself a crucial factor affecting trainee performance and training outcome. Likewise, Swanson and Sleezer (1987) explained three steps of measuring training effectiveness; developing an effectiveness evaluation plan, selecting tools for measuring training effectiveness; and preparing an evaluation report. By contrast, Zaczewski (2001) examined the individual characteristics, such as motivation, attitude, and basic ability of the employees, which affect a training program and its potential success in healthcare. Dahiya and Jha (2011) discussed the

steps in the development of training programs and stated that a training program is not complete unless methods and results are evaluated for effectiveness.

The outcomes of medical education can be assessed using process, patient outcome, and proxy measures (Haan et al., 2008), which represent key indicators of the effectiveness of a CME program. The effectiveness of educational programs, such as CME programs, can be assessed reliably by using documented and measurable outcome data. These outcome data can be of various types, such as national norms of accomplishment, and performance of students at enrolment and after the program. The ratings of the program according to the national norms of accomplishment and the difference in the student performance before and after the training program indicate the extent to which the objectives of the educational program have been met. Student performance includes performance in national licensure examinations and that on courses or clerkship, academic progress, program completion rates, and rate of acceptance into residency programs (Nolte et al., 2011). If the appropriate indicators of clinical quality are selected, trainee performance as well as program effectiveness can both be measured.

Many HCPs appreciate learning alongside their peers, but they may struggle with the feeling that CME programs are inefficient or not sufficiently productive; consequently, they may not invest their time and effort in these programs (Graham, 2016). In the present study, the effectiveness of CME programs has been assessed from the viewpoint of HCPs who participated and attended these programs. Therefore, the effectiveness will be defined as the extent to which the CME programs conducted in UAE and accredited by UAEU achieved their learning objectives, met the expectations of the participants, improved their knowledge, involved enjoyable activities, and involved activities with educational benefits perceived by the participants.

In the subsequent sections, the following three main educational program evaluation models will be discussed, in chronological order: the objective-oriented evaluation model, Kirkpatrick's evaluation model, and the outcome-based education model. The advantages and disadvantages of applying each model in CME evaluation will be explained.

2.3.3.1 Objective-oriented evaluation model:

As discussed previously, Ralph Tyler is credited with initiating the objective-oriented approach in the 1930s. This approach was readily adopted by evaluators, and it influenced evaluation theorists. Tyler viewed evaluation as a process of determining the extent to which the expected objectives of a program are actually achieved; the stakeholders and evaluators work together to establish and decide whether program objectives are met. Evaluation results facilitate the reformulation of the purposes of an activity, the activity itself, or the assessment procedures as well as the decision to maintain, terminate, or change approaches within the program.

The advantage of the objectives-oriented evaluation model lies in its ease of application and simplicity because the achievement of objectives determines the success or failure of the evaluation process. The analysis of discrepancies between objectives and performance provides crucial information for improving the training program. Its results can validate actions for program improvement, maintenance, or termination. However, the limitation of this model is that it disregards the context of program and outcomes that are not covered by the objectives. Moreover, the model does not define standard methods to assign values to grade the importance of observed discrepancies between the objectives and performance. Hence, the evaluation performed using this model is likely to be narrow in scope, linear, and inflexible. CME programs are a means for HCPs to fulfil various requirements such as of maintenance of certification,

focused professional practice evaluation, and ongoing professional practice evaluation. The programs may have different aims and may cater to separate target learners. Consequently, they are conducted in different contexts. Differences in context can contribute to differences in results or unexpected results (Guskey, 2003). However, evaluation by using Tyler's model does not involve contexts. Due to its limitations, this model is not widely used for evaluating medical education programs, such as CME programs (Al-Shehri et al., 1994; Fitzpatrick et al., 2004).

2.3.3.2 Donald Kirkpatrick's evaluation model:

Donald Kirkpatrick (1976) suggested the following four criteria for evaluating training programs: (1) reaction, which measures a trainee's impression of the training program and may include impressions of the course, trainer, pace of instruction, content, and materials; (2) learning, which involves acquisition of knowledge, skills, and attitudes (KSA) by the trainee; (3) behaviour or application, which refers to the extent to which a trainee applies the acquired KSA at the workplace; and (4) results, which are a measure of the changes in the trainee's performance at the organisational level resulting from the application of KSA in the workplace. Clearly, this model has been developed mainly by considering the effects on and viewpoint of the learner at all levels.

Kirkpatrick's Training Evaluation Model

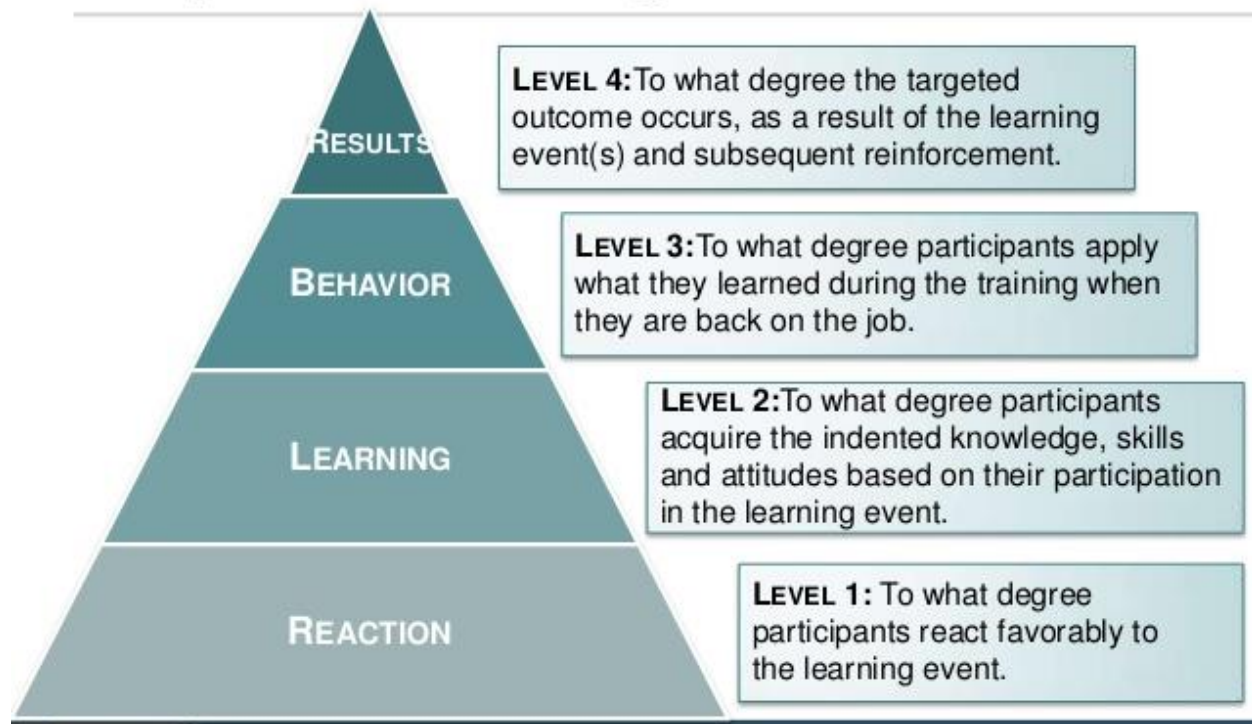


Figure 2.5: Kirkpatrick's training evaluation model. Source: Cardet1 (2018). <https://www.slideshare.net/Cardet1/mod8-ppt1-080609tmtty-1>.

According to Kirkpatrick (2006), evaluation is a process by which the relevance, effectiveness, and impact of activities are determined in relation to the objectives of the activities. According to Rossett and Sheldon (2001), evaluating an educational program involves examining a program or process to determine its learning and training value; the results of the evaluation are used as an input for judgment and improvement. Thus, in this context, the aims of evaluation are typically to identify the satisfactory parts of the program and the areas of improvement as well as to determine whether the objectives or desired outcomes were achieved (Kirkpatrick, 2006).

Kirkpatrick's model has been widely used for evaluating training programs in academics as well as industry. Several studies on CME evaluation have used this model for evaluation. In the UAE and neighbouring countries, relatively few studies on CME evaluation are currently available. However; these studies have used level 1, reaction (satisfaction), for CME evaluation or as an indicator of CME effectiveness. Levels 1 and 2 are easier to quantify than levels 3 and 4; consequently, they have been used in most training evaluations.

However, Kirkpatrick's model has been studied extensively and has undergone modifications to improve its suitability for application in various fields. Phillip's five-level evaluation model is an example of a modification of Kirkpatrick's model for evaluating learning and development programs conducted in business organisations. Phillip's model introduces an additional level, namely return on investment (ROI). ROI is calculated by collecting level-4 data, analysing the effect of the training program on each data item separately, and converting these data to monetary values; these monetary values are then compared with the cost of the program (Phillips, 1996).

Kaufman's model (Kaufman et al, 1996) is another widely used alternative to Kirkpatrick's model. Unlike Kirkpatrick's model, which is centred on the learner, Kaufman's model considers the effects of training interventions on different groups. The five levels of Kaufman's model are as follows: (1) resources and processes, (2) acquisition or micro benefits, (3) application or microanalysis, (4) organisational payoff or macro benefits, and (5) societal contribution or mega analysis (Kaufman et al, 1995). A comparison between Kirkpatrick's and Kaufman's models reveals that level 1 from the former (reaction) is divided into resources and processes. Hence, Kaufman's model assesses the reaction on learners along with the factors that could affect the

learner's reaction at level 1. Level 2 of Kaufman's model is analogous to that of Kirkpatrick's model, but it also considers learning interventions that may not be included in the training program. Levels 3 and 4 of both models are similar. Level 5 of Kaufman's model considers the organisation's contribution to its clients and society as well as whether it is responsive to the needs of clients and society.

The evaluation model suggested by Guskey (2014) is consistent with Kirkpatrick's model and identifies the same levels adding only one additional level (as level 3) for organisation support, which measures the extent of an organisation's support, facilitation, and recognition of staff development. The data are used to improve organisational support and to streamline future change efforts.

2.3.3.2.1 Kirkpatrick's model and CME evaluation:

Kirkpatrick's model has played a crucial role in providing guidelines for evaluating training programs. It has been used in studies that focus on the methods of evaluation that use levels of evaluation higher than level 1. Satisfaction of learner, learning outcomes, performance improvement, and patient or health outcome are some of the evaluation targets associated with Kirkpatrick's model. Each successive level of Kirkpatrick's model represents different measures of the effectiveness of the CME program, and the influence of a measure on the clinical significance increases with the level of the measure within the model (Tian et al., 2007).

Program evaluation through Kirkpatrick's framework was studied by Ulum (2015). The author concluded that the Kirkpatrick's four-level model of training evaluation appears to be one of the mostly widely used models by evaluators of CME programs. Wall (2010) noted that Kirkpatrick's hierarchy has been applied in medical education.

Kirkpatrick's hierarchy evaluations have produced improvements in patient care; the result is right at the top of Kirkpatrick's hierarchy. Masoomi (2012) pointed that the modification of perceptions, participation, and knowledge; behavioural change; change in practice of an organisation; and benefits to clients are included in various levels in the Kirkpatrick hierarchy.

Since Kirkpatrick's evaluation model was developed in 1959, it has been extensively used in all educational fields; however, its use is still controversial. Kirkpatrick (1977) confirmed that the utility of level-1 evaluations depends on the honesty of the learners who complete the questionnaire and their comfort with reporting their true opinions. To overcome this limitation and to encourage honesty in this process, anonymous questionnaires are recommended. However, this practice would also limit the availability of the opportunity to obtain additional support to trainees who felt that their objectives were not met. Moreover, the trainees may exhibit a social desirability bias in their responses; they feel that they have to provide a specific response (Darby, 2006), particularly if they fill out their evaluation forms in the presence of the trainer or other learners. Furthermore, Lee and Pershing (2002) insist that Kirkpatrick's model does not provide sufficient guidelines regarding the use of questionnaires for level-1 evaluation. The risk of focusing on trainee enjoyment during the session instead of the usefulness of the information (Hamblin, 1974) is particularly high.

Bersin (2008) reported that satisfaction or positive reaction of adults towards attending educational programs can be a powerful tool for predicting their effectiveness. Ghosh and his colleagues who conducted a study in 2011 on reaction evaluation supported this claim (Klein et al., 2006). The study results revealed that satisfaction of participants contributes to improvements in the educational program. Meanwhile, Bersin (2008) argued that 'satisfaction' is

a more appropriate term to use rather than ‘reaction’ because it indicates the effect of training design and positive reaction towards training effectiveness (Aziz et al., 2013).

Level 2 of Kirkpatrick’s model gives the learners the opportunity to evaluate their own learning and to describe how the training program may change their behaviours and beliefs. In this stage, Kirkpatrick explains that ‘evidence’ and ‘proof’ can be obtained by comparing the performance of trainees in the pre-learning and post- learning stages to determine and quantify the change due to the training. Qualitative data can be used to control other factors and ensure that the training is mainly responsible for the change (Kirkpatrick, 1977).

In level 3 of Kirkpatrick’s model, ‘behaviour’ measures the extent of the change in the participants’ behaviour due to the training program (Kirkpatrick, 1998:20). Similar concerns also arise in level 2. In level 3, the measurement of behaviour change may require highly open questions. The data obtained through the responses to questions can be used to prove that the training program being evaluated has caused a change in the participants’ behaviour. However, reported data do not necessarily reflect actual behaviour.

Level 4 in Kirkpatrick’s model represents the results that are obtained because the participants attended the program (Kirkpatrick, 1998:60). This is the highest level of outcomes; therefore, ‘final results’ has been used. In CME, this level of evaluation is used when improvement in patient outcomes, improved recovery rates, improved cancer-free survival are observed. Measuring the outcomes for all types of programs at the level of results is difficult. James and Roffe (2000) reported other factors that may have affected results and behaviour changes, including personal factors (e.g. motivation, ability, and attention); instructional factors (e.g. course design and trainer’s ability); and organisational factors, including climate, timing,

management, and learner support. In addition, Tyson and Ward (2004) considered the variable 'interactions between people' another confounding factor.

Another criticism for Kirkpatrick's model is related to the limited value of levels 1 and 2 in determining the effectiveness of an educational program and the poor correlation between how trainees feel and what they actually learned (Bimbrauer, 1987). Cheng and Hampson (2008) argued that levels 3 and 4 are rarely used because the evaluation of variables in these levels is difficult and expensive. These levels are usually omitted from evaluation. However, the model is flexible, and each level can be administered separately. In addition, some interventions are not designed for evaluation at all four levels. Hence, the form of evaluation and the level at which evaluation is needed should be considered. Often, levels 1 and 2 may provide sufficient information (Alliger & Janak, 1989).

Alliger and Janak (1989) criticised Kirkpatrick's assumption that each level is correlated with a preceding level, and they argued that the correlation is not necessary, particularly where there are queries regarding causality. Weissner et al. (2008) discussed the need to move beyond Kirkpatrick's model, and this has been reflected within many other studies. Rossett (2006) suggested that while measuring the effectiveness of CME enhanced by technology, a fifth level should be added for the evaluation of cost and efforts. Dyer (1994) suggested a revised version of Kirkpatrick's model, known as Kirkpatrick's mirror evaluation system. The mirror system starts by looking at the final stage of Kirkpatrick's model rather than the first stage. Recently, Moore and colleagues built a framework on Kirkpatrick's model; the new model involves seven levels of outcomes (Moore, 2007). Moore extended it to Kirkpatrick's domains and distinguished between declarative knowledge (participants are able to state what they should know) and

procedural knowledge (participants are able to state how to do what they should do) (Moore, 2007).

2.3.3.2.2 Kirkpatrick's model in the literature:

Starvropoulou and Stroubouki (2014) stated that the Kirkpatrick model appears to be a less-used evaluation model in the context of educational evaluation because the focus of the model has mainly been on training. This model has played a crucial role in providing guidelines for training evaluation. It is also included in the review on methods of evaluation useful at levels of evaluation higher than levels 1 and 2 (i.e., levels 3 and 4). Satisfaction of learners, learning outcomes, performance improvement, and improvements in patient or health outcomes are some of the primary areas of evaluation associated with Kirkpatrick's model. Each successive level of Kirkpatrick's model represents different measures of the effectiveness of CME programs, and the use of a relatively high level (level 2, 3, or 4) of Kirkpatrick's model is associated with findings of a relatively high level of clinical significance (Tian et al., 2007).

Ulum (2015) analysed the Kirkpatrick's framework-based evaluation of programs or planned activities with specific aims provided to specific target groups. The author concluded that Kirkpatrick's four-level model of program evaluation is one of the most frequently used models by the evaluators of programs. However, Kirkpatrick's four-level model cannot include circumstantial input variables that are crucial in the evaluation of educational programs; consequently, evaluation using this model have obscured the complexities involved in the progress of education.

Kirkpatrick's model is mostly used at the level of reaction, and the other levels are not described in adequate detail. Wall (2010) pointed that Kirkpatrick's hierarchy has mostly been used for the

evaluation of medical education programs. The lowest level has been defined as the participants' participation in, satisfaction with, or reaction to the programs and healthcare outcomes. Kirkpatrick's hierarchy has caused concern in most of the studies and the results have not lent themselves to further analysis in terms of generalizability. The evaluations have conclusively facilitated improvements in patient care, and the results are at the top of Kirkpatrick's hierarchy. Masoomi (2012) noted that the modifications of perceptions, participation, knowledge, behavioural change, change in practice of an organisation, and benefits to clients are some of the levels included in the Kirkpatrick hierarchy.

According to Alfaris et al. (2015), a one-day item-writing faculty workshop was evaluated using Kirkpatrick's model. The study reported in positive changes at all four levels of Kirkpatrick's model, namely reaction, learning, behavioural change, and impact. In general, behavioural change is considered an essential outcome of any training exercise.

Bhatnagar et al. (2010) correlated educational outcomes with the four levels of the model. Level 1 corresponds to the learner's reaction to the experience of education. Level 2 consists of learning indicators, including changes in attitude, knowledge, and skills. Level 3 corresponds to behaviour, including modification in practice. Finally, level 4 corresponds to results, which refer to changes in the practices, infrastructure of an organisation, student behaviour, and behaviour of colleagues who participated in the program of faculty development.

Boet et al. (2012) noted that in the original design, the Kirkpatrick levels were not intended to be hierarchical. Changes in participants resulting from training, such as changes in attitude, knowledge, behaviour, professional practice, and patient condition are some of the educational

outcomes of Kirkpatrick's model. Adding a new level, a fifth level in Kirkpatrick's model, to determine the cost-effectiveness of the educational intervention, has also been suggested.

Chan (2016) evaluated the effectiveness of a teacher-training program. Kirkpatrick's framework has not changed since its introduction >40 years ago. To date, this model is probably considered the most well-known model and continues to be used for assessing the effectiveness of training programs. Recorded trainee feedback regarding the program provides useful information for evaluation at level 1 (reaction). The evaluation of reaction provides usable and rich information for the improvement of the program. Evaluation at level 2 appears to be more essential because 'reaction' does not necessarily imply learning. Furthermore, evaluation at level 2 is more difficult and time consuming than that at level 1; however, it facilitates the identification of changes in behaviour at later stages. Moreover, the primary strength of Kirkpatrick's model is the ease of its use; it enables evaluators to focus on the systematic understanding of training evaluation.

Kirkpatrick's four-level model was used to evaluate an undergraduate medical training intervention (Chavda et al., 2016). In this study, Level 1 was assessed by recording the perceptions of the trainees about the session by using a questionnaire and a Likert scale. Moldovan (2016) proposed a training model for quality managers, which was developed using the principles activity-based learning. The outcomes of the training program were evaluated using student response systems, which appears to be a modification of evaluation at level 1. Kirkpatrick described four levels of evaluation in which the behavioural change complexity increases as the strategies of evaluation ascend to the higher levels of the model. Kirkpatrick's methodology, freely available Google forms (software), mobile technology, and partnership were

evaluated at four levels. Identifying the four levels of evaluation and using Kirkpatrick's model at all levels are both difficult tasks. At each level, the evaluation becomes increasingly complex and time consuming. Thus, evaluation complexity increases as intervention evaluation ascends the hierarchy.

Paull et al. (2016) applied Kirkpatrick's model to evaluate an interaction for learning framework curriculum intervention. The authors concluded that the Kirkpatrick model provides educators a straightforward basis to evaluate training interventions. The authors also noted that Kirkpatrick's model appears to be a simple, rapid, and functional means of evaluating intervention curricula based on the 'interaction for learning framework' by using outcomes. Usually, evaluation by using Kirkpatrick's model is confined to the lower levels of the model (levels 1 and 2).

2.3.3.3 Outcome-based education:

William Spady's (1994) outcome-based evaluation is considered a major contributor to outcome-based education (OBE). OBE is described as a comprehensive approach to organising and operating an education system that focuses on and is defined by successful demonstrations of learning sought from each learner. Spady defined the outcomes as clear learning results that learners can demonstrate by the end of the learning experiences as actions and performance that reflect learner competence in utilizing content and tools successfully (Spady, 1994). According to Spady, the questions what and whether to learn successfully are more crucial than when and how to learn something; McAvoy (1985) supports Spady's model.

As discussed before, Bloom and Engelhart (1956) developed taxonomies for educational objectives; these taxonomies are used in evaluation criteria particularly in the cognitive domain. Based on this model, in 1990, psychologist George Miller introduced a framework for assessing

clinical competence. The order of levels of the pyramid, starting from the lowest level is as follows: knowledge, competence, performance, and action in another words, the learner knows, knows how, shows how, and does in both simulated and real situations (Miller, 1990).

The OBE model has gained popularity in recent years in evaluation and training. The shift from process- to outcome-centred evaluation of educational programs, particularly in social services and healthcare (Fuaad, 2014) may have contributed to the popularity of the OBE model. Evaluators in healthcare have shifted their focus to outcomes as an index of physicians' utility in their practise. They also measure outcome parameters such as clinical symptoms, cost, mortality, and patient satisfaction before and after the training to evaluate the effectiveness of the training.

The main advantage of using the OBE evaluation model is that the results of the evaluation of outcomes can be used to improve the educational program immediately. However, the measurement of the main outcomes of a CME program, which are progress and improvement in patient care, is a challenge because of various other factors that may interfere with physician decisions and treatment.

In summary, the present study is based on the inputs of multiple theories of learning and training evaluation. The viewpoints of the participating HCPs represent the primary source of data. The use of this data source results from the adoption of sociocultural theory. The selection of HCP characteristics and motivation as factors for evaluating CME programs can be traced back to the inputs in the Transfer of Training model. The HCPs were questioned about the expected barriers to using new knowledge and skills in the workplace; these barriers are also similar to the 'work environment' inputs of the aforementioned model. Furthermore, the use of the factor HCP satisfaction with the learning experience for evaluation is clearly based on level 1 of

Kirkpatrick's model. The UAEU-accredited CME programs were also evaluated in terms of achievement of stated program objectives, which is an objective-oriented evaluation. Thus, sociocultural theory, Transfer of Training, Objective-oriented evaluation, and Kirkpatrick's evaluation represent the foundation of the present study. The higher levels (2–4) of Kirkpatrick's model were not used in this study because assessing outcomes of CME programs through a study based on the aforementioned principles was not feasible considering the constraints of time and manpower.

2.3.4 Construction of the conceptual framework:

Various studies and articles related to CME were examined during the literature survey. The criteria for including them in this study were that they discussed some aspect of CME and the evaluation of CME effectiveness. Considering the previously discussed theories, adult learning theories are highly relevant to our understanding of how HCPs learn from CME programs. Furthermore, these theories are applicable to the planning and implementation of CME programs.

The age theory emphasises the fact that professional development programs should include professionals' reflections during discussions. By contrast, the stage theory enables trainers to understand how the trainees accept the new ideas and implement them in their work place; the theory can also be used to develop suitable educational programs to broaden physicians' skills and methods to meet their work demands. However, understanding cognitive development theory enables the CME program organisers to consider and define the different needs of target audiences and meet their expectations, which ensure that development will be meaningful and transferable to the physicians' workplace. The functional theory insists on the importance of

creating a desire to grow as a measurement for learning and relying on experience to make a training program meaningful to the learner.

In addition to learning theories, adult professional development theories are applicable to CME programs because the aim of these programs is to promote HCP development by encouraging reflection and questioning by maintaining their motivation to learn, particularly if these programs rely mainly on experience. The programs are designed to promote self-directed learning and motivation. Moreover, the programs are designed to ensure that the physicians experience the need for learning and to generate interest. Consequently, their learning will be lifelong through daily practice and experience. Physicians are expected to be able to reflect, grow, and adapt throughout their healthcare careers through participation in training programs that involve interactive situations, continuous supervision and advice, encouragement of new and complex roles, and the use of feedback for new techniques.

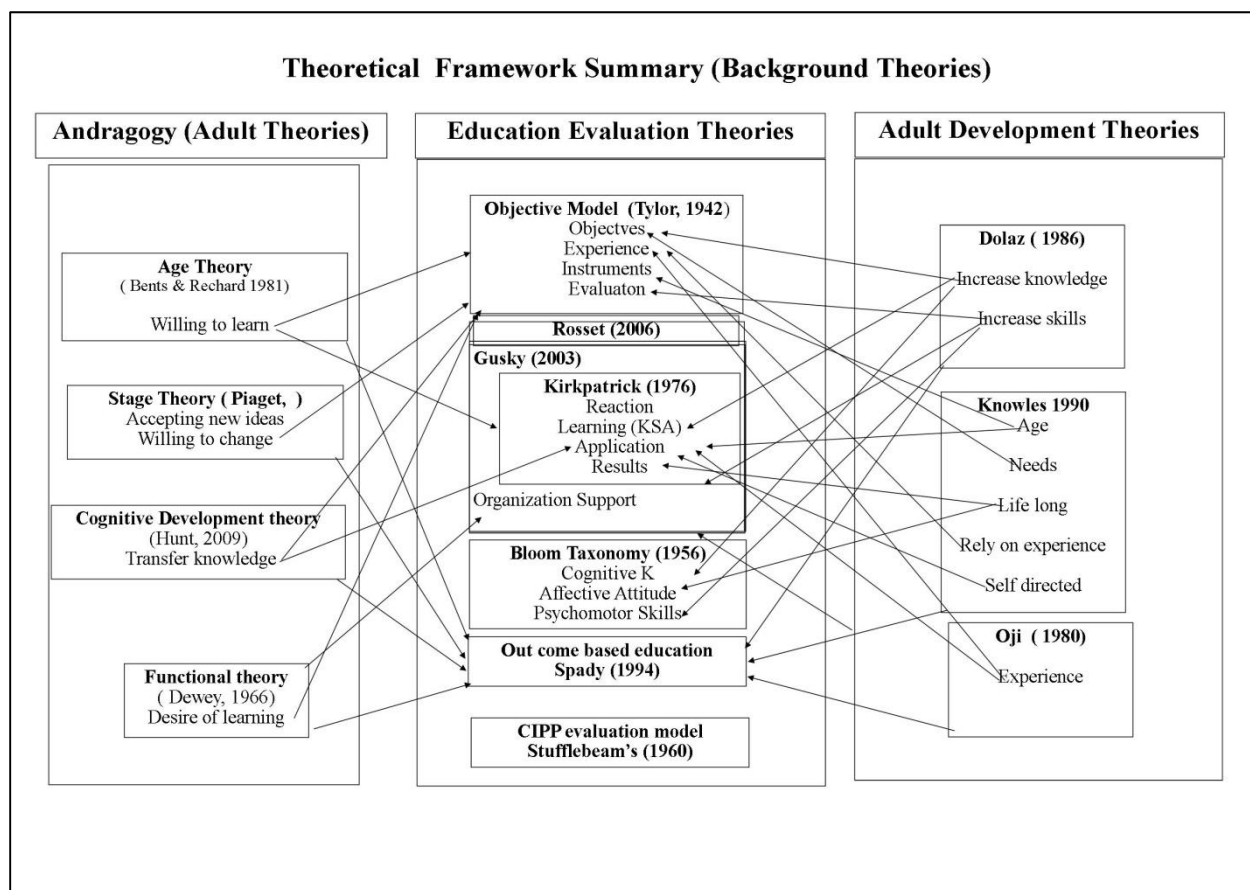


Figure 2.6: Self developed summary of the theoretical framework based on researcher literature reviews.

Gitonga's model for transfer of learning in CME was used as an alternative to adopt the factors studied to assess the transfer of learning in the context of CME. The HCP characteristics included the motivation of HCPs to attend the CME program, their level of education, their speciality, and the number of years of practise. The CME design characteristics included in this study were CME program content, structures, speaker performance, and program setting. The work environment factors considered in this study were the barriers that HCPs expect to face in the transfer of new learning from CME to their workplace.

Because the main goal of this study is to evaluate the effectiveness of CME programs, models for the evaluation constitute the baseline of the conceptual framework of this study. All education theorists appear to agree that measuring the effectiveness of educational programs is crucial. Although different models involve different approaches, no single evaluation model is applicable to all training programs, learners, times, and educational situations. Each of the models discussed previously has advantages and disadvantages in its application to evaluate the CME programs. In this study, levels 1 and 2 of Kirkpatrick's evaluation model were used to evaluate the effectiveness of UAEU-accredited CME programs because of the following reasons:

1. Kirkpatrick's evaluation model is a stepwise approach for evaluation. This multilevel model has been used in many studies evaluating medical education programs in many studies. Levels 1 and 2 are most commonly used (Al-Shehri, 2008).
2. The flexibility of this model enables the evaluation levels to be administered separately; therefore, the results are applicable at any level of Kirkpatrick's model. Generally, healthcare interventions are not designed with the aim to meet all four levels, particularly when levels 1 and 2 may provide sufficient results for evaluation. The OBE model relies only on outcomes such as progress and improvement in patient care, and outcome measurement is challenging because other factors may interfere with the physician's decisions and treatment. The objective-oriented evaluation model measures discrepancies between objectives and performance.
3. A training program may be evaluated at some or all levels depending on the planner's aim of evaluation. In addition, levels 1 and 2 can be assessed using registration data and responses to Likert-scale questionnaires, whereas KSA can be assessed before and after the educational program.

4. If this model is implemented after optimising the honesty of the learners (in terms of responses), the results will be optimised.

The assessment of performance at level 3 of Kirkpatrick's evaluation model is challenging because it requires self-reported changes by using simulated patients or clinical documents, which reveal actual performance (Moore et al., 2009). The difficulty of assessment increases further in level 4, which involves the evaluation of the change in patient health status; this evaluation requires access to patient data before and after the CME program. Moreover, the change in the health status of patients and populations can be difficult to interpret because several determining factors other than CME learning can affect the health status of patients (Moore et al., 2009).

Norcini (2003) discussed the challenges of measuring processes and outcomes in healthcare. First, problems of attribution are reduced considerably because HCPs usually control the process of patient care. Second, case complexity does not necessarily affect measurements; for example, the physician will continue to monitor a patient's HbA1C regardless of the severity of the patient's condition. Third, some of the process measures, such as vital sign monitoring, should be offered to all patients. This will reduce the problems of case mix. Hence, process measurement is inadequate for evaluating outcomes in healthcare services because doing the right thing does not always mean getting the best results for patients. Furthermore, although process measures are less susceptible to attribution, complexity, and case mix than outcome measures, these factors adversely affect measurement (Norcini, 2003). Giangreco (2009) noted that only large firms tend to use levels 3 and 4 of Kirkpatrick's evaluation model, and most small firms use only levels 1 and 2 because of the complexity of the evaluation process.

Because of the aforementioned constraints, time limit, and challenges involved in obtaining sufficient data for levels 3 and 4, in this study, levels 1 and 2 of Kirkpatrick's model were used to evaluate the effectiveness of the CME programs by using data provided by the HCPs (doctors, nurses, pharmacists, and paramedics) who attended these programs (courses, conferences, lectures, workshops, seminars, and symposia).

2.3.5 Proposed dimensions to measure CME program effectiveness:

The present study will only measure the effectiveness of UAEU-accredited CME programs by using data of HCPs who attended the CME programs in levels 1 and 2 of Kirkpatrick's model.

The main dimensions of effectiveness in this study will be as follows:

- The audience characteristics of the HCPs (age, sex, speciality, practice setting, years in practice, and motivations).
- Overall satisfaction of the HCPs with the CME program in terms of meeting their learning expectations, achievement of program objectives stated by the organiser and program design. Program design includes program content, structure, setting, and speaker performance.
- CME program effectiveness in terms of changing HCP knowledge with respect to the topics discussed as part of the program.
- The need for, strengths, and weaknesses of, and suggested strategies for improving CME program practise in UAE.

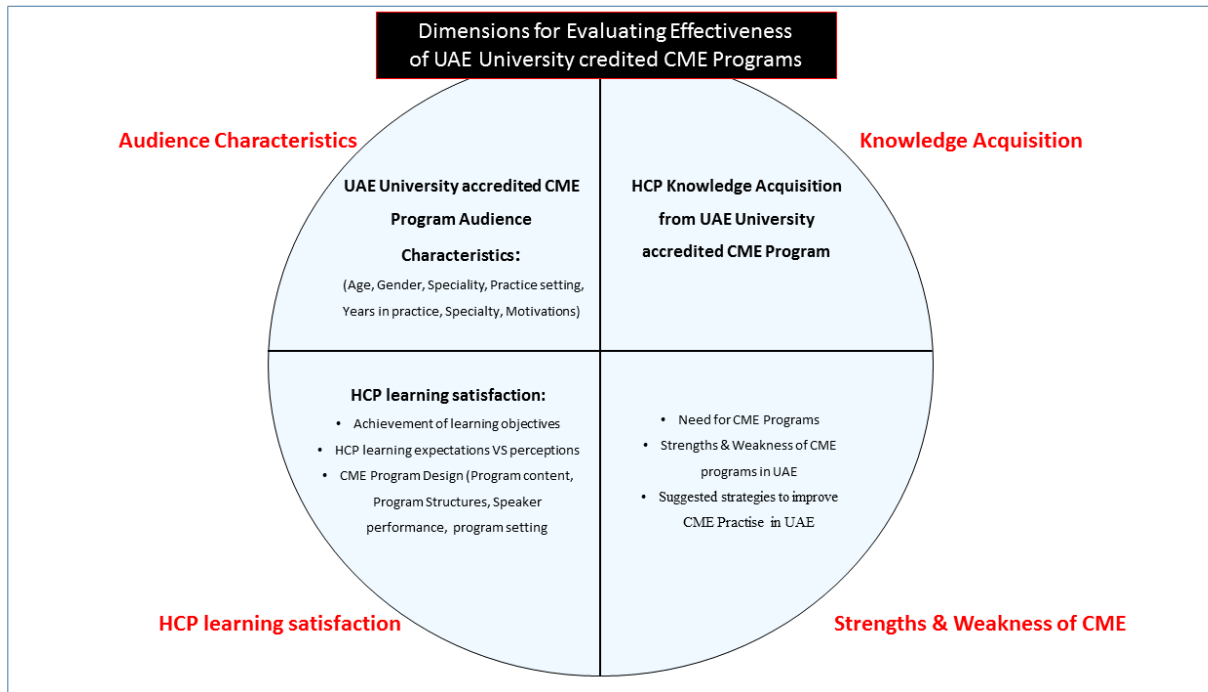


Figure 2.7: Proposed dimensions to measure the effectiveness of UAEU-accredited CME programs.

The conceptual framework presented in this study is a literature review consisting of various resources and is based mainly on Kirkpatrick's evaluation model, learning theories, and professional development theories. The framework is designed to approach the CME experience and be as comprehensive as possible. The conceptual framework for this study comprised the following four categories for measuring CME effectiveness:

- **CME audience characteristics:** These characteristics consisted of data regarding the number of HCPs who attended the CME program as well as their age, sex, speciality, the area of healthcare system in which they were practising their profession, years of practise, reason for attending the UAEU-accredited CME programs, and work load.

- CME program audience satisfaction: These data consisted of descriptions of the degree to which the expectations of the participating HCPs regarding the content and delivery of CME activities were met. This evaluation indicated the worth of the CME programs perceived by the learner and were expected to provide information to planners and other decision makers. The assessment of audience satisfaction with the CME learning programs included the following: the achievement of outcomes by the HCPs, overall effectiveness of the learning program, enjoyment of HCPs during the delivery of the program, effectiveness of the methods being used in the delivery of the program to achieve the program objectives, learning outcomes, and HCP learning expectations.
- CME audience learning expectations determined whether the CME program addressed pressing questions and competencies that are of interest for the target audience. It also measured the extent to which the CME program content provided was relevant, balanced, and supported with clear evidence, involved the use of interactive tools and materials, created opportunities to solve cases relevant to practise, and addressed barriers to optimal performance in the topic discussed. Furthermore, CME audience satisfaction involved an evaluation of CME program content, structure, setting, and speaker performance. In addition, this data collection provided the CME program audience with an opportunity to state their suggestions for enhancing CME programs.
- Acquisition of knowledge by CME audience (HCPs): This evaluation consisted of data regarding the knowledge acquired by HCPs from the CME program immediately after the program, the percentage of new knowledge that was presented in the CME program, and finally the barriers anticipated by the HCPs in implementing their new learning in their workplace.

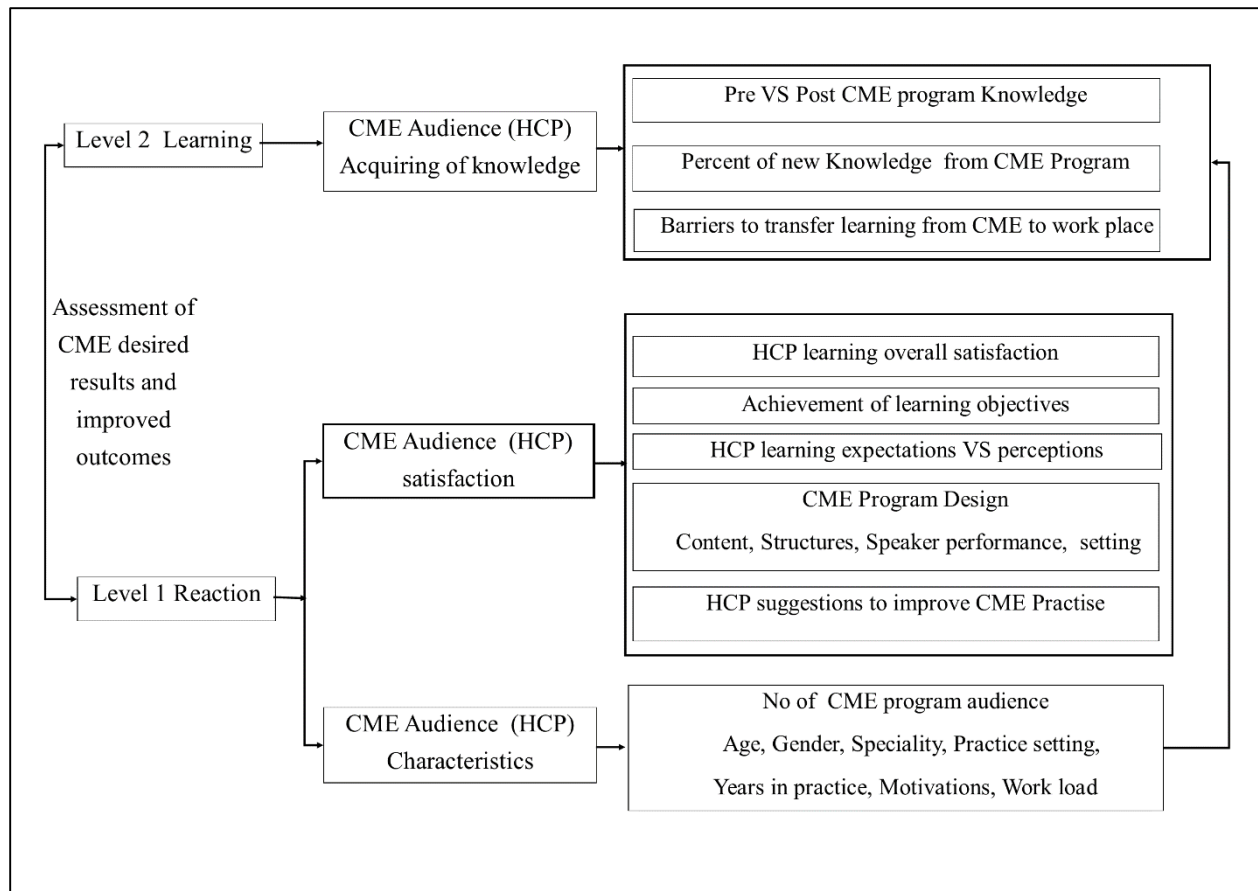


Figure 2.8: Conceptual framework of this study based on levels 1 and 2 of Kirkpatrick's evaluation model.

2.4 literature review:

In this part the literatures review for this study conceptual framework items will be discussed in addition to review of the CME research's according to the countries.

2.4.1 Conceptual framework items literature review:

This next part will present the literature review for the 10 items of this study conceptual framework:

1. CME audience (or HCP) characteristics.
2. CME audience satisfaction.

3. Achievement of CME audience learning objectives.
4. CME audience learning expectations.
5. CME program design.
6. CME program structure.
7. CME speaker performance.
8. CME program settings.
9. Knowledge acquisition by CME audience.
10. Barriers to transfer learning from CME to work place.

2.4.1.1 CME audience (or HCP) characteristics:

According to Marinopoulos et al. (2007), participants themselves play the roles of patients or family members in CME programs that focus on communication skills. In many studies, the participants were fully trained physicians. Furthermore, other participants, such as physician assistants and nurse practitioners, had been included in some other studies. Studies were conducted to determine whether some internal and external factors, such as the hospital environment, other participants, or the programs themselves affect the outcomes of the programs. The results of small-scale studies could not be used to arrive at conclusion regarding the influence of internal factors, such as the characteristics of the audience, or other external factors on the outcome of CME programs.

Christ et al. (2017) stated that general practitioners frequently access CME through journals. However, few studies have assessed the agenda CME articles, feedback from readers and users, and contribution features. The objective of the study of Christ et al was to determine the main sociodemographic characters of contributors and occurrence and sequential distribution of contributions. The study also examined the suitability of the journal for general medical readers

and practitioners' rating of the CME journals. The study also assessed the success rates of the practitioners (readers) in responding to simple multiple-choice queries and noticing different sets of contributors.

An evidence report of the Agency for Healthcare Research and Quality identified and assessed audience characteristics in 13 studies as an internal factor that influences the effectiveness of CME programs. The internal audience characteristics were age, sex, practice setting, years in practice, specialty, graduation country, country of practice, personal motivation, non-monetary rewards or motivation, learning satisfaction, and knowledge enhancement (Lowe et al., 2009).

Internal factors (audience characteristics)	External factors
Age	Regulation
Sex	State licensing board
Practice setting	Professional boards
Years in practice	Hospital credentialing
Specialty	External audits
Country of graduation	Monetary/financial rewards
Personal motivation	Academic advancement
Non-monetary rewards/motivation	Provision of tools
Learning satisfaction	Public demand/expectations
Knowledge enhancement	CME credit

Table 2.5: Effectiveness of the CME programs depends on internal audience characteristics and external factors. Source: Kiang et al., 2005.

Carrera et al. (2015) determined the relationship between participation in CME and physicians' healthcare production (or practice volumes, which consisted of number of hospital admissions and surgical procedures performed) over a 12-month period. Periodic management reports on the CME programs were assessed for this study. Information provided by the participating physicians was used for preparing these reports, and the reports were validated by the CME program administrators. Several factors were found to affect the physicians' decisions to participate in CME programs. The number of patients treated and surgeries performed by physicians were assessed for their effects on the likelihood of physicians' achieving the required number of CME credits. The findings of this study provided new perspectives. However, only a few factors were considered for their effects on the achievement of CME program credits by the physicians. The physicians were classified according to age, sex, time since graduation, number of hospital admissions, and number of surgical procedures performed; the effects of each of these factors on CME participation and the achievement of CME program requirements were assessed.

2.4.1.2 CME audience satisfaction:

Moattari et al. (2014) stated that changes in medical sciences occur rapidly and are accompanied with several innovative technologies. Organising well-designed programs for physicians is one of the methods of providing CME. Thus, CME plays a crucial role in the development of knowledge of new technology and orientation for providers of healthcare. To provide the latest treatment to their patients, physicians have to participate in CME. The complete study of any CME program requires sufficient resource, energy, and time for designing, organising, and evaluating the program. Hence, mainly opinion evaluation is used to assess the effectiveness of a CME program.

Tian et al. (2007) examined the systematic analysis of formal CME. The study reported the level of satisfaction with the program by the participating physicians, and this was achieved by recording data on the physicians' perceptions; satisfaction with the objectives of the program, program content, and delivery; and finally satisfaction with the instructors. The study focused on the satisfaction of the learners, which is their reactions, learning outcomes, improvement in the performance or behaviour, and finally results obtained from the patients or the changes in their health statuses. Overall, a high-quality evaluation method for CME programs would comprise the assessment of all levels of Kirkpatrick's evaluation model by using trustworthy and validated tools and objective measures. Reasoned randomisation and suitable follow-up periods were suggested to determine the effects and viability of the intervention.

Price and Reichert (2017) explored the effects of CME on nurses' professional satisfaction and their capability to offer quality healthcare. A thematic analysis of the research exhibited that CPD is an expressed demand and anticipation for practitioners across the different career phases. Early-career practitioners expected adequate training and education to assist workplace transitions, along with ongoing education prospects throughout their professions for promotions and career advancement. The findings of this research suggested that because of rapid transformations in healthcare field, practitioners must participate in CME programs. Hence, sufficient efforts for undertaking CME and CPD programs are required.

2.4.1.3 Achievement of CME audience learning objectives:

Ghosh (2008) proposed a structure for increasing the efficiency of CME programs. These programs are the main source of updated and recent information. Identifying suitable syllabus for CME programs is the one of the organisers' primary responsibilities. Before deciding on the

curriculum of a CME program, the organisers must evaluate the physicians' current knowledge. The CME organisers are expected to organise activities that consistently enhance the competence of physicians. The efficiency of CME programs must be estimated at the 'reaction' level (level 1 of Kirkpatrick's model) by measuring the satisfaction of the attending physicians. CME organisers should integrate the techniques to identify the needs of the attendees and enhance the course attendees' KSA during CME activities. In this study, the author presented proof-based conclusions regarding education principles; the need for evaluating CME programs; presently used guidelines for CME training; and guidelines for creating multiple-choice questions. These four themes provide sufficient information about CME as a basis for lifelong learning as well as for enhancing physicians' competence.

According to BMHC Regulations (2009), the mission of CME is to provide holistic education programs for the management of healthcare providers in clinical and research settings, including the management and leadership aspects of healthcare, to promote the highest quality of patient healthcare. The primary objectives of CME programs are to provide CME activities for improving interdisciplinary interaction of health professionals; to provide CME activities depending on the deficiencies and needs of determined learners; to design CME activities that satisfy the stated objectives of learning; and to provide CME practices in KSA, which results in enhanced professional development and clinical performance. CME programs should provide educational resources to all registered healthcare and medical professionals to update and improve their clinical ability, to provide high-quality clinical services and patient healthcare; and to enable HCPs to perform self-assessment.

Nutter and Whitcomb (2001) assessed clinical education in US medical colleges. At its beginning, this report provided background information regarding the assessment of clinical education in the USA and offered a framework for interpreting the findings and understanding the basis of projects. Formal learning of doctors takes place in two separate stages. The first stage involved defining the organisations' clinical curriculum and determining the problems associated with clinical education. The second stage involved the distribution of information regarding the state of the clinical curriculum to engender a national conversation on the types of modifications required to enhance the clinical education and to help individual medical professional in their attempts to enhance the quality of clinical education available to their students. The task of medical school practice was to permit future physicians to start obtaining the KSA that they need as medical experience.

Chen (2007) determined the short- and long-term effects of organiser-aided learning (in the form of a visual concept map or text outline) on retention in a completely web-based class. Organisers are inclusive and general instead of detailed and specific to existing concepts in a cognitive structure. The use of concept maps and text outlines in a completely web-based medical course was examined in this study. The learning attainments did not vary significantly between students with organisers and those without. This study provided proof for the positive results of the use of organisers in knowledge acquisition and purpose for online learners, particularly learners with low learning abilities. The use of advance organisers is expected to facilitate learning and teaching in a completely web-based setting.

According to ACCME (2011), CME and lifelong learning enhances the quality of healthcare and improves physicians' performance. CME involves learners, accrediting bodies, and organisers or

providers. The organisers should ensure that the study has end measures of education efficiency (knowledge, performance, or competence); should be able to create a certification of participation; should use teaching techniques suitable to the objectives of stated learning; and should ensure that learning objectives are suitable for target audience. A special responsibility of CME organisers is to disclose any commercial interests or support of the activity, presenters, facilitators, or planners to the learners and accrediting bodies. Moreover, the commercial interest should not affect the content or structure of the educational program. There is a partnership and collaboration between organisers and accrediting bodies.

Sriharan et al. (2009) reported that the current global trend is to integrate CME as an essential component of medical education. CME structure is extremely multifaceted, and CME systems differ widely in different countries. CME was adequately explored in the study. Advantages and obstacles of exerting online continuing education were examined and various concerns were emphasised. The study concludes with subjects assimilated and implications for CME programs in the future. This research is an effort to document certain provincial differences and inclinations pertaining to CME credit systems. Only a few studies, mainly systematic literature reviews, have examined the diversity in CME credit systems in different countries. This study will possibly generate a discussion among the CME stakeholders and policymakers to investigate the differences in the credit structures and to build global comparison literature to comprehend the efficiency of different methods.

Buriak et al. (2015) used a predictive model of physician intention to promote CME programs particularly on cancer survivorship. Directed by the theory of planned behaviour (TPB), the intentions to offer survivorship care, qualification, experience, insight of obstacles, and

individual survivorship position were assessed by logistic regression. A group of physicians, nurse practitioners, and registered nurses participated in this online CME program. The findings of the study revealed that practitioners were considerably less likely to convey intention to offer survivorship care than the other groups. Obstacles to the delivery of survivorship care adversely affected physicians' intention to offer survivorship care, which differed with the years of experience in this study.

2.4.1.4 CME audience learning expectations:

Moattari et al. (2014) analysed the design of a CME program conducted for general practitioners. The physicians who participated in the program mainly criticised the mismatch between the educational content and participants' real needs (professional requirements). Therefore, if CME programs are designed to cater to the specific learning needs of the participants, they are likely to be received well and valued highly by the participants.

According to a report by Association for Research in Vision and Ophthalmology published in 2017, the objective of educational plans of CME programs is to satisfy the requirements of basic researchers, medical students, PhD candidates, ophthalmology residents, clinician scientists, postdoctoral fellows, graduate students, ophthalmologists, optometrists, and research assistants who treat patients with eye diseases. After participation in the CME programs, physicians should discuss the outcomes of clinical investigations of eyes and vision research according to their field of interest. They should describe new designs and techniques to be followed by researchers and physicians in the ophthalmology departments. The participants should identify new methods that might influence research in the fields of ophthalmology. The participating physicians should discuss about advancements in eye research.

Lowe et al. (2009) discussed the future of CME programs. CME providers should be sufficiently decisive and respond readily by modifying the design of CME programs in the future in response to the emerging expectations of the target audience. Organisations and individuals involved in CME activities should ensure that CME preserves its responsibility as a strategic asset for safety and quality that will assist physicians develop, maintain, or improve their skills, knowledge, and performance. CME programs are a strategic asset for safety and quality and are intended to assist physicians and improve patient care. In the future, HCPs, who believe that CME programs may provide significant information creating a difference to healthcare, will support and participate in these programs.

Moore and Tonniges (2004) reported that the “every child justifies a medical home” training program was a more crucial developmental step towards establishing accessible primary care centres for children with special health care needs (CSHCN) than a conventional CME program. Educational goals were determined using a curriculum planning method. By the end of every training module, the participants were expected to know about the following: family–professional partnership; common components (medical home concept); policies; procedures and practices; coordinated, comprehensive, collaborative care for CSHCN; screening and surveillance; and local and state advocacy. The training course was associated with CME credits and used a direct and result-based adult learning approach (determining long- and short-term objectives). Moreover, the program goals were aligned with the Healthy People 2010 objectives and goals.

Kühne-Eversmann et al. (2008) analysed case- and team-based learning techniques to improve knowledge and participation of learners in CME programs. The results revealed that the

proposed interactive techniques, namely case- and team-based learning, imparted higher satisfaction and sustainable knowledge to the participants than did lectures. Interactive CME programs may encourage the participants to complete online cases and extend their knowledge through individual learning. In the post course questionnaires, the participants reported the class to be highly informative and diversified; they also reported that the program content was suitable for their pre course knowledge. They strongly agreed that the team-based technique improved learning and thinking and that the themes learned in the CME program might affect their professional performance.

Norman et al. (2004) reported that the main objective of CME is to enhance patient outcomes by transforming the training behaviours of practitioners. The maintenance of specialised proficiency is a crucial element of professionalism. However, long-established assessment techniques, which depend on individual self-evaluation, are insufficient to assess specialised proficiency. Findings from a systematic analysis of the literature revealed that CME programs based on well-performed assessments of needs efficiently transform practitioners' behaviours. The gap between the knowledge requirements of individual practitioners and the major educational needs recognised by the organisers of these CME programs and curriculum designers continues to remain. Educational units for CME will possibly generate instructions and single-subject techniques to review practice, which practitioners or their office employees can use for performance appraisal.

Griebenow et al. (2017) defined the roles and functions of shareholders in the various phases of planning and assessment of CME and CPD in the present-day context. Because the demands and multiplicity of practice of medical doctors have increased, the demand for predicting

organisational behaviour, particularly group learning behaviour in the field of credited CME and CPD, has increased. This development requires the educational planner to evaluate the practice-based demands of doctors and be alert to updates in practice. The objective of this study was to initiate and direct deliberations on describing the roles and functions for various stakeholder categories in emerging accredited CME/CPD.

Haruna (2004) stated that CME is a means of keeping doctors abreast of innovative advancements and new insights in therapy. It also assists them in recalling what they have forgotten. This study involved interviews of some on-call healthcare employees and reported that those employees were well aware of the significance of CME. CME curricula have been established and willingly accepted globally; however, they are evaluated only occasionally. An increasing amount of efforts are being channelled into CME programs by healthcare providers, thus indicating that CME programs are becoming increasingly structured and focused. This study suggested appropriate and participatory development of CME through various methods, including an evaluation of professional development needs and increase in the financial support for CME programs.

O'Neil (2009) reported the effect of CME on practitioner knowledge application and psychomotor skills. The study provided suggestions for optimising CME effectiveness to improve the implementation of knowledge and psychomotor proficiencies among recovery practitioners. The CME programs were intended to improve the application of procedures, encourage changes in practitioner behaviour, and enhance patient care. In total, 136 studies were selected for systematic assessment from 15 journals, of which 12 and 3, respectively, directed practitioner use of knowledge and were concerned with psychomotor abilities. Suggestions for

optimising CME were provided using the American College of Chest Physicians guideline for ranking. The study concluded that CME is efficient in enhancing practitioner application of knowledge. Multiple exposures and CME programs of longer durations were suggested to optimise learning outcomes.

Van and Meehan (2011) stated that the main objective of their study was to draw renewed attention to continuing education theory and to propose the key elements of a new model. Continuing education that is expected to enhance patient care in a multifaceted healthcare delivery system requires a different model from the continuing education that is expected to improve the knowledge and proficiency of physicians in a didactic background. A new model for continuing education is essential for transforming the practice behaviours of clinicians or physicians and for enhancing patient results in an increasingly patient-oriented, quality-based healthcare setting. The authors emphasised that the new model must focus on an extended and prioritised list of didactic results of behaviours that require transformation, beginning with those that openly distress patients. When completely established, the new model will facilitate mentors in planning and executing more efficient continuing education programs, which represent a necessary element of quality enhancement efforts, and in endorsing policy inclinations and in supporting continuing education research.

2.4.1.5 CME program design:

Lena et al. (2016) analysed CME programs and their outcomes. Skill and information are crucial in the medical field. Doctors and general practitioners are accountable for their work and are expected to constantly improve and enhance their medical skills. The study examined the need for CME programs. Medical experts can be motivated through the CME programs and content.

They must participate in knowledge-based programs to be able to provide high-quality service to patients. As the program content is generally practical, the programs ensure an improvement in service. The development and assessment of CME programs should be a strategic goal of every educational institution. The result of this study shows that CME programs must extend beyond only acquisition of skill and seek alterations in the practice of physicians.

Sara Johnson et al. (2012) examined CME programs and structures. In order to be effective and manageable, CME programs must satisfy numerous conditions, which are associated with the requirements of learners in terms of knowledge, content, and learning outcomes, both at the micro and macro level. The presentation of lectures is evaluated based on the value and clarity of content. When selecting a program, physicians most probably prioritise the quality of content, ease of practice, and ease of gaining a credit for attending, listening to, and participating in a course. CME programs that entirely consisting of instructions without practice and reflection sessions usually exhibit a small effect on medical practice and learning. Previews of content indicated the importance of the program in professional practice and affected the results and outcomes. In general, the outcomes of program addressing specific learning objectives depend on the course content.

Gitonga (2007) indicated that the development of new and innovative technologies, new systems of work administration, and rapid improvement in products and services has rapidly improved the frequency of learning at work. This dynamism has increased the interest in healthcare experts and physicians in improve their knowledge and skills. Thus, CME has become a distinct and crucial process that promotes, sustains, improves, or enhances the understanding, abilities, and

professional implementation of physicians. These physicians eventually offer appropriate services to their patients and society. Their careers progress due to improved patient outcomes.

Bhullar (2006) stated that the aim of CME programs is to develop the practice, capabilities, and knowledge of HCPs by using suitable proper materials and content. Reasonably time-bound programs are needed to motivate physicians to acquire and update their knowledge. Moreover, these programs distinguish between HCPs who meet the requirements of department boards and those who do not. CME programs are multibillion-dollar operations in most Western nations. This study examined the CME programs and their outcomes to determine their effectiveness and identify potential barriers. CME lectures should be designed to address the requirements of doctors and physicians and should be centred on self-valuation and peer assessment. CME materials should be highly transparent to save time and improve accessibility.

2.4.1.6 CME program structure:

Moore et al. (2009) stated that generally physicians strongly believe that they should attend CME programs to provide high-quality care to their patients. Most importantly, learning systems that are presently available do not appear to offer healthcare experts suitable prospects for effective continuous learning. Simultaneously, the interest in the quality of service in medical care and the diversity of groups in systematised medication have led to the development of methods to address the problems of physician capability and execution. Hence, CME organisers should focus on CME structure to provide high-quality service to participants and learners. The study raises the question whether CME programs can be acknowledged as an independent and complete support in these new methodologies if the contributors do not adequately use present methods for designing and evaluating CME.

Marinopoulos et al. (2007) specified that structured CME programs are intended to educate physicians and healthcare practitioners by providing current medical information. General practitioners usually overdo, underuse, and mishandle medicinal and diagnostic interferences. Feeble CME program structures either cause inconsistencies in training. Identifying CME structures and methods that are most efficient in distributing and sustaining clinical knowledge is vital to enhancing CME program and accordingly reducing the space amid indication and training. The study was conducted to determine the value of CME structure and different instructional strategies with regard to knowledge, approaches, abilities, training behaviour, and medical practice effects.

Tommaso and Pietro (2014) expressed that physicians are continually required and prompted to update their speculative, practical, and communication skills to enable them to keep pace with the rapid advancements in clinical and biomedical practice and only use necessary resources to ensure effective clinical practice. Accordingly, many countries have established CME structures to assure that medical experts would meet mandatory learning conditions to retain their license to practice and provide high-quality service. The objective of this study was to assess and determine the procedures and structures of CME systems in European region. The results provide information to policy makers and medicinal experts regarding the possibility of improving the standard of European e-learning.

Tian et al. (2007) noted that CME programs are a means to facilitate physicians in staying updated and well-informed and providing improved patient care as well as discontinue less efficient methods. Physicians participate in CME programs to sustain their medical licences. CME assessment studies differ considerably in assessment techniques, levels of assessment, and

span of continuity. Standards for CME assessment are required to enable homogenous evaluation among various studies and to find features that can be used for CME assessment. In total, 32 reviews were incorporated to the evaluations. Many assessments have been issued; these represent attempts to review CME appraisal studies to measure the efficiency of the assessments. Sustainability of the information, assertion, and competences acquired is a problem that has to be borne in mind while structuring CME assessments.

Cervero and Gaines (2014) stated that a CME program is a method or practice by which medical experts and physicians stay abreast of the latest information, knowledge, and developments in the medical field. This study was conducted to determine whether industry support for CME affects the opinions of physicians regarding the commercial inclination of CME programs. An appropriate CME structure not only increases the knowledge of physicians but also benefits their patients in the long term. However, the current structure of CME programs does not sufficiently support the growth of medical professionals. CME programs are currently structured according to medical expert contribution instead of performance development. Against the background of increasingly complex literature, the inclusive aim of this study was to determine the reasons for the coexistence of considerable proof of the efficiency of the structure of CME program and the extensive literature on improvement in CME structure.

Schoen et al. (2009) stated that since 2000, physician participation in CME activities for practice advancement has improved noticeably; however, the study results reveal that most healthcare experts choose not to participate in CME programs. The study examined data from the CME program database of a large randomised controlled trial, to define whether an association was observed among the degree of perceived inclination, the category of CME movement, and the

occurrence or nonappearance of commercial provision. This large, potential examination does not indicate that commercial support causes apparent bias in CME activities. The present study examined the correlation between practitioner features, registration rates, or strength of contribution in a web-delivered learning intervention and increase in concern for and attention to patients. Motivating practitioners to participate in professional improvement activities, by incorporating contemporary and advanced CME agendas, is difficult. Elements that projected initial practitioner registration, nevertheless, did not forecast the scope and extent of course involvement after initial registration.

Glazier et al. (2005) critically assessed the evidence of the efficiency of CME programs in terms of rheumatic ailments for primary care practitioners. Inadequate training might result in failure of the program. Attending CME programs alone cannot improve the performance of physicians. Proper strategies have to be followed to organise a program effectively. Outpatient-based CME programs may continue to be conducted in the form of courses; however, if the logistics appear favourable, longitudinal programs can be organised over time. Moreover, the responsibility on instructors in longitudinal programs will not be more than that in courses. This flexibility in possible formats of CME, with an assessment of the strengths and limitations of each format, enables CME programs to be tailored to meet the specific knowledge requirements of the target audience. The participants in the study reported that with their current funding, CME programs could not suitably moderate preferences despite their strengths; hence, seeking a new system structure for financing CME programs is necessary.

Hiroshi (2011) specified that physicians are solely responsible for developing their own knowledge and skills, improving their practice, and continually enhancing themselves throughout

their careers to continue their practice in the fast-emerging areas of clinical science and healthcare. Medical professionals must be encouraged to undertake lifetime learning on their own. To efficiently assist self-learning and practice, medical associations offer CME programs. CME program settings are expected to motivate and improve practitioners' attention in training and meet the expectations of society by strengthening the physicians' determination to learn new methods of treatment and gain new knowledge. Considering the self-directed and self-contained practice of individual practitioners, structured CME activity has constantly been a self-reporting system. Physicians are personally involved in their patients' lives and well-being; therefore, the duration of physicians' practice spans several years. Considering the rapidity of development in medical research, the need for continuing education in healthcare-related professions is stronger than that in other professions.

Sergio (2006) stated that healthcare organisations are becoming increasingly alert regarding the significance of constantly improving quality of care by several programs among which CME is a major key. CME programs are crucial for enhancing the patients' quality of treatment in primary healthcare settings. The objective of this study was to define how the characteristics of practitioners affected the efficiency of a multi-layered CME intervention to improve the management of acute respiratory infection. A secondary analysis was conducted using data from 121 practitioners, who participated in the learning intervention study. The results of this study revealed that physicians' characteristics and structural environment affected the effectiveness of the learning intervention and are consequently must be considered during the design and execution of CME programs.

Murgatroyd (2011) stated that CPD programs recognise the wide range of skills that physicians are required to develop to provide high-quality medical service; these skills include medical competence, as well as decision-making, communication, ethical, social, and interpersonal skills. Consequently, CPD includes CME, which is primarily designed to improve the knowledge, skills, and performance of physicians. Currently, many nations are implementing CME programs based on experience and skills; these programs provide a wide range of skills required to practice high-quality healthcare. CME programs are not a compulsory in many countries, but physicians are advised to participate in CME programs because they enable physicians to develop their professional skills and provide high-quality service to the patients.

2.4.1.7 CME speaker performance:

Ferguson (2016) stated that the primary objective of CME is to improve the physicians' capabilities and their performance in providing medical treatment to ensure high-quality care for patients. The study determined whether slide design, the use of images, and text density in presentations in CME seminars affected the overall speaker evaluation by the participants (practising physicians). Speaker training is an essential component because speakers are the mediators who convey information to physicians who participate in CME sessions. The main factors affecting speaker evaluation scores are the organisation of image fraction and text density. The outcome of the program probably depends on the speaker evaluation scores and is not entirely based on the content that they deliver. The data for this study was collected from six different CME conferences and consisted of physicians' evaluation of the presentations and demographics of every speaker. CME programs must improve rules and guidelines pertinent to the minimum requirements of speakers, as well as use of presentations after lecturing and the proper number of scheduled lectures for any specific lecturer over time.

In a study by Collins et al. (2009), CME courses in thoracic imaging were evaluated and the factors affecting the decision of whether a course is effective or ineffective were analysed. The Radiological Society of North America sponsored the assessment of lectures and individual speakers participating in a 5-day CME course. Statements from participants were collected and examined to determine the number of positive and negative remarks as well as the common traits of unsuccessful seminars. Individual assessments of speakers at a CME program provided information about the value of the lectures, which could not have been obtained using assessments of grouped lectures. Assessments through a methodical review of each speaker provided precise data related to the categories and frequency of descriptions related to unsuccessful instructing. This type of data is highly valuable in planning CME course assessments, designing future CME programs, training speakers, and assessing speaker performance. Assessments about the selection or retention of clinical experts as speakers should be made according to outlined principles, for example, general clinical expertise, skill and experience regarding a specific medicinal field, and communication skills.

A study by Allen et al. (2010) identified how recurrent CME speakers worked effectively in lecture session and provide research data in comparative terms than absolute terms. The knowledge and expertise of the CME speakers were assessed. The results showed that the speakers offered data more frequently in comparative terms than in absolute terms. However, most often speakers presented frequencies, percentages, graphical representations, but without data. The result of this study revealed that both CME speakers and participating physicians required a deeper understanding of the subjects than they currently had for enhancing their professional development. Course content that is presented in clear format is useful for learners and is easily adopted by them. While lectures extend essential educational openings to physicians

and healthcare experts, they are different from CME programs, and speakers should clearly understand this difference.

2.4.1.8 CME program settings:

Shvartzman et al (2013) stated that obtaining a medical degree is simply the beginning of a protracted education process. After formal training, CME might present a highly suitable option that depends on individual initiative. The results of the study show that CME programs are designed to meet the learning needs of special subcategories, which have a minimal inclination to participate in CME programs. Officials and representatives have to modify CME settings to satisfy practitioner interests in CPD programs and the increase the accessibility of these programs for the practitioners. Moreover, CME resources must be available to the practitioners at their own workplace so that access to detailed information is convenient. Hospitals have a long practice of CME program and programs to update professional knowledge, which have been incorporated into their regular work schedule in the form of staff meetings, clinical-pathological gatherings, and journal clubs.

In their study, Mann et al. (2009) stated that healthcare experts and physicians today need to work in difficult and fluctuating healthcare settings; they constantly need to update and enhance their knowledge and abilities as well as support and resolve patient and well-being issues. Training experts with these abilities and skills is equally complex. The study determined the key factors affecting CME identify gaps in evidence, and to examine any inferences relevant to learning practice and exploration. Physician attributes for example career practice, commitment, and participation in education activities, approach to latest and current information, and

structural features of working atmosphere, and management methods will probably affect the efficiency of CME structures and settings.

A study on CME by Lowe et al. (2009) showed that various CME programs are designed for instructing practising doctors through the distribution of new and current medical information. To assure that CME program provides information that is pertinent to practitioners, in keeping with the definition of CPD, CME contributors must respond to evolving trends and organise programs accordingly. In the study, the effects of the present importance on lifetime learning in medical professionals, mainly the need for continuation of accreditation and licensure, on CME were assessed. In addition, the effects of changing assessments of needs and the effects of the incorporation of new tools in CME were also assessed. The evolving unique requirements of CME providers and organisations related to these changes were examined.

Mazmanian et al (2009) stated that prospects for improvement in quality have become increasingly notable; consequently, educational organisers, healthcare scholars, and representatives are in search of approaches that can improve patient outcomes. CME is one strategy for improving outcomes; however, the effects of CME on medical outcomes are not clearly defined. Moreover, the guidelines for defining patient outcomes are in various phases of development and standardisation. Standards and models are available for designing and assessing CME programs as well as for assessing the quality of care. CME and research should be defined by implementing guidelines.

Wentz (2011) assessed the efficiency of various CME strategies in transforming medical behaviour. Effectiveness assessments are now gaining importance because reaccreditation and quality declaration guidelines have become stringent. CME for physicians has to be mainly based

on the function that they perform. An evaluation of needs is an essential factor of CME programs, but an evaluation of their learning requirements provided by the physicians themselves might not provide complete information of the learning requirements. Additional studies is needed to determine the qualities necessary for assessing causal links that are believed to exist among CME, practitioner activities, and medical outcomes. A CME course or program can be considered effective if a participating physician exhibits a measurable improvement in performance as a consequence of the CME program.

Ebadi et al. (2007) conducted a systematic assessment of all accessible formerly conducted studies on CME based on motivational factors, components correlated to the educational priorities, and components pertaining to the framework and methodology. The results of the systematic review were based on the responses and viewpoints of the participants. Accordingly, obtaining technical and systematic information was the participants' primary preference. The majority of the participants believed that subject matter should be presented according to the professional demands. Furthermore, some CME professionals have strongly affirmed that these curricula are designed without systematic and technical needs assessment.

Wekell et al. (2013) defined the medical proficiencies that are presently necessary for on-call consultant paediatricians and to define how these proficiencies could be obtained by attending a result-based CPD program. The key objectives of the study were to address the present accountabilities of on-call professionals. In addition, the study was formulated in line with the needs assessment among professionals working in on-call services. A pre course needs assessment was conducted with 26 professionals. Subsequently, the learning intervention was provided to 16 respondents, through many learning, appraisal, and evaluation approaches. This

described the execution of a competency-based CPD program to address various demands encountered on-call HCPs.

Filipe et al. (2017) affirmed that CME is rapidly evolving into competency-oriented CPD; consequently, the agenda for self-directed CPD and those provided by CPD mentors are also changing similarly. Rapid changes in clinical knowledge and in the preferences of clinicians, patients, and society; advancements in healthcare delivery systems; regulatory changes; and political changes drive the changes in the syllabus for CME programs.

2.4.1.9 Knowledge acquisition by CME audience:

As mentioned earlier, improvements in physicians' performance, knowledge, skills, and healthcare outcomes are the types of changes that have been the focus of studies on CME (Davis, 1992; Fox et al., 1998). However, researchers have observed variations in these outcomes. Because the levels of required knowledge and skills are not well-defined (Gibbs et al., 2005), debates concerning the effects of CME on the performance of HCPs in practice are common (Davis et al., 2009). Moattari et al. (2014) stated that the results of CME in terms of behaviour changes have been emphasised; however, the opinions and acquired knowledge of the participating physicians can be easily assessed by comparing the results of tests conducted before and after CME programs.

Oxman et al. (1995) conducted a systematic review of 102 trials of interventions to determine the effectiveness of CME. They concluded that the quality of healthcare could be gradually improved by selecting the appropriate type of training interventions for HCPs from among various available interventions. Appropriately used interventions can engender crucial improvements in professional practice and patient outcomes. In a systematic review Davis

(1998) revealed that the results of two-thirds (70%) of the studies on CME effectiveness showed an improvement in HCP knowledge and performance due to the CME programs.

The ACCP recognised the need for recording results and generating evidence in the evaluation of CME effectiveness; therefore, the Evidence-based Practice Centre (EPC) conducted evaluation studies. In 2007, Marinopoulos, in collaboration with Johns Hopkins Centre, performed a systematic review to obtain evidence that delivering CME effectively imparts knowledge to physicians, changes physician attitudes, imparts skills, changes physician practice behaviour, and changes clinical practice outcomes. This review included 136 and 9 individual articles and systematic reviews, respectively, published between 1981 and 2006 to determine the effectiveness of CME programs. The conclusion drawn from the study was that CME was effective in terms of acquisition and retention of knowledge, attitudes, skills, behaviours, and clinical outcomes. However, the effectiveness of CME in terms of patient outcomes was lower than that in terms of knowledge outcomes. The outcomes were as follows: knowledge (22 of 28 studies, 79%), attitudes (22 of 26 studies, 85%), skills (12 of 15 studies, 80%), practice behaviour (61 of 105 studies, 58%), and clinical practice outcomes (14 of 33 studies, 42%) (Marinopoulos, et. al., 2007).

The aim of another systematic review (Davis, 2009) on 105 studies was to evaluate the effects of CME on the short- and long-term clinical performance of physicians. In this review, 50 studies reported long-term CME effectiveness in terms of changes in the behaviour of the learners and 37 studies evaluated the effects of CME on clinical outcomes. Overall, 42% of these studies showed that CME improved clinical outcomes.

A review on 28 studies conducted by the Johns Hopkins EPC assessed the knowledge gained by specialists through CME programs assuming that knowledge is directly related to clinical outcomes and psychomotor skills. The results of this review revealed that 22 (79%) of these studies reported an improvement in knowledge after the CME program, 4 (14%) showed no difference, and 2 (7%) showed mixed results. The conclusion of the review was that CME appears to be useful for the acquisition and retention of knowledge although the evidence was only moderately strong (Ahmed et al., 2013).

In 2014, Cervero and Gaines, supported by the ACCME, conducted updated synthesis of systematic reviews to assess the effectiveness of CME. The synthesis involved studies published until 2014. It identified 39 systematic reviews that presented an evidence-based approach for designing CME programs to increase the chances of CME programs to achieve the objectives of improving physician performance and patient health outcomes. Among the 39 included studies, 31 reviews were published between 1977 and 2002 (relatively old), while the rest were published after 2003 (relatively new). Five of the new systematic reviews addressed the question of the effect of CME, in general, on physicians' performance, and patient health outcomes (Davis & Galbraith, 2009; Marinopoulos et al., 2007; Mazmanian, et al., 2009.) Most of these studies reported positive outcomes for the effectiveness of CME on HCP knowledge, performance, and patient health outcomes (Cervero and Gaines, 2015).

2.4.1.10 Barriers to transfer learning from CME to work place:

Broad (1997) described transfer of learning as a change in attitude or behaviour or a demonstration of newly acquired skills on the job. All CME stakeholders (program designers, trainers, learners, and workplace managerial staff) want and expect transfer to practice to occur

due to CME programs. Poor transfer skills were associated with the use of traditional instructional strategies for training (Speicher & Kehrhan, 2009). Waddell and Dunn (2005) reported significant gaps in transfer of learning and proposed peer coaching as a solution. Gitonga (2007) examined models of transfer of learning in the context of CME.

Organisations spend a considerable proportion of their funds on training or educating their workers and maintaining a high level of competitiveness in their workforce. However, studies examining the amount of the information absorbed, conceptualised, and implemented in practise have shown that the transfer of learning decreases significantly when workers return to work from an educational program. Merriam and Leahy (2005) in their review of the literature on learning transfer, report that considerable attention is now focused on the factors that hinder and those that facilitate the transfer to practice in learners. According to the review, the environment of the workplace was the most crucial factor affecting the transfer. HCPs reported that they were not encouraged to share their newly acquired knowledge with other colleagues, demonstrate what they have learned, or have conversations with supervisors regarding new ideas gained through CME programs. Broad and Newstrom (1992) stated that most HCPs stated that the hierarchy of management and political culture in the workplace were frequently reported barriers to transfer of learning. Daffron et al. (2015) suggested that organisations should set aside time to change the status quo in the workplace when the employees return to work after their training.

2.4.2 Review of studies evaluating CME effectiveness:

Collins et al. (2002) stated that the number of CME studies has increased considerably because the factors motivating physicians to learn, the learning methods of physicians, and the contributions of formal and informal education to the medical practice of competent physicians are gaining importance. According to Cervero and Gaines (2015), after the 1960s, educational

models have been expanded, elaborated, and extended considerably; consequently, the number of studies on CME, particularly those designed to elucidate the association between CME and clinical performance by using patient health outcomes, has increased.

The focus of this part of the literature review is mainly on the studies conducted worldwide that closely match the objectives and methodology of the present study. These studies have been summarised and classified according to the geographical region in which they were conducted. Studies on CME that were conducted in the UAE are explained at the end of this section.

2.4.2.1 CME studies in the USA:

An article titled ‘Organizing an effective continuous medical education session’ was published in 2008 by a member of the Department of Internal Medicine, Mayo Clinic, Minnesota in the USA. This article highlighted the importance of CME programs in increasing the professional competence of HCPs and updating their current information. In addition, the CME organisers shoulder the considerable responsibility of determining an appropriate curriculum. Therefore, the organisers are expected to understand the principles of adult education, assess the learning needs of participating physicians, and organise interactive CME activities designed to consistently improve physician competence and knowledge. Furthermore, the effectiveness of a CME program should be evaluated at a level that goes beyond measuring only physician satisfaction. The incorporation of methods to determine the improvement in the KSA of the course attendees due to the CME activities into CME program evaluation is necessary. Testing the physicians’ learning by comparing the scores on multiple-choice question tests conducted before and after the program is a suitable method of assessment (Ghosh, 2007).

Tian (2007) developed a CME evaluation instrument to facilitate future CME evaluation efforts. A generic instrument template was first developed for addressing variables in the second evaluation level based on TPB, which involves attitude, behavioural belief, subjective norm, perceived behavioural control, and behavioural intention. The instrument was then adapted to evaluate the effectiveness of a CME-related conference, in which more than 134 physicians returned duly filled questionnaires. A 22-item instrument and a revised generic instrument template were finally developed ($\alpha \geq 0.70$) for early-stage instrument development, which exhibited the unidimensionality of the subscales. Tian recommended that the established and validated instrument could be used to evaluate the effectiveness of other CME activities if the template is adapted to different clinical domains addressed by each individual CME activity. However, other studies that adopted and implemented Tian's evaluation instrument were not found during our study of the relevant literature.

Shenoi et al. (2013), in a study in Texas in the USA, evaluated the effectiveness of an educational program intending to improve the knowledge of learners (physicians and nurses) and learner-perceived comfort in managing paediatric office emergencies. The researchers used pre- and post-program knowledge questionnaires comprising 15 items to assess improvement in knowledge and a 10-level Likert scale to assess comfort. In this study, the physicians demonstrated significant improvement in the mean knowledge scores (1.83, 95% confidence interval (CI) [0.76, 2.91], effect size [$d = 0.98$]). The percentages of correct answers on the knowledge test were 79% and 91% before and after the program, respectively. However, the nurses exhibited a relatively small and non-significant improvement in the knowledge scores (0.59, 95%CI [-0.19, 1.37], effect size [$d = 0.24$]). By contrast, significant improvement was

observed in both groups in the management comfort scores (physicians: 1.3, 95% CI [0.9, 1.7], nurses: 1.4, 95% CI [0.7, 2.1]).

Dewey et al. (2015) evaluated an educational program by using Kirkpatrick's model, in terms of effectiveness and effects of the program on HCP knowledge and prescribing behaviours. The participants were physicians, dentists, physician assistants, and advanced nurse practitioners; 174 participants were typically middle-aged (average age: 53 years), male (89%), and physicians (82%). The other HCPs comprised 18% of the study population. Many physicians practiced in solo primary care settings (46%). Course evaluations were completed by $n = 155$ (89%) participants who had provided high ratings to the course and presenters (mean 4.8/5). Physicians' knowledge scores increased significantly after the program (mean \pm standard deviation scores pre-test: 58.7 ± 13.12 and post-test: 78.28 ± 9.83) ($t(173) = 20.06$, $P \leq 0.0001$, 95% CI: $[-21.51, -17.65]$). Almost half the participants, ($n = 83/174$, 48%), completed the follow-up survey, and 93% agreed or strongly agreed they made changes in their professional practice owing to the course. Most participants practising with an active Drug Enforcement Administration registration ($n = 57$), agreed or strongly agreed that they implemented changes to align their practices with current guidelines (89%), used CPD more appropriately (87%), implemented office policies on prescriptions (81%), identified and referred more substance abuse patients to treatment (80%), shared new information or experience from courses with 25 other health professionals (93%), and felt that the course positively affected their behaviours, both personally and professionally (90% and 96%, respectively). The results demonstrated participant satisfaction and improvement in prescribers' knowledge and self-reported prescribing behaviours.

Davis and Carr (2016) reported the results of a systematic legal analysis of the presence and characteristics of CME requirements in the USA. They systematically collected, reviewed, and coded all laws that require physicians to undertake CME on reducing opioid misuse, abuse, and overdose risk as a condition for obtaining or renewing a license to practice medicine. The results of this review showed that only five states required all or nearly all physicians to undertake CME programs on such topics. Fewer than half the states required physicians to obtain such training. This study recommends that postgraduate clinical training, such as evidence-based CME, can help improve physicians' knowledge and practice.

2.4.2.2 CME studies in Europe:

A survey was conducted in Catania, Italy, (Coniglio et al., 2014) to evaluate the doctors' attitudes and beliefs regarding the usefulness of CME programs and to assess their level of satisfaction. In total, 205 medical doctors with a mean age of 52 years and from various specialties completed the questionnaire. Almost 65% of the responders expressed an overall favourable view of the CME courses provided, but only 26% reported the belief that CME courses 'always' improve the quality of healthcare provided. The results suggested that CME strategies should be reviewed after a detailed analysis of the training needs of HCPs.

Toftgaard et al. (2016) explored the effects of CME on the knowledge and attitudes of 831 general practitioners (GP) in the central Denmark region. The GPs were invited to participate in a CME program on cancer diagnosis and their role in cancer detection. A questionnaire focusing on knowledge, attitude, and clinical vignettes were sent to each GP 1 month before and 7 months after the CME programs. The GPs who participated in the CME program were compared with reference (nonparticipant) GPs while analysing the before–after differences. In

total, 202 GPs (24.3%) completed both the baseline and follow-up questionnaires, and 532 GPs (64.0%) assessed the risk of cancer before the CME and 524 GPs (63.1%) assessed the risk of cancer after the CME. Compared with the reference group, CME-participating GPs exhibited statistically significantly higher understanding of a rational probability of diagnosing cancer among patients urgently referred for suspected cancer than did the reference GPs. Attending the CME program increased the GPs knowledge of cancer likelihood and reduced the assessed risk of cancer in urgently referred patients.

2.4.2.3 CME studies in Australia:

Stewart and Khadra (2009) assessed the attitudes of Australian doctors towards CME to determine the differences, if present, in the modes used and attitudes among clinical specialties and practice locations. Using a 52-statement questionnaire distributed to 1336 senior Australian doctors, the researchers enquired about the doctors' attitudes towards current CME activities; 494 doctors responded to the questionnaire. All the doctors, particularly those in hospital practice, expressed a positive attitude towards CME but reported the lack of time as a barrier to learning. In addition, the results showed that traditional forms of CME (lectures, seminars, and workshops) were more popular than modern CME approaches, such as e-learning.

2.4.2.4 CME studies in Africa:

Gitonga et al. (2014) concluded that studies varied widely in the levels at which CPD programs were evaluated. CPD programs are complex and multifaceted; therefore, the most useful evaluations combine methods or conduct a holistic evaluation, which combines the rigor of quantitative methods and the deep formative information provided by qualitative methods. Thus, CPD evaluation ideally focuses on the participation, satisfaction, and changes in knowledge and behaviour of the participants as well as patient outcomes. In practice, however, most CPD

providers only assess levels 1 and 2 outcomes by using pre- and post-activity self-administered questionnaires. Although level 3 and 4 outcomes have been measured in the context of research projects by using health service evaluation methods, CPD providers are still developing reliable methods to measure these outcomes routinely. In summary, evaluation serves two main purposes: summative assessment (does the program improve outcomes?) and formative assessment (how can the program be improved?). These two goals can be achieved most effectively by collecting different types of data; for example, test scores are used for summative evaluation, while interview and survey data can be used for formative assessment.

In Nigeria, Obaseki et al. (2015) conducted a cross-sectional study during the annual conference of the Nigerian Thoracic Society held at Ile-Ife in November 2013. The participants included residents in respiratory medicine as well as qualified pulmonologists. The study instruments were pre-test and post-test questionnaires, which consisted of the same set of questions. The goal of this study was to examine whether CME programs can improve the knowledge of doctors. In this study, 54 and 46 pre-test and post-test questionnaires, respectively, were collected. The maximum obtainable score was 25. The scores (mean \pm standard deviation) on the pre-test and post-test were 13 ± 6 and 17 ± 5 , respectively, ($t = -3.9$, $P < 0.001$) translating as an improvement in knowledge from 52% to 68%. Clearly, participation in a CME program improved the participants' knowledge.

2.4.2.5 CME studies in Asia:

Kang et al. (2016) evaluated the effectiveness of the National Train-the-Trainer Program for Hospice and Palliative Care Experts in Korea, which was conducted in the form of eight 1-day sessions. The program objective was to improve the teaching skills of those in the field of

hospice and palliative care between 2009 and 2012. The effect of the program was measured using Kirkpatrick's model of educational outcomes. Level 1 and 2 outcomes were evaluated immediately after the 1-day sessions (n = 120). The results addressed participant reactions to and satisfaction with the program content, method, and the overall course (mean range: 3.94–4.46 on a 5-point Likert scale). The level-2 evaluation (learning) showed that participants gained teaching-related knowledge and confidence (4.24 vs 4.00). Kang et al conclude that the educational program was practical and effective. Medical professionals from Korea and Laos have been working together to develop CME program covering the major clinical fields of primary care. Yoon et al. (2016) evaluated the effectiveness of the program, which was conducted four times consecutively with 48 HCPs in total between 2013 and 2014. Kirkpatrick's model was used to create a questionnaire, which was administered to evaluate the reaction of the participants. The participants were satisfied with the CME program, and the average score was 4.48 out of 5.0. The average score of the trainees' performance at the beginning was 2.39 out of 5.0, and it increased to 3.88 at the end of the program. This study conclusively showed that the CME program was effective.

In their article from Malaysia, Aziz and Fardaniah (2013), the objective of the article was to discuss research findings on constructing a valid and reliable instrument to measure training effectiveness or developing a general training effectiveness scale. In this article, the scale was constructed by integrating the models of Kirkpatrick (1959) and Quinones (1997) for the evaluation of training effectiveness. Four dimensions were identified in the scale, namely satisfaction, learning performance, individual performance, and organisational performance. The instrument used to measure general training effectiveness requires respondents to attend the

training programs. Hence, the predictive validity of the scale cannot be tested because the same group of respondents will not attend the same training program in the future.

In India, Vasudevaiah and Dash (2013) assessed the level of knowledge among HCPs regarding paediatric emergencies and their management and evaluated the effectiveness of CME programs at a community health centre in Karikalampakkam. The study had a quasi-experimental design and involved pre-test and post-test assessment of a single group. All the HCPs were considered participants in this study. The sample size was 40 and was selected using the purposive sampling technique. The pre-test was conducted before the CME program with the structured interview schedule. The post-test was conducted after the completion of the program by using the same tool. The pre-test mean knowledge score among the HCPs was 3.15 ± 0.89 with a mean percentage of 7.8% whereas the post-test mean knowledge score was 4.47 ± 1.58 with mean percentage of 11.17%. The Z and P values were -2.555 and 0.011 , respectively, which indicate statistical significance at the 0.05 level. The study conclusively shows that during the pre-test evaluation, the HCP knowledge level was poor; however, after training, their knowledge level improved. Thus, CME programs are needed to update the knowledge and skills of HCPs.

Choudhari (2014) evaluated interdisciplinary regional CME programs at a rural tertiary healthcare institute in Central India by using the guidelines of Kirkpatrick's model for training program evaluation. The study had a quasi-experimental, one-group pre-test and post-test study design. In total, 100 delegates, 56 of which were faculty members, participated in the CME. The mean pre-test and post-test scores were 2.91 ± 1.59 and 10.01 ± 1.19 , respectively, and the difference between the mean scores was statistically significant ($P < 0.05$). The mean score of 'gain in learning' was 7.1, while the absolute learning gain was 59.16%. The class average

normalised gain was 78%, while the average normalised gain of a single student was 78.24%. The effect size was 5.09. The 'rating average' for each individual parameter of the feedback preform, measured on a 5-point Likert scale, was used for feedback analysis. The study results showed that CME successfully achieved its objectives, as indicated by the feedback and improved learning score of the participants.

In another study in Nepal, Shrestha et al. (2013) conducted a study to determine the effectiveness of an educational intervention for improving knowledge and practice of nurses in neonatal care in Kathmandu. The study had a quasi-experimental design. It involved time-series pre-test and post-test evaluation and a convenience sample of 30 nurses working in emergency rooms, delivery rooms, and birthing centres. The statistically significant findings suggested that this educational intervention was effective in improving nurses' knowledge and practice regarding neonatal care. Furthermore, a positive correlation was observed between knowledge and practice.

In Palestine, Shuval et al. (2007) examined an educational intervention through a controlled trial and before and after the program to examine the effects of the educational intervention on the test ordering performance of family doctors and drug utilization by their patients. In addition, Shuval and colleagues assessed the effects of the intervention on the attitudes of the doctors towards evidence-based practice and knowledge. The participants in the controlled trial consisted of 75 doctors and 106 349 patients (treated by the participating doctors). The study evaluated the doctor's attitudes and knowledge through a validated questionnaire before and after the intervention. Results from the controlled trial did not indicate statistically significant differences between the intervention and control doctors' test ordering performance or their patients' drug

utilization. However, the intervention positively influenced attitudes and knowledge of the doctors.

Shvartzman et al. (2013) assessed lifetime learning and CME among primary care physicians in Palestine. This study had a cross-sectional design. A self-administered questionnaire, based on the Jefferson Scale of Physician Lifelong Learning, was mailed to 4,104 primary care physicians. In total, 979 physicians completed the study, of which 53.4% were male physicians with a mean age of 51.8 years. A logistic regression model showed that male sex, teaching, and not working in a rural clinic, increased the lifetime learning score of the physicians. The results of this study indicate that policymakers should develop strategies to increase the interest of HCPs in educational programs and the accessibility of these programs.

In Iran, Farzianpour et al. (2009) assessed the satisfaction of CME programs participants in terms of their professional requirements of HCPs in Tehran University of Medical Sciences who participated in CME program. In this cross-sectional, descriptive analytical study, a reliable and valid retest questionnaire was used to determine the satisfaction of the HCPs with CME program in terms of their professional requirements. In total, 103 HCPs who had participated in the CME programs in 2006 were enrolled. The researchers concluded from the results of this study that a high level of satisfaction was noted among medical professionals. The satisfaction of the participating anaesthesiologists with the relevance of the CME programs to their professional requirements was 28.3%. The satisfaction level of general practitioners and paediatricians with the speakers' performance was 40%, while that of gynaecologists and obstetricians was 31.6%. The high level of satisfaction was due to previous efforts invested in the appropriate assessment of the learning needs of the participants and the use of standardised modern teaching methods.

In a descriptive cross-sectional study, the satisfaction and perception of participants with the current CME programs in Iran were examined (Bahador et al., 2010). The attitudes of the participants, comprising physicians, nurses, midwives, healthcare providers, dentists, clinical laboratory technicians, and nutritionist, in 28 CME programs implemented by Iran University between 2007 and 2009 were evaluated. The participants completed a questionnaire at the end of the CME programs. The prepared questionnaire (reliability coefficient Cronbach's $\alpha = 0.97$) consisted of seven main questions (which used a Likert scale) related to attitude of participants about the quality of program's content, teaching skills of the speaker, and participants' learning and satisfaction. Three open-ended questions regarding the weaknesses and strengths of the programs and the participants' recommendations for improvement were also included in the questionnaire. Sex of the participants, format of program, and program duration were factors affecting different types of scores. The results showed that 47.7% of the participants believed that the CME program was effective. Workshops were more effective than seminar sessions (61.5% vs 30.1%, $P < 0.001$). The total score of participant's attitude was significantly higher in male than in female participants (24.6 ± 0.48 vs 22.9 ± 0.54 , $P = 0.02$). Furthermore, the score was significantly higher for workshops than for seminars (28.2 ± 0.21 vs 24.3 ± 0.31 , $P < 0.001$). Effective programs (total score > 28) had significantly lower duration (18.1 ± 0.39 vs 19.1 ± 0.34 hours, $P = 0.044$).

Moattari et al. (2014) evaluated a CME program for general practitioners in Shiraz in Iran by using a pre-test and post-test design. In total, 45 participants were tested in two stages, namely before and after the program. A questionnaire was also used to record the participants' views on four variables including teachers' behaviour, the degree of achieving the objective of the program, objective of the learner, and satisfaction with the program. The results showed that the

mean scores of the participants' knowledge increased from 10.05 to 12.61 (pre-test to post-test, $P < 0.0001$). In addition, the teachers' behaviour and satisfaction with the program were rated the highest and least, respectively, by the participants.

2.4.2.6 CME studies in the Kingdom of Saudi Arabia:

Al-Qurashi (2000) evaluated a CME program using a questionnaire-based feedback provided during the symposium. In total, the responses of 194 participants were statistically analysed; the evaluation of the scientific sessions showed a satisfaction score of 3.98 ± 0.59 (maximum score = 5). The results conclusively showed that conducting the program was advantageous. Al-Yahia et al. (2002) conducted a study to evaluate CME activities in the Al-Qassim region in the Kingdom of Saudi Arabia; the study used a pre structured questionnaire, and physicians working in hospitals comprised the study sample. The survey was conducted in two phases. The first phase was conducted at the inception of the department of professional education and the second phase, 1 year later. Questionnaires were given to the study population. The results shows the mean CME hours increased from 5.5 ± 5.9 to 14.2 ± 19.7 ($P = 0.0001$). In addition, 50% of the participants said that the CME programs should be presented differently. The participants expressed the need for regular courses (61%), departmental and bedside activities (52%), and visiting speakers (45%).

A doctoral thesis by Al Ghamdi titled 'Challenges of continuing medical education in Saudi Arabia's Hospitals' was published in 2012. It identified factors impeding high achievement in CME. A mixed method was used in this study; it involved the collection of qualitative data by using semi structured interviews from purposeful sampling, observations from field work for 8 months, document analysis, and collection of quantitative data through survey questionnaire

distributed to the entire study population. The sample size was 44 participants; 11 of them were librarians who worked in hospitals, while 33 participants were employed in the healthcare system and were involved in the implementation CME programs. This study conclusively demonstrated the need for learning programs that meet the actual and widely varying needs of medical staff.

Alshammary et al. (2013) evaluated a CME program called Family Medicine Education (FAME) in family medicine for general practitioners in Saudi Arabia between 2009 and 2011. FAME was developed with seven modules, each comprising 12–14 hours of teaching, to be delivered in 3-day blocks over 45 days. In total, 2,761 GPs participated in this program. The initial assessment of the CME program showed significant improvement in knowledge scores from 49% to 89% (pre-test to post-test). In the same year, Karim et al. (2013) conducted a descriptive study was at King Saud University in Riyadh. The authors used six strategies for evaluation, namely convenience, relevance, individualization, self-assessment, interest, speculation, and systematic. The results indicated that CME program met the CPD and offered a useful approach to learning. The course content covered specific areas of practice, but some shortcomings, such as self-assessment and analysis of individual learning needs, required improvement.

Alhejji et al. (2015) stated that their study was the first analytical cross-sectional study for identifying factors that affect CME participation among physicians working in primary healthcare centres in the Alahsa region of Saudi Arabia. In this study, a self-administered questionnaire was used to measure each physician's level of CME participation and the presence or absence (categorical data) of 42 factors that were thought to have an effect on CME participation. The prevalence of the factors that might have an effect on CME practice was compared between two groups, namely those who participate in CME frequently (93 physicians

or 76.9%) and those who rarely or never participate in CME (28 physicians or 23.1%). The prevalence of 10 out of the 42 of the examined risk factors was found to be association with the level of CME participation among physicians. The factors affecting CME participation are current medical degree of the HCPs, medical knowledge satisfaction, satisfaction with the available CME methods, preferred CME methods, irrelevant topics in CME lectures, poor CME teaching techniques, job satisfaction, lack of computers in the work place, high patient load, and multiple work responsibilities. This study conclusively showed that the most crucial barriers to practice CME are non-acquisition of postgraduate degrees, dissatisfaction with the medical information the physician has, dissatisfaction with the available CME methods, preference for self-learning CME activities, lectures and workshops that have poor teaching technique, and job dissatisfaction. In addition, this study recommends additional studies to assess CME participation among nurses and other HCPs.

2.4.2 .7 Studies evaluating CME effectiveness in the UAE:

In the UAE, Younies et al. (2010) investigated the views of 147 HCPs regarding CME programs. According to the authors of this study, this was one of the first studies to examine perspectives of CME in the UAE. A six-part questionnaire focused on the following areas of CME: workshop leaders or trainers, training experience, relevance of CME information provided in the training session, training approach, convenience of CME sessions, and organisational support. The results of this study indicated moderate satisfaction with five areas but dissatisfaction with organisational support. However, they agreed with the importance and relevance of CME to the development of their professions.

In another study, Shehab et al. (2012) examined the characteristics of 150 participants and their views regarding two rapid review courses, which were part of a CME program organised in Al Ain in Abu Dhabi. The participants reported that the course material significantly improved ($P < 0.02$) their knowledge. The study recommended that studies in future should include assessments of the participants' knowledge and skills before and after program delivery as well as a detailed evaluation of the CME program. Finally, Al Akshar et al. (2014) recommended that well-designed training programs and workshops be organised as part of CME programs for community pharmacists to develop their careers and to enable them to seek new challenges in their profession to improve their experience and capabilities.

2.5 Literatures review conclusion and research gap:

This chapter has focused on many terms related to the CME programs and their effectiveness; additionally it provided an extensive review and relevant information to many researchers who may undertake research on CME in the future. A high-quality CME system is one of the primary requirements for the delivery of high-quality medical care in the future. CME has contributed to reducing the gap between practice and scientific evidence by enhancing knowledge; hence, it accelerates the successful implementation of new therapeutic and diagnostic strategies. In most of the developing countries, CME programs are accredited and funded by many industries; accreditation is also subject to a strict practice code.

From the review of literature presented in this thesis, several studies have examined CME, but few of the studies have focused on the audience evaluation of the effectiveness of CME programs by using the factors selected in the present study. For example, the present study assesses the satisfaction of the participating HCPs in terms of learner expectations, achievement

of objectives, course content, structure, speaker performance, and program settings; the aforementioned factors are primarily level-1 outcomes in terms of Kirkpatrick's model.

Similarly, the effect of the CME programs on learner knowledge, which was also measured in the study, is essentially a level-2 outcome. In addition, the present study also analyses the motivation for participation and the factors that affect the selection of CME programs by the participants. Thus far, studies on CME have not adopted a holistic or multifaceted approach to CME evaluation and this has been considered a gap in research on the evaluation of the effectiveness of CME. Therefore, this study tries to bridge the gap by providing a multifaceted approach to evaluating CME effectiveness with an emphasis on audience evaluation. CME programs accredited by UAEU have been selected for this study. Additional research on CME is necessary in the UAE, particularly studies that evaluate numerous courses, because an evaluation of several CME programs can provide a realistic picture of the effectiveness of CME programs in the UAE.

In conclusion, most studies on CME field have emphasised the importance of providing education for HCP as part of their professional development, however, the effects of these programs on HCP knowledge, skills, behaviour, and performance in workplace are debatable. Moreover, the outcome level at which the programs are assessed and evaluation methods are a cause of concern. The positive effects of CME programs can be optimised through combination of proper planning, implementation and evaluation, with the meeting of educational needs and innovative educational methods that include interaction and experience.

In the UAE, relatively few studies have been conducted on CME and most of the studies have examined a single CME program with a small number of criteria or variables.

This study is the first of its type in the UAE. Furthermore, this study derives its importance from the following reasons:

1. This study based on a strong scientific and theoretical methodology and approach that includes most of the CME-related theories (learning theories, professional development theories, and evaluation theories).
2. The mixed method approach used in this study enabled the researcher to optimise the validity of the results and maximise the possibility of generalisation with sufficiently strong support from the findings.
3. The results of this study regarding the effects of the CME programs on HCP knowledge, the satisfaction of participants, and the participants' recommendations for CME program improvement may provide crucial information to CME program designers and policy makers.

Chapter 3: Research methodology

3.1 Introduction:

The principle objective of this planned research is to evaluate the effectiveness of UAEU-accredited CME programs in terms of meeting the expectations of the participating HCPs and engendering learning changes; levels 1 and 2 of Kirkpatrick's evaluation model were used for evaluation.

This chapter describes the methodology used to achieve the aforementioned objective. It also describes the research paradigm, research approach, research design, sampling design, data analysis, and interpretation strategies used in this study; elucidates the strategies used to validate the findings; and presents the ethical considerations of this study.

3.2 Research paradigms:

Research methodology is a philosophical stance or viewpoint that underlies the process of research (Sapsford & Jupp, 2006). Collis and Hussey (2003) and Creswell (2009) have described research methodology as the overall approach to designing process of conducting research including all phases of research from creating the theoretical foundation to the collection and analysis of data. Therefore, a philosophical worldview is necessary for research methodology. Research philosophy is concerned with the way things are viewed in the world (Saunders et al., 2009; Yin, 2009). It addresses the assumptions that support the research strategy and methods selected as part of a research paradigm. In addition, our practical experiences and relationship with knowledge as well as the processes by which they experiences and knowledge are obtained and developed in real-life situations (Saunders et al., 2009) are crucial. Therefore, research

design should be clearly stated to determine the most suitable research design or create a completely novel design (Easterby-Smith et al., 2002). However, understanding research philosophy and agreeing to adapt to a particular perspective for a proper research paradigm are probably not considered the first steps because other research parameters and choices may be prioritised while conducting a study (Kagioglou et al., 1998).

A set of assumptions directs research philosophies; these assumptions could be ontological, axiological, or epistemological. The assumptions affect the identification of a suitable research process and facilitate the understanding of research in a field of study (Saunders et al., 2009). However, many researchers are inclined to understanding these complex philosophical perspectives within the context of quantitative and qualitative lines of inquiries (Creswell, 2009; Saunders et al., 2009).

Therefore, research paradigm is a set of assumptions or beliefs of a researcher that provides a well-defined research strategy and channels a study. The paradigm consists of three types of assumptions: ontological, epistemological, and methodological assumptions (Ritchie & Lewis, 2003).

Research methods can only be understood along with the four types of research philosophies (ontology, epistemology, axiology, and pragmatic). Therefore, the four major aspects of thinking about research philosophy and the postulations, as suggested by Creswell (2009), Yin (2009), and Saunders et al. (2009), should be considered.

3.2.1 Ontology:

Ontology refers to the assumptions regarding reality or the nature of reality (Saunders et al., 2009). According to this assumption in qualitative research, the researcher, in the research circumstances, constructs the problem of reality (Creswell, 2009). This philosophy, also known as constructivism, implies that the researcher, study population, and readers and interpret information differently (Creswell, 2009); consequently, the results are ‘interpretative’. However, quantitative research involves ‘objectivism’ and views realities as objective or absolute, and the study is independent of the researcher (Saunders et al., 2009). Objective results can be measured using questionnaires or another instrument and indicates ‘positivism’ (Saunders et al., 2009; Creswell, 2009). In the present study, qualitative data were collected through interviews.

3.2.2 Epistemology:

Epistemology refers to assumptions about the nature of knowledge; it questions the assumptions of what is acceptable as knowledge and that which constitutes acceptable knowledge in a field of study (Saunders et al., 2009). According to epistemology, in qualitative studies, researchers interact with those they learn from, that is, by interviewing or observing study participants over a long period; consequently, the study results are interpretive (Creswell, 2009; Saunders et al., 2009). However, quantitative approaches question the relationship between the researcher and study object or population (Creswell, 2003). Thus, the researcher should remain distant and independent of the study object or population. Attempts to control for bias include systematic sampling and adopting objective assessment or positivism (Creswell, 2009). Saunders et al. (2009), Tashakkori and Teddlie (2003), and Creswell and Plano Clark (2011) have suggested that some research questions can be answered using a combination of methods. In addition,

epistemology determines whether the study is influenced by the researcher. Therefore, axiology, pragmatism, and realism are considered necessary for this research.

The epistemological assumption exemplifies the realistic connection between the subject and object. Soini et al. (2011) stated that the epistemology has the following four components: causality, which is the satisfactoriness of the proposed concept under the nature of the study; meaning, which defines the level of realistic consideration of the theoretical acquaintance; diversity, which is known as the effect of visualising multiplicity as a real phenomenon or as an alternative of error that obscures essential commonalities; and validity, which involves the assessment of value and quality of research.

3.2.3 Axiology:

Axiology questions the role of values in research choices and emphasises the value judgement capability of researchers (Saunders et al., 2009). In qualitative studies, researchers consider the value-rich nature of their studies as valid and report these values. They also report prejudices for the values of knowledge provided in the field of study by the previous researchers (Creswell, 2003; Saunders et al., 2009). Hence, the choices of ‘What to do?’ and ‘How to do it?’ are determined using human beliefs and experiences (Easterby-Smith et al., 2003). However, in quantitative studies, the researcher’s values should not be included in the study. This implies that the researcher’s choices of ‘What to do?’ and ‘How to do it?’ are determined using objective criteria (Easterby-Smith et al., 2003). Finally, the choices of philosophical perspective, approach, method, and data collection techniques are determined by one’s values (Saunders et al., 2009).

3.3 Research methodological assumptions:

Methodology is the strategy, plan of action, process, or design underlying the choice and use of specific methods. It links the choice and use of the methods to desired outcomes (Crotty, 2003: 3). It aims to describe, evaluate, and justify the use of particular methods (Wellington, 2000).

The Western tradition of science involves two types of speculation, namely positivism and interpretivism. Positivism and interpretivism are generally called ‘investigative hypothesis’ and ‘resistance to positivism’, respectively. As shown by Blaikie (2007), an investigation can be conducted using any one of these two examination perspectives or both.

Positivism is considered a numerical examination. It adjusts reality and fits it into estimations to obtain specific results (Thomas, 2010). Positivism is a system that is used to indicate stability and reality of a situation from an objective viewpoint without interacting with the study object, situation, or population. In general, the perspective of positivism is characterised by the qualities of practicality, truth, conviction, and authenticity. Moreover, it considers primary substances (Gadamer, 2006). Here, the data are collected through understanding and observation and measured entirely by using quantitative techniques, such as quantifiable examinations, tests, and reviews; hence, positivism is also called quantitative investigation. It enables numerical exploration of raw quantitative data, thus empowering the researcher in evaluating influential factors through a systematic and arithmetic approach to analyse reality. The ontology of the positivistic paradigm demonstrates the existence of single truth or reality. The epistemological assumption of positivistic theory depends on the theory that an analyst cannot assimilate the current truth in its present form but can assess it by using appropriate statistical tools (Churchill & Sanders, 2007).

Interpretivism is associated with the depiction of created records; consequently, it is called the investigation of the investigator's choice. Interpretivism is generally called subjective examination. Interpretivism is a specific case that frequently affects the choice of subjective methods (Trauth, 2001). This methodology enables a researcher to obtain knowledge of world events through the experiences and perceptions of the participants. Furthermore, this technique enables the analysts to express theories based on the understanding acquired by analysing the opinions of the respondents (Thanh & Thanh, 2015). Interpretivism aims to deliver an enhanced understanding of subjects by a manifold perspective analysis of the respondents' opinions (Klenke, 2016).

Qualitative research is conducted through beliefs and assumptions; thus, interpretative theory is highly suitable for subjective research. The methodologies used for research in the natural sciences will not be appropriate for those in the social sciences because, unlike the natural sciences, the social sciences are neither governed by rules nor by laws. In fact, the social sciences are mediated by the perspicacity and opinions of the humanoid interventions. This also enables researchers to formulate modules based on the interpretations of the received data instead of passively uploading obtained information.

The identification of different features is a critical aspect of qualitative research. The exploration of social, cultural, psychological, and historical characteristics of the human biosphere is highly necessary for accepting and formulating theories. An interpretative phenomenological approach enables researchers to obtain holistic knowledge of the respondents (Mc Queen, 2002; Larkin & Thompson 2012). Interpretivism supports the researchers in portraying the participants' opinions as accurately as possible (Glesne & Peshkin, 1992; Lester, 1999). The primary intention of a

researcher is to obtain in-depth information and insights of the respondents and record it to represent the reality in a study; hence, the interpretative approach of research allows scientists to record information through indirect methods and implications (Creswell, 2014; Punch, 2009).

3.4 Pragmatism:

According to this philosophy, choosing between one position (epistemology, ontology, or axiology) and another is somewhat unrealistic in practice, and the research question is considered the most crucial determinant of which position to adopt (Creswell & Plano Clark, 2011; Saunders et al., 2009). This is particularly relevant when the research question does not suggest clearly that either a positivist or interpretive philosophy should be adopted for inquiry. Therefore, a combination of both qualitative and quantitative methods to resolve a real-life world challenge is recommended.

Pragmatism debunks concepts such as ‘truth’ and ‘reality’ and focuses instead on ‘what works’ as the truth regarding the research questions under investigation (Tashakkori & Teddlie, 2003, p. 713). The philosophical theory of pragmatism is a means of bridging the gap between the empirical singular scientific approach to research and the relatively new and unrestricted inquiry of qualitative research theories (Tashakkori & Teddlie, 2003, p. 52). A pragmatism-based theoretical framework can be pivotal to conducting research because it focuses on the logical link between the two paradigms of inquiry, namely quantitative and qualitative.

Pragmatism is unique because it focuses on the consequences of a study, assigns higher weightage to the research question than the methods used, and accepts that multiple data collection methods can inform the study. Singular or multiple realities may exist because the researcher can combine both deductive and inductive thinking to present multiple perspectives.

Epistemologically, the key to pragmatism is that researchers collect data by using ‘what works’ while addressing the research problem, unlike post-positivism, where distance and impartiality enables researchers to collect data objectively (Creswell & Plano Clark, 2007). In pragmatism, a multi stance approach allows the researchers to include both biased and unbiased perspectives and accepts that objective and subjective data are both valuable to a study (Creswell & Plano Clark, 2007). Methodologically, both quantitative and qualitative data are collected and mixed (Creswell & Plano Clark, 2007; Tashakkori & Teddlie, 2003); this process not only enriches the study but also completes it.

Supporters of pragmatism consider it a philosophy of common sense, which uses purposeful human inquiry as its focal point (Shields, 1998). A pragmatic paradigm is an appropriate means of inquiry in the present study on CME programs because of the dependence of CME effectiveness on numerous factors, need to understand and report the perceptions and recommendations of HCPs regarding CME practices in the UAE, and the subjective nature of the learning experiences from the topics presented in CME programs.

The present study used the mixed-methods technique for data collection, which implies that both positivism and interpretivism strategies were used for gathering data. The principle objective of this study was to examine whether UAEU CME-accredited programs could meet the expectations of attending HCPs and engender learning changes; levels 1 and 2 of Kirkpatrick’s evaluation model were used for examination.

3.5 Research design:

A research design is a diagram, which is generally called ‘blue print’, and it gives the course and structure of entire research (Creswell, 2003) Moreover, the research design provides crucial

information regarding the structure, organisation, and strategies that are required for completing the study in alignment with the research aims. The research design contains a set of decisions that enables the selection of the main course of action for the investigation; these decisions involve the selection of the systems and techniques for analysing and organising the required data. Research design is one of the techniques that are fundamental to the examination framework. The research design enables researchers to find solutions to achieve the research objectives and identify problems in addition to the problems incorporated into the investigation because it considers the study in totality (Jackson, 2011). When a research question is being demarcated, and a qualitative or quantitative approach is selected, the primary responsibility of the analyst is identifying the research design (Baxter & Jack, 2008).

Research designs are also classified as descriptive, explanatory, and exploratory (Yin 2003). The explanatory type of research is used to represent the assumed casual links of real-life interventions that are difficult to explain by using experimental designs and strategies. Descriptive research designs are mainly implemented for describing a precise occurrence or intervention with reference to the real-life context in which the event occurred. The collective case design, which is comparable with the descriptive design, also represents the same stratagem in case of compound case studies. The final type, exploratory design, is predominantly used in exploring situations that cannot be interposed as clearly because the outcomes are likely to be complex.

The current study has primarily an exploratory research design. From an approach perspective, an illustrative investigation layout is required by a study with an exploratory design to review the current phenomenon and its genuine associations, particularly when the limitations of the setting

are not entirely known. Part of this study design was descriptive because it involved the comparison of the satisfaction and knowledge gain among the HCP categories without a control group. The pre- and post-CME program data were obtained from all the participating HCPs (or participants) by using the same tool before and after the training intervention, respectively, and compared.

The objective of the present study was not to generalise the findings to a population; it describes the status and reveals areas of improvement of the UAEU-accredited CME programs offered to HCPs in the UAE on the basis of the participants' responses. The results of this research will enable the organisers of CME programs to overcome the limitations of the programs in meeting the education goals and expectations of the HCPs. Consequently, the quality of the CME programs offered to the HCPs and the quality of patient care are expected to improve. CME policy makers may use the results and recommendations of this study as a source of information for improvement.

Finally, summative evaluation was used in this study. Hopkins (1989, p. 16) differentiated between formative and summative evaluation as when the cook and the guest, respectively, tasted the soup. He also stated that although both result in decision making, different decisions result from both evaluations. Summative evaluation summarises the entire process and describes its purpose. Although summative evaluation may provide insights into impact, it is not concerned solely with the impact. It is often been associated with the identification of pre-set objectives and decisions regarding their achievement (Hopkins, 1989, p.16).

3.6 Research approach:

The research method is an approach that describes how an investigation is to be conducted. The two examination approaches are quantitative and qualitative (McNabb, 2008). However, a combination of both approaches in research is increasingly gaining acceptance in the social sciences, such as sociology, nursing, health, and education; this approach is called the mixed-methods approach (Creswell & Plano Clark, 2007).

Quantitative examination is used to provide a practical blueprint, chart, and picture regarding the proposed foci of a study (Rasinger, 2008). Quantitative examination suggests that the investigative examination, which contains a couple of trial examinations and frameworks, also focuses on some assessed and controlled measures related to the research question. Quantitative research fundamentally considers the thoughts that reflect from positivism and the suitability of a deductive reason, the research hypothesis, possible associations, and objectivity. Quantitative examination is entirely based on positivism (Muijs, 2010).

In contrast to quantitative examination, qualitative examination is a coherent investigation that assesses data that were not chosen beforehand. Subjective examination refers to a multifaceted framework that continuously tends to focus on naturalistic and interpretive techniques in the perspective of the research topic. Similarly, subjective investigation has been widely used by researchers worldwide. Denzin and Lincoln (2000) stated that subjective investigation accumulates the verification before obtaining information regarding reactions to the request. Subjective examination is mostly used to gather some uncollected data or data from a small sample or study population about the perspective, concerns, practices, societal issues, objectives, belief systems, motivations, and lifestyles. In general, subjective investigation serves to

accumulate and analyse unstructured data or data collected in the form of meeting transcripts, input structures, notes, messages, or study responses (Thomas, 2003). Subjective investigation provides nonnumeric data because it represents the viewpoints of the respondents. However, numerical values may be assigned to these data by the use of tools such as the Likert scale. In the present study, the opinions or satisfaction of the participating HCPs, which provided subjective data, were collected using questionnaires. The current study also involved the collection of categorical data such as nationality, profession, education level, and workplace of the participating HCPs.

The qualitative and quantitative parts of this study were mainly conducted using inductive and deductive approaches, respectively. The inductive approach principally involves data collection in the form of reports, texts, and documents. This approach familiarises the researcher with the composite nature of data; the data can be organised and crude data can be processed without deviating from the research aim and objectives (Maykut & Morehouse, 2002). By contrast, the deductive approach uses predefined theories to formulate hypothesis and collects evidence for testing the formulated hypotheses; conclusions are drawn depending on whether the hypotheses are accepted or rejected. The hypotheses are formulated on the basis of the research objectives, and the results depend on the analysis (Thomas, 2003).

The present study was conducted using a mixed-methods design, which refers to the use of multiple investigative approaches in a single study; this results in the collection of multiple types of data (Creswell, 2009). Although a mixed-methods study uses various strategies for collecting data, it typically relies on interviews, observations, and survey questionnaires (Creswell, 2007;

Hammersley & Atkinson, 2007). The current study evaluated the effectiveness of UAEU-accredited CME programs using levels 1 and 2 of Kirkpatrick's evaluation model.

The study aimed to provide an assessment of the programs from multiple viewpoints to enhance the current understanding of the status of CME in the UAE. Level 1, which assesses the outcome of participant's satisfaction, requires mainly subjective data. Most of the variables assessed for evaluation at level 1 required the participants' responses by using a suitable (5- or 7-point) Likert scale. Level 2, which assesses learning outcomes, requires mainly objective and quantitative data, such as HCP test scores before and after the HCPs had attended the CME programs. Consequently, both qualitative and quantitative research methods were used in this study. Moreover, although means are not generally computed for ordinal qualitative variables, the pragmatic approach to research permits the use of means for comparison between groups and treatments because the calculation of means provides useful data.

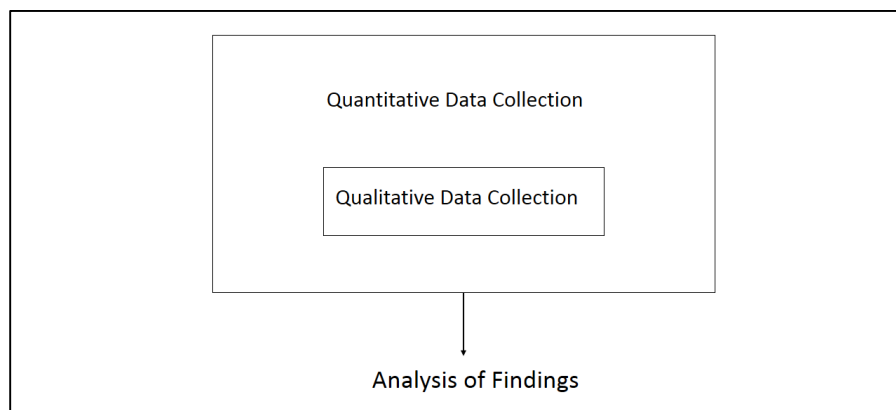


Figure 3.1: Study design developed using a concurrent embedded mixed-methods approach

Qualitative variables of different types were recorded in this study; for example, HCP age, place of work, and nationality (Arab vs non-Arab in this study), which represent ordinal, nominal, and

dichotomous variables, were recorded in this study. Quantitative variables such as HCP knowledge scores before and after the CME programs were also recorded. Collecting qualitative and quantitative data for a single study is not new; however, combining both forms of data and presenting them as a distinct research design is novel (Creswell & Plano Clark, 2007; Tashakkori & Teddlie, 2003). The fundamental principle of mixed-methods research is that the use of a combination of quantitative and qualitative approaches provides a better understanding of the problem than the use of either approach alone can (Creswell & Plano Clark, 2007; Tashakkori & Teddlie, 2003). First, mixed-methods research provides strength to the weaknesses of quantitative and qualitative research; this rigorous approach was suited to the study because a complex issue, such as CME program evaluation, had to be addressed. Furthermore, researchers can use various tools of data collection for comprehensively studying a problem. Mixed-methods approaches also allow researchers to simultaneously measure trends, prevalence, and outcomes as well as examine meanings, contexts, and processes (Creswell & Plano Clark, 2007). Another strength of the mixed-methods approach is the integration component. Integration provides readers with high confidence in the results and the conclusions they draw from the study (O’Cathain et al., 2008).

This study used quantitative and qualitative data collection approaches, which represent different paradigms; therefore, each approach exhibits its own values and techniques that guide how research is conducted, analysed, and reported (Creswell, 2009). The mixed-methods approach was applied to this study to gain a comprehensive understanding of the view of HCPs regarding their CME learning experience, including their expectations and the reality of the status of CME practice in the UAE. For example, in the current study, some of the research objectives were as follows: determining the knowledge gained by the HCPs after attending the CME programs,

assessing the expected change in the management based on the HCPs new learning, and identifying the barriers to implementing their newly acquired knowledge at the workplace.

To achieve the previous objectives, both quantitative and qualitative methods were applied. Knowledge gained by the HCPs after the CME programs were quantified using their scores on a test with multiple-choice questions (MCQs) on the topics covered during the programs. However, the HCPs were also asked to state their views regarding the role of CME programs in changing their knowledge during semi structured interviews, which provided subjective qualitative data. Similarly, the HCPs were questioned regarding the management-related changes that they expected in their workplace by using a Likert scale, which provided subjective quantitative data. Subjective qualitative data regarding their views on the role of CME were also recorded during the interviews. Clearly, the use of the mixed-methods approach provides data on the multiple facets of a research objective.

3.6.1 Mixed methodology:

Mixed methodology arises from a pragmatic worldview, with the assumption that research on a topic benefits from utilising a multitude of approaches. In this methodology, collection of quantitative and qualitative data is seen as compatible and is thought to provide a more complete picture compared with a single data collection strategy alone (Creswell, 2009).

The use of a mixed-methods approach in this study provided qualitative and quantitative data, which included subjective and objective information, from different aspects of the research question and objectives; consequently, results and suggestions from this study can be considered reliable.

The study findings will improve the comprehension of the hindrances to CME program effectiveness and barriers to HCP satisfaction. Moreover, data from the study will provide suggestions and proposals from HCPs to enhance programs and insights regarding the effects of program settings on the HCPs' satisfaction and learning (Bamberger, 2012). By combining qualitative and quantitative philosophies, a study can avail of the advantages of the validity of quantitative examination (noting the 'what') and the profundity of comprehension of subjective investigation (noting the 'how' and 'why'). The target of this study was primarily to depict the status of CME programs offered to HCPs in the UAE and identify the opportunities and areas of improvement of these programs through the members' suggestions. The results of this study will eventually result in an improvement in the quality of the instructive programs offered to the HCPs.

In most studies on CME, the research approach used varied according to the objectives and setting of the study. Many studies have used quantitative approaches, some studies have adopted qualitative approaches, and some other studies have adopted mixed-methods approaches (Ramanathan, 2011).

According to an inclusive and comprehensive description of mixed analysis provided by Onwuegbuzie and Combs (2010), it involves the use of both quantitative and qualitative analytical techniques within the same framework, which is guided either a priori, a posteriori, or iteratively (representing analytical decisions that occur both prior to and during the study). Both data types may be collected either concurrently (i.e., in no chronological order) or sequentially in two phases or more than two phases (i.e., iteratively). The steps of analysis might not interact until the data interpretation stage, thereby yielding a basic parallel mixed analysis.

Greene, Caracelli and Graham (1989) identified five purposes for mixing quantitative and qualitative data: triangulation (i.e., quantitative findings are compared with qualitative results); complementarity (i.e., results from one analysis type [e.g., qualitative] are interpreted to enhance, expand, illustrate, or clarify findings derived from the other strand [quantitative]); development (i.e., data are collected sequentially and the findings from one analysis type are used to inform data collected and analysed using the other analysis type); initiation (i.e., contradictions or paradoxes that might reframe the research question are identified), and expansion (i.e., quantitative and qualitative analyses are used to expand the study's scope and focus).

In this study, concurrent embedded strategy was used to collect data; a questionnaire, which was the primary source of data, was used to collect quantitative data. Interviews were conducted with a subset of the sample and were embedded or nested within the predominant method to collect the qualitative data as described by Creswell (2009). Thus, in this study, both quantitative and qualitative data were collected simultaneously. After collection, both types of data were analysed separately. Both types of data have been discussed together because combining both data types will provide a deeper understanding of the research question. The quantitative and qualitative data obtained in this study were used to answer different research questions; in addition, the qualitative data were used to explain quantitative results that required further exploration.

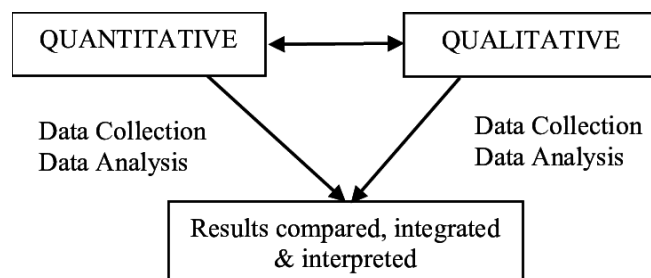


Figure 3.2: Concurrent embedded strategy. Source: Atif et al. (2013).

3.6.2 Quantitative methodology:

The quantitative part of this method involved collecting information on the participants' demographics, satisfaction with the CME program, the gap between HCP's expectations and perceptions regarding the CME programs, and whether the stated objectives for the CME program were met. In addition, knowledge acquired by attending the CME program was measured. All these data were collected through surveys. Pre- and post-test questionnaires related to the topics presented in these programs were used for measuring the change in participants' knowledge. The responses of the HCPs to the CME assessment questionnaires revealed the HCPs' opinions regarding CME programs and their suggestions to enhance CME programs. Subjective and quantitative methods were utilised to survey the viability of CME programs on HCP experiences (Tian et al., 2010). As indicated by Wolcott (1999), researchers should interact with participants, particularly while collecting 'interview data', as required by standard conventions and obtain the trust of the interviewees. Consequently, in this study, the researcher's experience as a coordinator for the programs offered to the HCPs strengthened the interaction with and support extended to the participating HCPs.

3.6.3 Qualitative methodology:

Qualitative research in healthcare refers broadly to methods used to collect and analyse textual or image-based data to comprehend behaviour and practice in clinical settings

(Al-Busaidi, 2005). We can also use qualitative research to interpret program evaluation responses. The adoption of competency-based and performance improvement CME requires increasing awareness of the roles of organisational culture, stakeholder perspectives, and clinical settings in learning and changes in behaviour or practice. Understanding why one group of learners in an educational activity had a more positive experience than another did is critical.

Such information can be collected using semi structured interviews with the CME program participants. CME program designers and organisers can benefit from the information of the challenges that HCPs face and the recommendations that they make for improving the educational programs and meet the learning expectations. Researchers can make their interpretations when they gain access to multiple perspectives of the participants and the subjective implications of their experiences (Glesne, 2006 p. 4).

Research Objective	Methodology	Data
Examine UAE University accredited CME programs audience characteristics	Administer self-developed questionnaire	Quantitative
Identify HCP determinant factors for attending the CME programs accredited by UAE University.	Administer self-developed questionnaire regarding attending determinant factors	Quantitative
Explore the desired characteristics of the CME programs from the point of view of HCP who attending the UAE University CME programs.	Explore the desired characteristics of the CME programs in interview	Qualitative
Assess the perception of the HCP after attending the CME programs accredited by UAE University.	Administer CMEQUAL survey regarding HCP perception (Post-CME)	Quantitative
Test of the UAE University accredited CME programs level of meeting HCP expectations.	Administer CMEQUAL survey regarding HCP expectations	Quantitative
Investigate the UAE University accredited CME programs achievement of organizers stated learning goals, from the point of view of HCP.	Administer self-developed questionnaire includes CME program objectives	Quantitative
Investigate the design and speakers performance of the CME programs accredited by UAE university.	Administer self-developed questionnaire regarding satisfaction of HCP with CME program , design and speakers	Quantitative
Determine the knowledge gained from UAE University accredited CME programs by HCP who attending these educational meetings.	Administer pre and post CME self-developed questionnaire includes reviewed multiple choice questions related to CME program content	Quantitative
	Explore the believes of HCP regarding role of CME programs in changing their knowledge in interview	Qualitative
Assess the expected change in management strategies in HCP work place based on the new learning gained through attending UAE University accredited CME programs.	Administer self-developed questionnaire regarding expected change in workplace management strategies based on CME learning experience	Quantitative
	Explore the believes of HCP regarding role of CME programs in changing workplace management strategies based on CME learning experience in interview	Qualitative
Identify the barriers anticipated by HCP in implementing the new learning gained through attending UAE University accredited CME programs in their work place.	Administer self-developed questionnaire regarding anticipated learning implementation barriers in work place.	Quantitative
	Explore the believes of HCP regarding anticipated learning implementation barriers in work place in interview	Qualitative
Identify the challenges HCP face in seeking and attending CME programs.	Explore the believes of HCP regarding challenges HCP face in seeking and attending CME programs in interview	Qualitative
Explore the recommendations of HCP in Abu Dhabi to improve the CME practise in general in UAE.	Explore the believes of HCP regarding the recommendations of HCP in Abu Dhabi to improve the CME practice in general in UAE in interview	Qualitative

Table 3.1: Overview of mixed-methods research design

3.7 Ethical Considerations:

Ethical considerations in research methodology are essential because the researcher is committed to use both quantitative and qualitative data methodologies. Furthermore, the results include intellectual, emotional, and political outcomes and depend on the relationships between the researcher and participants. Indeed, most research methodology books and articles have insisted on ethical considerations in dealing with research methodological issues (Bogotch et al., 1993; Cassell & Wax, 1980; Punch, 1986; Bogdan & Taylor, 1975; Cowl, 1993; Glesne & Peshkin, 1994; Lancy, 1993). Ethics in research methodology are defined by Bogdan and Biklen (1992, p. 49) as the ‘principles of right and wrong that a particular group accepts’. Glesne and Peshkin (1992) and Punch (1986) referred to research codes of ethics when addressing the rights of individuals to dignity, privacy, confidentiality, and avoidance of harm.

Ethical approvals to conduct this study were obtained from the Research Ethical Committee of British University in Dubai (see Appendix 1) as well as UAEU Ethical Committee (see Appendix 2). The approvals were granted on an official letter from the CME office in the College of Medicine and Health Sciences of UAEU. The letter stated that the committee had no objection to this study on the CME programs being conducted, to being credited by the aforementioned office, or to obtaining the necessary details related to the accreditation process as an input for the researcher (see Appendix 3).

While conducting this study, as a researcher, I ensured quality and integrity of this research. I also sought informed consent from all the participants after providing them with full information about the research. Moreover, the confidentiality and anonymity of all the participants were

maintained. Each HCP who attended the UAEU-accredited CME programs were allowed to participate in the study to ensure voluntary participation. The participants were assured of their personal and professional safety. In addition, all collected information and electronic files were stored in a confidential file. Furthermore, this study was self-funded, independent, and impartial.

3.7.1 Role of the researcher in this study:

Within both post-structuralist and post-modern theories the researcher is seen as part of the research methodology (Matsumoto, 1996; Miller, 2000). However, in the perfect quantitative studies, the researcher's role is theoretically non-existent, because participants in these studies act independently of the researcher. In this study the researcher has no influence in the quantitative part of the study, since the instruments used to collect data was validated and adopted from previous researches, while the data was collected through self-filling questionnaires distributed over the participants' in the CME program pre and post the meeting without any interfere from the researcher side.

In qualitative research the researcher plays a fundamental role as an instrument of data collection (Creswell, 1994) and data interpretation. Data analysis and interpretation are often intertwined and rely upon the researcher's logic, artistry, imagination, clarity, and knowledge of the field under study. Miller (2000), states that interviews should be treated as a piece of social interaction whereby the researcher's contribution is as interesting as that of the interviewees. The researcher in this research project is a medical professional with nursing background and has his own experiences regarding continuous medical education. Although the introductory chapter outlines the motivations of the researcher to conduct this study, these are also briefly detailed below since they are closely linked to the concept of the researcher role in this study.

The researcher holds a bachelor's degree in nursing and has worked for more than 15 years in medical facilities, currently is working as a research specialist in the department of internal medicine at UAE University where this study is conducted. He has also been involved in supporting and organizing medical education conferences and events for more than 10 years as part of his job description. This educational background enables the researcher to understand the medical terms used by the participants in the study during the interviews, as well as to understand their concerns in terms of their competence and place of work. In addition, the researcher's experience in the medical field enabled him to conduct interviews at medical establishments and to understand the decisions taken by the committee which reviewed the questions related to knowledge and the questionnaires. Burns (2006) argues that reflexivity allows the researcher to arrive at an in-depth understanding of the meaning of the phenomenon under investigation. This implies that the researcher is able to draw on his or her own experiences during the research process to enable him or her to understand and identify with what is being said.

As for the researcher experience in organizing CME conferences, it has had a great impact as mentioned earlier in the researcher's decision to study this phenomenon, but despite the personal beliefs of the researcher regarding the effectiveness of the CME programs built through personal observations, the researcher maintained the independence of the study and made sure that he did not impose his values or opinions on the participants during the interviews. In particular, each person who was approached for qualitative interviews was given opportunities to refuse to participate in the project, so as to ensure that the data collection sessions involve only those who are genuinely willing to take part and prepared to offer data freely. Furthermore, the researcher

indicates that there are no right answers to the questions that will be asked and the participant has the right to withdraw from the study at any point.

The focus of the investigation or research remains on understanding the phenomenon from the participants' perspective (Babbie & Mouton, 2001). In this study, despite the fact that the researcher used his own experience in the CME context and medical field, the researcher was able to put aside his own values and beliefs and open his mind to participant's comments during the interviews and interpretation of the results.

3.8 Sampling method:

Researchers decide the sampling method while selecting the respondents for data collection. Sampling enables researchers to select a representative subset of individuals from the entire population to measure the characteristics of the entire population. Appropriate sampling reduces the cost and improves the quality, collection speed, and precision of data. The nonprobability and probability testing methods are the two main design-testing methods. According to Paneerselvam (2004), the probability testing method may belong to one of the following five types: simple random sampling, cluster testing, systematic testing, multi-stage sampling, and stratified sampling. As indicated by Babbie (2008), the nonprobability testing method can be classified into four main types, namely convenience sampling, snowball sampling, quota sampling, and judgement sampling. Nonprobability sampling or non-random testing is a system, which does not include the arbitrary determination of samples. However, probability testing is a procedure that enables researchers to arbitrarily select participants or respondents for their studies. As indicated by Thomas (2010), examining design is a strategy by which data are gathered from a large (aggregate) population.

3.8.1 Sampling method adapted in this study:

This study used both probability and nonprobability testing techniques for selecting the respondents. For the quantitative examination, respondents were selected according to basic irregular testing to avoid predisposition. A simple random sampling design was used for selecting the respondents for this study. According to Pathak (2008), simple random sampling is a technique that is mainly used for selecting participants for research from naturally occurring populations, and each participant has an equal chance of being selected. In addition, researchers conducting quantitative studies prefer this sampling method because it is a relatively simple method of selecting participants, and the selection of participants is based on ease of availability. In the current study, all the HCPs who attended the UAEU-accredited CME programs (selected for evaluation) were provided with questionnaires for data collection. Thus, every attending HCP had an equal chance of participating in the study. The total number of participants attending the CME programs was 334. The aim was to obtain approximately 200 filled questionnaires.

The convenience sampling technique was used for gathering subjective data from the respondents. This design is also known as accidental or haphazard sampling. The easy accessibility of the respondents, geographical proximity, willingness, and availability of the respondents at the required time allows qualitative researchers to use this technique for the selection of respondents for data collection (Palinkas et al., 2013). Although this sampling method involves a high level of social interaction, it is neither a strategic nor purposeful sampling method. The major assumption of this method is that the participants chosen from the target population are reliable and the population is homogenous. Selecting participants by using this method is relatively simple. Qualitative researchers prefer this type of sampling technique because it is a straightforward approach owing to spatial accessibility (Saumure & Given, 2008).

The target audience is selected in irregular numbers from the records acquired from the organisations, and from that point forward, they are asked to respond to questionnaires regarding their sentiments and perspectives or fill out surveys provided to them.

3.8.2 Sample unit and size:

Sampling plays a crucial role in mixed-methods research and is again linked to the study design (Creswell & Plano Clark, 2007; Kemper et al., 2003). Generally, the size of a quantitative sample is larger than that of a smaller qualitative sample (Creswell & Plano Clark, 2007; Tashakkori & Teddlie, 2003). According to Creswell (2007), in mixed-methods, the qualitative sample should be purposively selected from the quantitative sample and should consist of participants who can most satisfactorily provide the details needed to expand on the quantitative results (Creswell & Plano Clark, 2007).

This study was conducted in Al Ain in the Emirate of Abu Dhabi because the selected CME programs were conducted in Al Ain. As stated earlier, all HCPs in the UAE, including physicians and general practitioners are committed to their policies and requirements; therefore, all HCPs are eligible to attend the UAEU-accredited CME programs to claim CME hours and include these hours in their professional development profile for their annual recertification and relicensing. (HAAD, DHA, MOH, 2014). Therefore, the study population consisted of all HCPs who participated (only physical attendance was considered) in the aforementioned CME programs. According to a description by World Health Organization, HCPs are highly skilled workers in professions that usually require extensive knowledge including university-level study, leading to the award of a first degree or higher qualification. HCPs include physicians, physician assistants, dentists, midwives, radiographers, registered nurses, pharmacists, physiotherapists,

optometrists, and operating department practitioners. For this study, the participating HCPs were grouped into four major categories, namely physicians from all specialities, nurses, pharmacists, and others for all the remaining professions included under the term HCP.

The recruitment and sampling process for this study was divided into the following three phases: program selection, participant selection for the survey, and participant selection for qualitative interviews. Phases 2 and 3 were implemented together. The three phases are explained as follows:

3.8.3 Phase 1: CME program selection:

The selection of CME programs for the study was started immediately after receipt of the ethical approval from UAEU Research Office. According to Gay and Airasian (2012), the number of study participants considerably affects the power of a study. Power refers to the statistical ability to reject a false null hypothesis. Furthermore, if the sample size is very small, the results of the study may not be generalizable to the entire population (Gay & Airasian, 2012, p. 111). Because HCPs who attended the CME programs were the target population of this study, and the number of participants attending each program was unpredictable, the recruitment of CME programs was continued until a sufficient number of participants filled the survey form. The approved and accredited CME program applications, which were submitted to the UAEU CME Office starting from October 2016, were reviewed to verify whether they met the following requirements:

1. UAEU CME accreditation criteria
2. Expected program attendance of more than 30 participants
3. Non-commercial educational program (the scientific content is not directly or indirectly influenced by drug companies).

	CME program title	Date	Venue	Topics	Speakers	CME hours	Estimated attendance	Actual attendance
1	Acute Coronary Syndrome Course	Nov-16	Al Ain	6	5	6	150	97
2	Infectious Diseases Course	Dec-16	Al Ain	6	5	6	150	78
3	CardioRheumatology Review	Dec-16	Al Ain	6	4	6	100	61
4	Respiratory Rapid Course	Jan-17	Al Ain	6	5	6	150	98
Total				24	19	24	550	334

Table3.2: Details of the selected CME programs.

Based on application date, the selected program organiser was contacted and asked to sign the consent form. Four CME program organisers were contacted, and they agreed to permit inclusion of their programs in the study. The organisers of each CME program were asked to provide the following information: key objectives of their program, the agenda and list of speakers, expected outcome changes, and 10 suggested questions based on the topics that were to be presented in the CME programs. Some of these questions were selected and used to create pre- and posttest questionnaires for knowledge change evaluation. The four CME programs recruited were designed for the speciality of internal medicine; hence, the background information related to each program was reviewed and validated by a panel of specialists in the field of study of the program, which was, chaired by a professor of internal medicine in College of Medicine in UAEU.

3.8.4 Phase 2: Participant selection for the survey:

The questionnaire was modified for each CME program, but the main parameters were the same. The participants who attended these programs were recruited at the beginning of the program, asked to sign a consent form, fill in the demographics and the expectations part, and respond to the pre-test knowledge questionnaire. All program attendees agreed to participate in this study. Each participant was issued a unique code to label the post-test questionnaire and the satisfaction survey at the end of the program. Quantitative data were collected using self-administered questionnaires. The sample size was maximised as much as possible. A target of 200 participants who should fill the pre- and post-CME program questionnaires was set. The pre-CME program questionnaire was distributed to 334 participants (100% attendance). However, in accordance with the attendance at each CME program (97, 78, 61, and 98), 302 participants (88%) returned filled pre-CME questionnaires (92 [95%], 71 [91%], 43 [70%], and 96 [98%]).

3.8.5 Phase 3: Participant selection for qualitative interviews:

The sample for the semi structured interviews consisted of a purposefully selected sample of 14 HCPs who attended the UAEU-accredited CME programs in Abu Dhabi. Purposive sampling is common in qualitative studies; participants are selected because of some characteristic (Patton, 1990). Lincoln and Guba (1985) emphasised that the guiding principle of sampling in qualitative research is one of convenience, which implies that this sampling method should save time, money, and effort. In addition, it will be typical cases that illustrate or highlight what is typical, normal, and average. The 14 HCPs interviewed include 8 physicians, 4 nurses, 1 laboratory technician, and 1 research assistant.

3.9 Data collection method:

Data constitute the most crucial part of an investigation (McIntyre, 2008). Data collection is considered a dynamic step of a study because it provides evidence for conclusions. Procurement of reliable data pertinent to the research question is necessary for drawing correct conclusions (Sekaran, 2006). Research is mainly responsible of exploring the flow of well-defined authentic events (Lambert & Lambert, 2012).

Blessing and Chakrabarti (2009) stated that a study might be some strategy of request that enables researchers to collect data from the respondents about critical truths and events in the past and future by posing questions related to participants about attitudes, perspectives, conclusions, and thoughts. Furthermore, respondents can easily answer close-ended surveys. Moreover, it allows respondents to cover various responses in a single form or questionnaire. Close-ended surveys contain the type of request, which is used extensively to obtain data in the quantitative examination. Furthermore, close-ended surveys may provide all the possible reactions to a question in a prewritten response class, which helps the respondents to pick the appropriate response among them.

In this study, I used a mixed-methods approach by using a concurrent nested strategy for data collection in which quantitative data were collected using survey questionnaires including standardised instruments, which are appropriate for large-scale or repeated evaluations (See Appendix 5,6, and 7), and qualitative data were collected using individual semi structured interviews. In this section, the instruments that were used for data collection will be introduced and explained in the context of the methodology and research question.

3.9.1 Collection of quantitative data:

Aliaga and Gunderson (2002) describe quantitative research methods as explaining phenomena by collecting numerical data that are analysed using mathematical methods. This method is used when research questions demand a quantitative answer, numerical change needs to be studied, researchers need to determine the state of something, or hypotheses are tested. Quantitative data were collected in this study to answer the five main questions of this research by using pre- and post-CME program surveys, which included all the variables that will be used in the analysis to answer the related research questions in this study. In addition, demographic data of the participating HCPs were collected.

Survey is a key method in health services research, and questionnaires are doubtlessly one of the primary sources of obtaining data in any research endeavour (Zohrabi, 2013). Overall, questionnaires can be of three types: closed-ended (structured), open-ended (unstructured), and a mixture of closed- and open-ended questionnaires (semi structured) (Zohrabi, 2013). A majority of survey questionnaires consist of closed-ended questions where respondents are asked to select from a fixed number of options. These closed-ended questionnaires are considered efficient because data are easy to collect code and analyse (O’Cathain & Thomas, 2004). In this regard, Blaxter et al. (2006, p. 170) divided questionnaires into seven basic question types, namely quantity or information, category, list or multiple choices, scale, ranking, complex grid or table, and open-ended. Generally, a questionnaire might use a single type or multiple types of these question forms. The survey questionnaire used in this study includes closed-ended questions of the type’s quantity, category, list, and ranking.

The survey questionnaires were administered to the participants face-to-face as a group-administered questionnaire. The participants were present all at one time and place. Gillham (2000) stated that this procedure can be used to compel the respondents to answer the questions; consequently, the return rate is high, and any ambiguous questions can be clarified immediately by the researcher. The instruments used to collect the data will be discussed in detail according to research questions.

3.9.1.1 Demographic characteristics of the participants:

As part collection of quantitative data, the participants were asked to provide demographic information about themselves. Life history or biographical data forms have a long history and their validity has been well established (Bliesener, 1996; Stokes & Cooper, 2001). Demographic forms, which are used to collect information regarding participant's history, are an effective means of background data collection. The collected data facilitate the development of a pattern of prior behaviours and experiences (Mumford, 1987). Past behaviours have acted as effective measures of predicting future behaviours (Mumford, 1987). Capturing this data not only assists in creating a framework for the discussion of various problems generated by the data but also widens the scope of data analysis (Mumford, 1987), permitting comparisons among participant subgroups (Griffith et al., 1999). Tsui and O'Reilly (1989) also noted that collecting demographic data highlights individual characteristics, which are crucial variables in research and can often affect individual outcomes. Although the construct validity (Stokes & Cooper, 2001) of participant demographic data is considered low, these data are appealing because they exert a minimal adverse effect on participants (Mumford & Stokes, 1992) and require cost-effective collection methods (Stokes & Cooper, 2001).

Demographic data of the participants were collected by asking them their age, nationality, level of education, profession, place of work, years of experience, and average number of patients they treat per week. The objective of collecting this data was to provide a framework of variables that can later be used to identify patterns, behaviours, characteristics, commonalities, and differences within each group of HCPs and among HCP groups (Hinde, 2009).

Given below is a summarised account of the questions for CME program evaluation and the instruments that were used to collect data pertinent to each research question:

- To assess whether the UAEU-accredited CME programs met the attending HCPs' learning expectations, a tool named CMEQUAL (based on SERVQUAL), which has been validated and is widely applied for evaluating service quality perceptions in other fields, was used. The performance indicators were assessed using a 7-point scale. The same survey was filled-in by participants before the program wherein they described their expectations, and at the end of the program, they described their perceptions.
- To assess whether the UAEU-accredited CME programs achieved the learning objectives stated by the organisers, the participating HCPs were provided a list of five main goal statements in the form of a questionnaire for each CME program at the end of the program. The questions were pertaining to goal achievement. The participants rated the achievement of each goal using a 5-point Likert scale: The five choices on the Likert scale were coded as follows: strongly agree (5), agree (4), neutral (3), disagree (2), and strongly disagree (1).
- To identify the determining factors for HCPs' selection and attendance of the UAEU-accredited CME programs, the HCPs were asked to respond to one question in the

survey. The question provided multiple options among which the HCPs were asked to select one or more possible factors. The options were as follows: CME program content, location, faculty, schedule, fee, date, need for CME hours, reputation of organiser, invitation, and any other factor (not in the list of options provided).

- The HCPs' satisfaction with learning experience of the CME programs was assessed (according to Kirkpatrick's model) with respect to the following domains: CME program content, CME program structure, speakers' performance, and CME program setting. The HCPs' responses were obtained using a questionnaire. The questionnaire comprised two main sections; in the first section, speaker's performance was evaluated, and in the second section, CME program effectiveness, content, structure, and management were evaluated. A 5-point Likert scale and a scale of 1–10 (poor to excellent) were used for rating the first and second sections, respectively.
- To measure the changes in the HCP knowledge regarding the topic of the CME programs, pre- and post-test quasi-questionnaires were distributed to the attending HCPs before and after the program, respectively. Five MCQs were defined by the trainers according to program content and objectives. The MCQs and the answers were reviewed and validated by a panel of specialities in the same subject areas as the CME programs; for each question, the last choice was 'don't know'. The use of context-rich MCQs, which test the application of clinical and therapeutic knowledge after educational activities, promotes retention and application of knowledge (McConnell, 2015). A one – group pre-set- post-test design is a quasi- experimental research design in which the same dependent variable which is CME participant's knowledge in this study is measured in one group before and after the education program administered. As stated earlier in

chapter 2, Vasudevaiah and Dash (2013), Chaudhary (2014), and Shrestha et al. (2013), all conducted studies to determine the effectiveness of an educational intervention for improving knowledge and practice of HCP and used a quasi-experimental design for this purpose. Furthermore, the use of pre- and post-test models is considered one of the most common techniques to measure change in knowledge (Allen & Nimon, 2014). According to (Gall, 2003), evaluating a change using a pre- and post-test model involves three phases, namely administration of a pre-test that measures the variable(s) of interest, implementation of the intervention, and administration of a post-test that measures the variable(s) of interest again.

Appendix 4 includes an elaborate explanation of the instruments that were used to collect data pertinent to each research question in this study.

3.9.2 Collection of qualitative data:

This methodology was used to obtain data for answering the last question of my research; the question pertains to the recommendations of the HCPs for improving CME programs in the UAE. In addition, this method was used to obtain additional information for the other questions where applicable, including, the role of CME programs in improving HCP knowledge, changes in the workplace management strategies based on the CME programs, and barriers to application of new knowledge. Data were collected by conducting semi structured face-to-face interviews. Face-to-face interviewing may be appropriate where depth of meaning is essential and the study is primarily is meant to focus on gaining insight and understanding (Gillham 2000, p. 11; Ritchie & Lewis 2003, p.138). This type of data collection is mostly preferred for research involving social science and applied science research. This type involves a socially oriented style of data

collection and primarily aims at procuring data from the participants belonging to a more relevant atmosphere than obtaining information from respondents in an artificially created environment of investigation (Seymour, 2001).

In this study, 14 HCPs consisting of 8 physicians, 4 nurses, 1 laboratory technician, and 1 research assistant were interviewed. The number of participants who were interviewed represented a small, purposefully sampled fraction of the total study population (14/302, 4.6%). The interviewed HCPs were informed during the interviews about the aim of the study. They were informed that their participation was voluntary, and withdrawal from the study was possible in accordance with the HCP's choice. The interviewees could be encouraged to express their views elaborately in the interview, which provided deep insights regarding the HCPs' evaluation of the CME programs.

The interviews included HCPs who had attended the CME programs in the UAE. A list of guiding questions was used during the interviews Appendix 6 includes the guiding questions for semi structured interviews in this study. Validity in qualitative research means "appropriateness" of the tools, processes, and data, this includes whether the research question is valid for the desired outcome (Leung, 2015). The guiding questions used in the interviews were validated through two ways: firstly, these questions were framed in accordance with the main goal of the study and to answer the last question of this research, the questions mainly described their experience and interpretations about the CME programs they attended in Abu Dhabi, and the contribution of these programs to their knowledge, as well as their opinions about the challenges and opportunities to improve the CME programs for physicians in Abu Dhabi, so the questions were focused to achieve the research goals. Secondly, the questions were reviewed by HCPs and

speakers led by a professor from a college of medicine with extensive experience in medical education.

The interviews were recorded using the recorder application of iPhone mobile after obtaining the consent of the participants. The time for the interview varied from (20 minutes to 45minutes), and the place was decided according to the desire of each participants and the confidentiality concerns. Parts of the interviews were conducted at the CME program venue, while others at the participant's place of work.

3.10 Data analysis and interpretation of data:

The data collected for any research must be evaluated, and the explanation should be used for appraisal (Miller & Gatta, 2006). Graphical methods or quantifiable tools are required to analyse the results of the study. The analysis of data and graphical representation enable the investigator to identify responses to the proposed research question or problem.

As noted by Creswell and Plano Clark (2007), data analysis in mixed-methods research conventionally consists of analysing quantitative and qualitative data using quantitative and qualitative methods, respectively.

In this study, quantitative data analysis consisted of examining the HCPs demographics (age, number of years of practice, and number of patients per week) and their answers to survey questions on the determinant factor for attending the CME program and satisfaction. It also included their responses to the pre- and post-CME knowledge test in addition to the pre-CME HCP learning expectations and post-CME learning perceptions and other responses to questions related to CME evaluation, and application and barriers of transformation of knowledge to their

work place. Qualitative data analysis consisted of an examination of HCPs' answers to open-ended interview questions related to the effectiveness of CME and their recommendations for improving CME programs in the UAE.

According to Cresswell and Plano Clark (2007), one of the procedures for mixed-methods data analysis is related to concurrent data analysis, in which both qualitative and quantitative data are merged because they are analysed separately. They also stated that this type of data analysis generally involves concurrent, but separate, collection and analysis of quantitative and qualitative data to enhance the researcher's understanding of the research problem.

In this study, both data types were mixed for complementarity and expansion. The quantitative data analysis was prioritised in analysis and reporting, while the qualitative data analysis results were used to expand and support the discussion in the findings and recommendations for this research. Hence, the quantitative analysis component was given considerably higher priority than the qualitative component. Thus, the analysis essentially is a quantitative-dominant mixed analysis, wherein the analyst adopts a post-positivist stance, while believing simultaneously that the inclusion of qualitative data and analysis is likely to increase the understanding of the underlying phenomenon (Johnson et al., 2007).

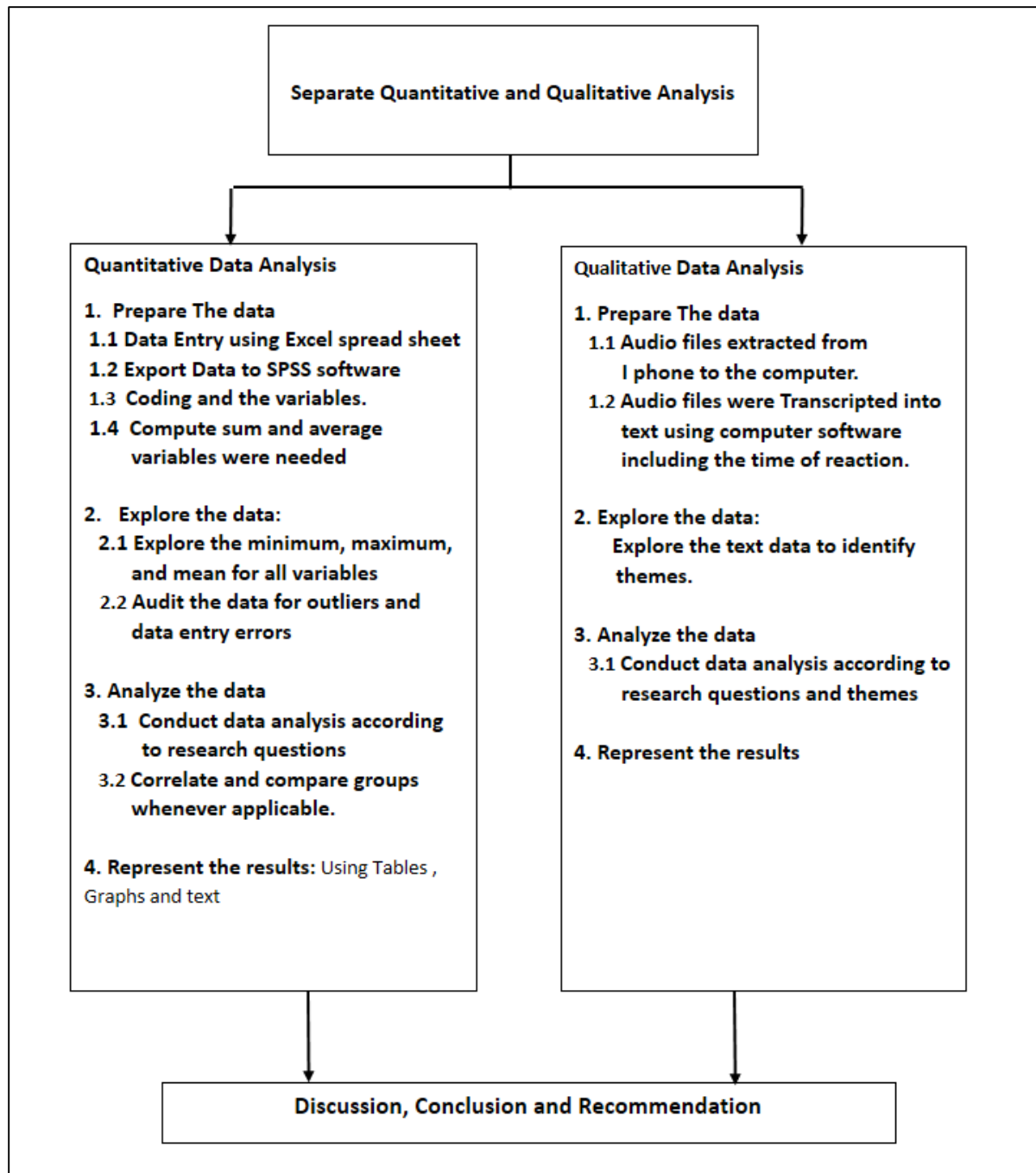


Figure 3.3: Concurrent data analysis diagram. Adapted from: Cresswell and Plano Clark, 2007, p. 127.

3.10.1 Qualitative data analysis:

The primary aim of collecting qualitative data was to obtain additional data based on the viewpoints and experiences of the HCPs regarding the effectiveness of the CME programs. Open-ended questions enabled the HCPs to convey their own opinions, which were not affected by the presence of prewritten options (as in a Likert-scale-based questionnaire). Content examination was used for exploring collected data (subjective). According to Travers (2001), content examination incorporates observing, separating, and planning an arrangement of data in alignment with the ultimate objective to test theories. It involves arranging and planning subjective data according to topics and views. Content examination is a framework for examining forms or verbal correspondence in a precise and subjective design. A similar framework was adopted in this study.

Understanding the perceptions of HCPs towards CME effectiveness in the UAE and their recommendations for improving CME practice was paramount to the goals of this study. The multiple perspectives from the participants were valuable in understanding the stated problem. Thus, the semi structured interview questions provided a deep understanding of the context of the learning behaviour of the HCPs for attending CME programs; thus, as described by Seidman (1991), the study provided insights into understanding what underlies their behaviour and actions. The qualitative portion of this study was designed to investigate and describe how the HCPs preview the effectiveness of CME programs and what they recommend for improving CME practice in the UAE.

The data collection and analysis in this study were conducted simultaneously as recommended by Cresswell and Plano Clark (2007). In doing so, I prepared and organised the data for analysis.

According to Trochim and Donnelly (2006), data preparation and organisation enable the researcher to assess the types of themes emerging from the collected data. Patton (2002) stated that data preparation and organisation result in categories and themes that are aligned with the research questions; hence, data are retrievable during the intensive analysis that follows data collection. The process of data preparation and organisation in a rigorous and standardised manner ensured the validity of the study results. In this context, consistency is crucial in this process because it helps to shape the data into information. In this regard, the research questions for this mixed-methods study provided a framework to prepare and organise the data.

All the interviews were recorded using the recorder application of a mobile phone. The format of the recorded interviews was changed for compatibility with the computer system. All the recorded interviews were transcribed. Spradley (1979) stated that audiotapes must be transcribed to paraphrase common patterns and experiences. Appendix 7 includes sample for one full transcript qualitative interview. The interview transcripts were read and the deductive approach was used for data analysis. Only 14 short interviews were conducted; hence, no software packages were used to code the interview data. The data were coded manually and classified on the basis of the research questions for which they provided answers.

According to Fellows and Liu (2015), the data collected for subjective research requires in-depth analysis and deeper interpretation than does quantitative data because qualitative data is highly theoretical in nature. Content or thematic analysis is the primary approach for analysing qualitative data (Thomas & Harden, 2008). Given (2008) stated that thematic analysis is defined as an all-inclusive process through which researchers can identify various cross references among the collected data. The data collected in the form of interviews are segregated according

to specific themes for answering the research questions. These themes can be constructed using the analysis of data collected from the participants.

The qualitative study involves the collection and understanding of data in terms of various aspects; thus thematic analysis increases the probability of correctly understanding many types of problems (Namey et al., 2008; Marks & Yardley 2004). In this study, the data were analysed for trends and patterns to identify themes to understand them (the data) better within the confines of a thematic analysis. Next, the data were coded using a numbering system based on similar categories and topics that emerged from the data as they aligned with the research questions. Each topic addressed in the data had a number assigned to it. Next, all the data related to the thematic pattern and related subthemes were classified. According to Taylor and Bogdan (1998), subthemes emerge from conversation topics, vocabulary, recurring activities, meanings, and feelings. When a researcher intends to investigate the relationship between the various study components and relates different segments of obtained evidence, which are useful to the same study in separate situations, a simple textual analysis is most suitable for data evaluation (Alhojailan, 2012).

Following coding, descriptions, and categorising, the researcher represented findings as a narrative. A narrative analysis of the data collected painted a portrait of the perceptions of HCPs towards CME effectiveness in the UAE and their recommendations for improving CME practice. This included direct citations from participants and a comparison of results from the study, literature review, and theories on this topic (Cresswell, 2003).

3.10.2 Quantitative data analysis:

The investigation and interpretation strategies of a statistical study are dominated by the purposive tendency of an analyst to publish results and develop information that is reliable. These strategies are necessary for developing a deep understanding of the results of the surveys and experimental studies that help in the formulation of administrative policies. This also justifies the data gaps through instigating enhanced strategies, which further increases the importance and practicality of the proposed topic (Burgess, 1989).

Statistical analysis is a fundamental part of quantitative research. This analysis facilitates the researcher in testing the hypothesis formulated on the basis of research objectives and generation of results to support the deductive approach endorsed in the study. In this study, descriptive univariate and bivariate statistics and graphical analysis, which describe basic features of the analysed data, were used to examine the quantitative aspects of the data (Trochim & Donnelly, 2006). According to Gay and Airasian (2003), the use of descriptive data analysis for answering questions about how participants view issues within a given reality facilitates readers by providing an idea of typical values in the data and how these vary. Thus, researchers summarise the data, so that readers can construct a mental picture of the relationship between the data and the phenomena under study.

Surveys are the primary source for data collection of this nature. In doing so, the results from the survey questions were analysed using the Statistical Package for Social Science (SPSS) software. Frequencies of distribution (Trochim & Donnelly, 2007) were used to describe multiple variables such as test scores and demographic data. The central tendency of a distribution (Trochim &

Donnelly, 2007) is used to determine and describe the median of sets of values of the data that require this approach.

The following statistical tools were used for the quantitative analysis of the collected primary data:

1. Graphical method
2. Karl Pearson Correlation Coefficient test
3. Simple percentage analysis

In this study, the researcher also presented the quantitative findings of the data through visuals such as figures and tables that represent the results of different themes. Visual representations facilitate the readers in understanding the summarised analysis of the quantitative data results.

A frequent goal in data analysis is to efficiently describe and measure the strength of relationships between variables (Muijs, 2010). In this regard, bivariate descriptive statistics describes such relationships. This study used the Karl Pearson Correlation test to test the proposed hypotheses. Clark and Adler (2010) stated that descriptive research results are summarised with statistics, and it is called the correlation coefficient. In this study, the descriptive research design makes use of the correlation test. Here, the proposed hypothesis was tested using Karl Pearson Correlation method.

Descriptive statistics such as mean, average, median, percentiles, and minimum and maximum were used to describe and analyse the data that provided answers for the research questions.

Moreover, cross tabulation and the chi-square test as well as percentages were used to describe some data. The paired-samples t-test and the t-test were used to compare the means of some variables. The equality of variance was also assessed.

The correlation coefficient is represented by the symbol ' r '. The coefficient of correlation ' r ' can be calculated using the following formula:

$$\text{Correlationcoefficient } (r) = [N\Sigma XY - (\Sigma X)(\Sigma Y) / \text{Sqrt}([N\Sigma X^2 - (\Sigma X)^2][N\Sigma Y^2 - (\Sigma Y)^2])]$$

Where

N = Number of elements or values

X = First Variable

Y = Second Variable

ΣXY = Sum of the product of First and Second Variables

ΣX = Sum of First Variables

ΣY = Sum of Second Variables

ΣX^2 = Sum of square of First Variable

ΣY^2 = Sum of square of Second Variable

The value of correlation coefficient ranges between -1.0 and $+1.0$. If r is to $+1$ or -1 , the two variables are more closely related to each other.

Simple percentage analysis is a method used to determine the correlation between two or more datasets. In simple percentage analysis, proportions are predominantly used to demonstrate relationships and to show two relative terms.

$$\text{Percentage} = \frac{\text{No of responses} \times 100}{\text{Total number of responses}}$$

In this study, data interpretation involved explaining the patterns and trends revealed during the data analysis process. It involved constructing a logical scientific argument to explain the data collected. In this regard, scientific interpretations were descriptions, comments, and suggestions related to the meaning of the quantitative and qualitative data. When researchers interpret the data in their study, they draw on their own personal and collective knowledge to construct one or more plausible explanations for the data. Usually, interpretations of the findings that are most reasonable and are sufficiently supported by the data are presented (Maruyama & Deno, 1992).

Data	Data Type	Statistical analysis methods
Demographic (AGE, Nationality, profession, education, work place, Years of practice, Patients seen) (Pre-CME)	Numerical, Categorical	Descriptive statistics (Frequency, mean, standard deviation, percentages, graphs)
Determining factor for attending CME program (Pre- CME)	Categorical	Descriptive statistics (Frequency, , percentages, graphs)
HCP expectations from CME program (Pre- CME)	7 -point Likert's scale	Descriptive statistics , total score average and mode
HCP perception about CME program (post- CME)	7 -point Likert's scale	Descriptive statistics , total score average and mode , (perception-expectation average), compare groups using ANOVA
The post CME program objectives evaluation questionnaire.	5- point Likert's scale	Descriptive statistics , total score average and mode, correlation
The post CME program speakers and structure evaluation questionnaire.	5- point Likert's scale	Descriptive statistics (Frequency, , percentages, graphs)
The post CME program structure evaluation	10 -point Likert's scale	Descriptive statistics (Frequency, , percentages, graphs)
The pre and post CME program knowledge questions.	Categorical, numerical	Calculating groups , descriptive statics, comparing groups ANOVA correlation
Work place Management strategy change	7 -point Likert's scale	Descriptive statistics (Frequency, , percentages, graphs)
Barriers to transfer learning to work place	Categorical	Descriptive statistics (Frequency, , percentages, graphs)
Share CME experience with work peers	7 -point Likert's scale	Descriptive statistics (Frequency, , percentages, graphs)
Overall CME program effectiveness rate	Numerical	Descriptive statistics (mean, standard deviation , graphs,)

Table4.3: Statistical methods used in this study for data analysis.

3.10.3 Software tools:

Collected primary data or information is analysed using software tools. The software tools used in this study are Microsoft Excel and SPSS.

Microsoft Excel was used to create graphs for percentage analysis of the collected quantitative data to support the hypothesis. While SPSS was used in this study considering the objective of presenting quantitative data, SPSS is fundamentally used for dubious evaluations as a part of the need to examine the numerical data.

3.11 Measuring reliability and validity of the research instruments:

The validity of a research instrument depends on the accuracy of the tool. Validity is the degree to which an instrument measures what is supposed to measure (Hinton, 2004; Perez et al., 2009; Anthony, 2011). Validity is a technique that ensures that each requirement of the examination is met. Denzin and Lincoln (2011) referred to validity as the assurance given by a researcher regarding the proposed study that every requirement of this work is being met by using the acquired data.

In this investigation, the quantitative data surveys, the approve schedules examined the appropriateness of the collected data for review. Validity can be requested into two sorts, as in particular internal validity and external validity. In this study, the validity was maintained by ensuring that the inquiries in the survey are crucial to the goals of the research. Validity of a questionnaire can be established by arranging for a review by a panel of experts, who explore theoretical constructs underlying the questionnaire (Bolarinwa, 2015). Therefore, to collect the accurate and concise information, the research tool for quantitative data and the list of questions

guiding the qualitative interviews were validated through a detailed review of the questionnaires by HCPs and speakers led by a professor from a college of medicine with extensive experience in medical education. Furthermore, validity and reliability in this study were enhanced because various data collection instruments were used. Data were broken down into separate parts, closely examined, and compared for similarities and differences. The questions in the questionnaire were regarding different aspects of the CME programs, as reflected in the data.

The construct validity of this research questionnaire, which is the relationship of variables theoretically related to that scale and has to be measured in a study (Sirkin, 2006), was ensured. Construct validity measures the arrangement of items and indicates that either items are in a required sequence, need to be replaced, or need to be deleted from the tool. For the pre- and post-CME knowledge test questionnaires, hypothesis testing validity was used. Drost (2011) concluded that hypothesis testing validity means presence of evidence that a research hypothesis about the relationship between the measured concept (variable) and other concepts (variables), derived from a theory, is supported by the data. In the case of CME programs for HCPs, all learning and professional development theories discussed earlier stated that trainees can learn by observing and participating in an educational program. From all these theories, we could derive a hypothesis stating a positive correlation between physical attendance of HCPs in CME programs and the amount of acquired knowledge. If the pre- and post-CME knowledge test performance (as evidence) supports the hypothesis, we can conclude that there is a high degree of construct validity in the measurements of knowledge change.

Reliability measures the consistency of the research instrument. Reliability is the degree to which the given concept of measurement produces the same results with the same tool (Corbetta, 2003; Best & Kahan, 2006). Reliability indicates the degree of judgement of the incidental state of a

study. Reliability indicates the probability of encountering self-sufficient and specific coincidental conditions in a quantitative investigation. The criticalness of the results within the data gathering frameworks is ensured. Reliability is mainly used to evaluate the accuracy of an instrument that is used to collect data or the accuracy of the data itself. Reliability is also considered the consistency of a research tool that prevents bias and error (Perez, et al., 2009). Three methods are commonly used for measuring the reliability of a questionnaire test, namely retest, split-half, and internal consistency methods (Cohen et al., 2012).

In this study, the survey completed by the HCPs before and after the CME programs served as the assessment instrument. This survey mainly included the following questionnaires:

1. Demographic and supporting information
2. Pre-CME program expectation and post-CME program perception questionnaire
3. Post-CME program objective evaluation questionnaire
4. Post-CME program speaker and structure evaluation questionnaire
5. Pre- and post-CME program knowledge questionnaire

In this study, the internal consistency method was used to determine the reliability of the survey questionnaires. Internal consistency indicates the extent to which items on the test or instrument are measuring the same quantity. The appeal of an internal consistency index of reliability is that it is estimated after only one test administration; therefore, it avoids the problems associated with testing over multiple time periods. Internal consistency is also estimated using the split-half reliability index and coefficient alpha (α) index, which is the most commonly, used method for assessing internal consistency reliability. (Cronbach, 1951; Anderson et al., 2002; Mackison et

al., 2010; Liang et al., 2014; Deniz et al., 2013; Anastasiadou, 2011; Tavakol, 2011; Shaik, 2014).

The internal consistency method was used to determine the reliability of the survey questionnaires by identifying α values at 95% confidence level for each scale items in the pre-CME program expectation and post-CME program perception questionnaire, post-CME program objective evaluation questionnaire, and post-CME program speaker and structure evaluation questionnaire.

Cronbach's α reliability coefficient normally ranges between 0 and 1. However, there is actually no lower limit to the coefficient. The closer Cronbach's alpha coefficient is to 1.0, the greater the internal consistency of the items on the scale (Gliem & Gliem, 2003).

As stated earlier, the pre-CME program expectation and post-CME program perception questionnaires were adopted from the CMEQUAL survey. The CMEQUAL survey instrument measures the gap between participant expectations for quality and the perception of actual service delivered. When this instrument was developed in 2007 by Shewchuk and other authors, a test of internal consistency was conducted on these items using Cronbach's α , with a resulting 0.821, which lies within the range of internal consistency recommended for survey research (Shewchuk et al., 2007).

The post-CME program objective evaluation questionnaire scale consisted of five items, and Cronbach's α for the five items was 0.94. The objective evaluation instrument was found to be highly reliable. Furthermore, the post-CME program speaker performance and structure evaluation questionnaire exhibited an α value of 0.95 and 0.96 for two components; both instruments were found to be highly reliable. However, using the pre- and post-CME program

knowledge questionnaire as an instrument for knowledge change is often cited as a common sense approach. Bond (2005) stated that the knowledge or skill acquired by learners over a course can be assessed determining what they knew at the beginning of the course and reassessing their knowledge with the same or equivalent instrument at the end of the course. Theoretical justification for the technique was provided by Willet (1989a, 1989b, 1994, 1997) and Rogosa (1995). They demonstrated that pre- and post-testing dramatically improved the method's reliability. In addition, the findings (difference in scores) of this test could be tested statistically for significance. In this study, the researcher maintained the quality of the test by ensuring that each of the respondents had responded to each test question entirely on their own (individually).

3.12 Qualitative Data Trustworthiness:

The issues surrounding the use and nature of the term validity in qualitative research are controversial and many. It is a highly debated topic both in social and educational research and is still often a subject of debate (Creswell et al., 2007). As Merriam (1998, p. 202) states in qualitative research "reality is holistic, multidimensional and ever-changing." Therefore, it is up to the researcher and research participants who attempt to build validity into the different phases of the research from data collection through to data analysis and interpretation (Zohrabi, 2013).

The qualitative data in this thesis was collected because the researcher believes that this data will help him to understand, represent, and explain the complex nature of the CME participants experience phenomenon, in addition to the fact that the recommendations will not be applicable to collect through other methodology. On this basis, it is a naturalistic inquiry that seeks to

understand phenomena in context-specific settings in which the researcher does not attempt to manipulate the phenomenon of interest (Krefting, 1991).

A valid study should demonstrate what actually exists and is accurate, and a valid instrument or measure should actually measure what it is supposed to measure (Golafshani, 2003). In this study as mentioned earlier the guiding questions used by the researcher during the interviews were validated through panel experts and research questions and objectives verification.

Furthermore, triangulation was used in part of the guiding questions which was accomplished by collecting data from different sources using different methods through the quantitative survey and by comparing the results of the quantitative data by asking the participants the same research questions.

Finally, Koch (1994) claimed that the trustworthiness of the research process can be determined by the extent to which the research provides information and the process by which the end product has been reached. The discussion of data collection, research methodology and data analysis processes handled in details previously in this Chapter is in keeping with this claim of ensuring validity during the research process.

3.13 Summary:

This chapter provided a detailed account of the research methodology of this study. It started with discussing the different research philosophies and the ontological, axiological, and epistemological assumptions that guide this research and showed that pragmatic paradigms are an appropriate means of inquiry for this study. The present study involved the use of the mixed-methods technique for data collection. This implies use of both positivism and interpretivism strategies, which represent different paradigms; therefore, each strategy has its own values and

techniques of quantitative and qualitative data collection that guide how research is conducted and how data are analysed and reported.

This chapter also explains the concurrent embedded strategy that was used to collect data in this research. A questionnaire was used to collect quantitative data regarding the UAEU-accredited CME programs, and HCP demographics, expectations, perceptions, and evaluation as well as pre- and post-CME knowledge tests. Semi structured interviews were conducted with a subset of the sample and were embedded or nested within the predominant method to collect qualitative data of the effectiveness and recommendations of HCPs for improving the UAEU-accredited CME programs in the UAE.

Finally, the sampling design as probability and nonprobability testing techniques for determining respondents, sample size, and the recruitment phases were discussed. The surveys as the primary means of data collection were discussed, and the concurrent data analysis along with measuring reliability and validity of the quantitative data survey were discussed in this chapter.

Chapter 4: Results and data analysis

4.1 Introduction:

This study was conducted in Al Ain city in the Emirate of Abu Dhabi to evaluate of the effectiveness of UAEU-accredited CME programs by participating HCPs (physicians, nurses, pharmacists, and other health professionals). A mixed-methods approach was followed in this research; consequently, both quantitative and qualitative data were collected from the participating HCPs. This chapter presents the findings from the analysis of both quantitative and qualitative data. The first part of this chapter presents and analyses answers provided by the quantitative data to the research questions. Tables and graphs display and illustrate the results. This part starts with the description of the collected data. The data consist of responses for both the pre- and post-CME surveys, demographic characteristics of the study population, factors that determine HCP selection and attendance of the CME programs, as well as the participants' evaluation of CME programs and speakers, achievement of program objectives, and change in (participant) knowledge after attending the CME programs.

The quantitative data answers the following research questions:

1. To what extent did the CME programs meet the learning expectations of the participating HCPs?
2. To what extent did the programs achieve the stated goals?

3. Which factors determine the selection and attendance of the CME programs by HCPs?
4. To what extent are the HCPs satisfied with the learning experience of the CME program (content, structure, speakers' performance, and setting)?
5. To what extent did the CME programs change HCP knowledge regarding the topics covered in the CME programs?

The second part of this chapter presents a thematic analysis of the collected qualitative data, which consists of descriptions of relevant themes and quoting excerpts from participants' statements. These data answered the following questions:

- (1) What are the determining factors for the selection and attendance of the CME programs?
- (2) To what extent did the CME programs change HCP knowledge regarding the topics covered in the CME programs?

Furthermore, the semi structured interviews yielded subjective qualitative data regarding the HCPs beliefs regarding the role of the CME programs in changing their knowledge (on topics covered in the program) and workplace management strategies as well as regarding the barriers anticipated by the HCPs in implementing their newly acquired knowledge and skills at their workplaces.

4.2 Analysis and findings from quantitative data:

The quantitative data analysis and the findings will be discussed in details in this part of the thesis.

4.2.1 Description of collected data:

The pre-CME program survey questionnaires were administered to over 334 HCPs who represented the total HCP attendance in the four selected CME programs. The questionnaire consisted of questions on demographic data, HCPs' expectations from the CME program before they attended it, and their knowledge on the topics covered in the CME program (for pre-CME knowledge assessment) (see appendix 5). Among the 334 attendees, 279 participants returned the questionnaires, consisting of partially and completely filled questionnaires. The total response rate was 83.5% of all the four CME programs. At the end of each CME program, the post-CME program questionnaires were distributed to the attendees who were physically present at the end of the meeting. In total, from the four CME programs, 233 completely and partially filled questionnaires were returned; accordingly, the response rate was 70%. However, 225 participants filled both the pre- and post-CME program surveys either partially or completely; therefore, the total response rate was 67%. All responses to the questionnaires were entered in the computer, and the total number of cases in the database was 302, which represents the total sample size of the study population. Table 4.1 summarises all these results. For easy reference of results for the four CME programs selected in this research, in tables, these programs will be referred to by the serial numbers assigned (chronologically) according to program date: Acute Coronary Syndrome course is CME Program 1, Infectious Diseases course is CME Program 2, Cardio-Rheumatology Review is CME Program 3, and Respiratory Rapid Course is CME Program 4.

	CME Program 1	CME Program 2	CME Program 3	CME Program 4	Total
Actual attendance	97	78	61	98	334
Pre-CME questionnaires distributed. Count (%)	97 (100%)	78 (100%)	61 (100%)	98 (100%)	334 (100%)
Pre-CME questionnaires returned. Count (%)	92 (95%)	63 (81%)	43 (70%)	81 (83%)	279 (83.5%)
Post-CME questionnaires	75 (77%)	61(78%)	30 (49%)	67(68%)	233 (70%)

distributed. Count (%)					
Post-CME questionnaires returned. Count (%)	75 (77%)	61(78%)	30 (49%)	67(68%)	233 (70%)

Table4.1: Number of responses and response rates for the total sampled population of 334.

4.2.2 CME audience characteristics analysis:

The survey instrument used to collect data in this research contained questions intended to produce specific demographic data about the participated HCP within each of the four CME programs evaluated in this research. These questions included questions about participant's age, profession (doctor, nurse, pharmacist, or others), nationality (Arab or non-Arab), level of education, current place of work, number of years in practice, number of patients dealt with or treated every week. Tables 5.2 through 5.8 summarise the descriptive statistics analysis results of these items. Data of the HCP demographics (audience characteristics) were collected in order to determine the effects of age, nationality, year of experience, workplace, workload, and HCP qualification on the participation of HCPs in CME programs as well as the outcomes of the CME programs. Considering that CME programs are linked with the renewal of licenses, the aforementioned factors are likely to affect the participation of HCPs in the programs. Moreover, factors such as age, experience, and HCP qualification are likely to affect the outcomes of the programs.

The first question asked the participants about their age because age of the HCPs is likely to affect participation and learning outcomes of CME programs. The mean (\pm standard deviation [SD]) age of the participants in this study was 42.4 ± 11.3 years. Overall, 47.8% of the participants stated that their ages were <40 years, while only 7.3% of them stated that their ages were >59 years (Table 4.2 and Figure 4.1).

Variable	Items	CME Program 1 (N = 91)	CME Program 2 (N = 61)	CME Program 3 (N = 43)	CME Program 4 (N = 79)	All CME Programs (N = 274)
Age mean (SD)		42.3(12.8)	41.6(11.4)	44.1(11.6)	42.5(9.5)	42.4 (11.3)

Age Categories in Years	Frequency	Valid Percentage
less than 30	32	11.7%
30–39	99	36.1%
40–49	63	23%
50–59	60	21.9%
60 and more	20	7.3%
Total	274	100%

Table 4.2: Descriptive statistics for the age of CME program participants and categories in years.

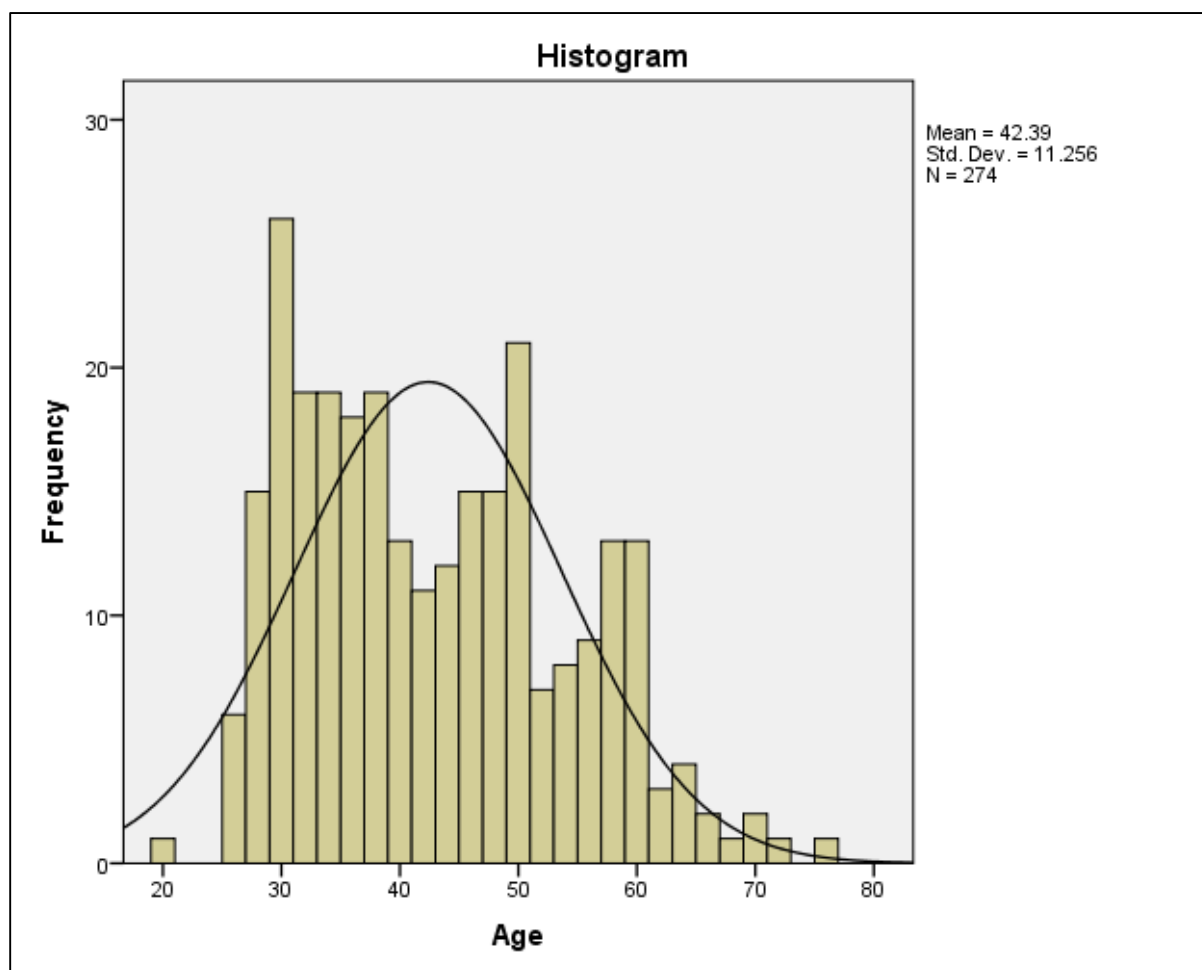


Figure 4.1: Histogram of age distribution (in years) of the participating HCPs in all four CME programs

Participants were then asked about their nationality; however, because nationality will not be used as a factor in this study, the nationalities of participants were recoded as ‘Arab’ and ‘non-Arab’. Nationality was considered a factor that could affect the participation of HCPs in CME programs because the programs are associated with renewal of licenses to practice. Moreover, the UAE, and Abu Dhabi, in particular, has a highly cosmopolitan population. The results showed that in all the four programs, the percentages of Arabs and non-Arabs were 49.8% and 50.2%, respectively, which are almost equal. Table 4.3 displays nationality group results, and Figure 4.2 illustrates the portions accordingly.

Variable	Items	CME Program 1 (N = 90)	CME Program 2 (N = 61)	CME Program 3 (N = 43)	CME Program 4 (N = 79)	All CME Programs (N = 273)
Nationality <i>Count (Valid percentage)</i>	Arab	44 (48.9%)	30 (49.2%)	21 (48.8%)	41 (51.9%)	136 (50.2%)
	Non-Arab	46 (51.1%)	31 (50.8%)	22 (51.2%)	38 (48.1%)	137 (49.8%)

Table 4.3: Nationalities groups of health care professionals sample in this study

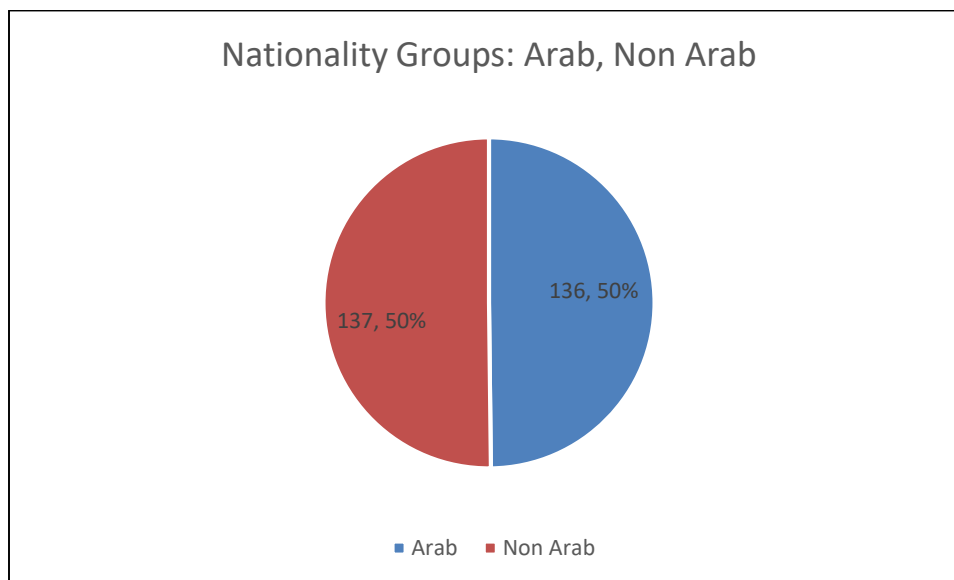


Figure 4.2: Nationality groups of the participating HCPs in all four CME programs.

The third question was pertaining to the participants' profession because HCP profession was considered a factor that affects HCP participation. Some HCPs, particularly those other than doctors and nurses, are required to attend CME programs that are highly specific to their work. In all the four programs, 277 participants responded to this question. Among the HCPs, 35.7%, 46.2%, 11.9%, and 6.2% were doctors, nurses, pharmacists, and other HCPs, including laboratory technicians and physiotherapists. The counts of participants from different professions and the corresponding percentages are presented in table 4.4 and figure 4.3.

Variable	Items	CME Program 1 (N = 91)	CME Program 2 (N = 63)	CME Program 3 (N = 42)	CME Program 4 (N = 81)	All CME Program s (N = 277)
Profession <i>Count (Valid percentage)</i>	Doctor	25 (27.5%)	22 (34.9%)	21 (50%)	31 (38.3%)	99 (35.7%)
	Nurse	52 (57.1%)	28 (44.4%)	13 (31%)	35 (43.2%)	128 (46.2%)
	Pharmacist	8 (8.8%)	9 (14.3%)	6 (14.3%)	10 (12.3%)	33 (11.9%)
	Others	6 (6.6%)	4 (6.3%)	2 (4.8%)	5 (6.2%)	17 (6.2%)

Table 4.4: Professions of health care professionals participate in this study.

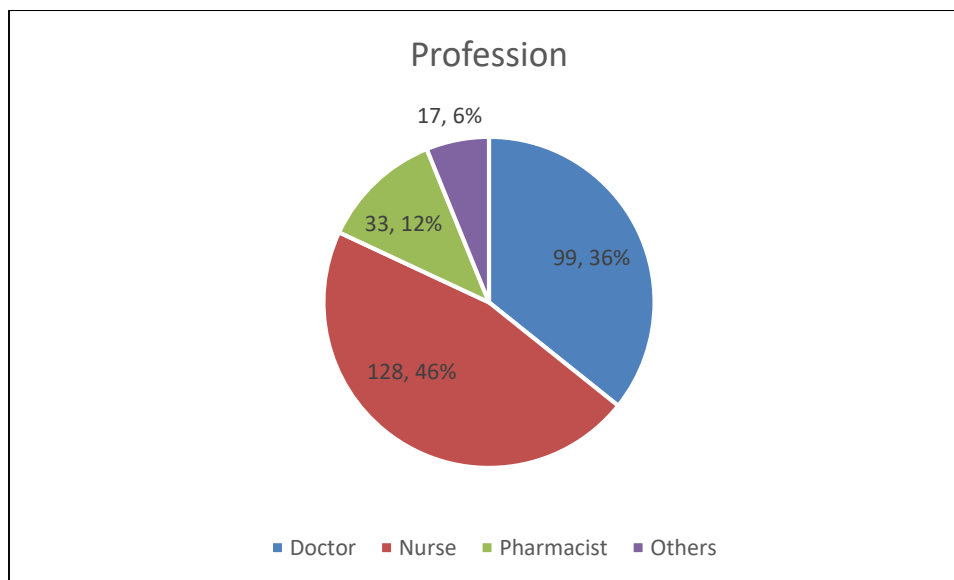


Figure 4.3: Professions of HCPs attending all four CME programs.

The fourth question was pertaining to the level of education. The HCP education level was considered an influential factor affecting the learning outcomes of CME programs. In all the four programs, 51.4%, 24.9%, and 23.8% of the participants had bachelor degree university certificates, diplomas, and higher education certificates, respectively.

Variable	Items	CME Program 1 (N = 84)	CME Program 2 (N = 60)	CME Program 3 (N = 40)	CME Program 4 (N = 77)	All Events (N = 261)
Level of education <i>Count (Valid percentage)</i>	Diploma	24 (28.6%)	15 (25%)	6 (15%)	20 (26%)	65 (24.9%)
	BSc	45 (53.6%)	32 (53.3%)	21 (52.5%)	36 (46.8%)	134 (51.3%)
	Master	10 (11.9%)	10 (16.7%)	11 (27.5%)	16 (20.8%)	47 (18%)
	PhD	5 (6%)	3 (5%)	2 (5%)	5 (6.5%)	15 (5.8%)

Table 4.5: Levels of education of HCPs.

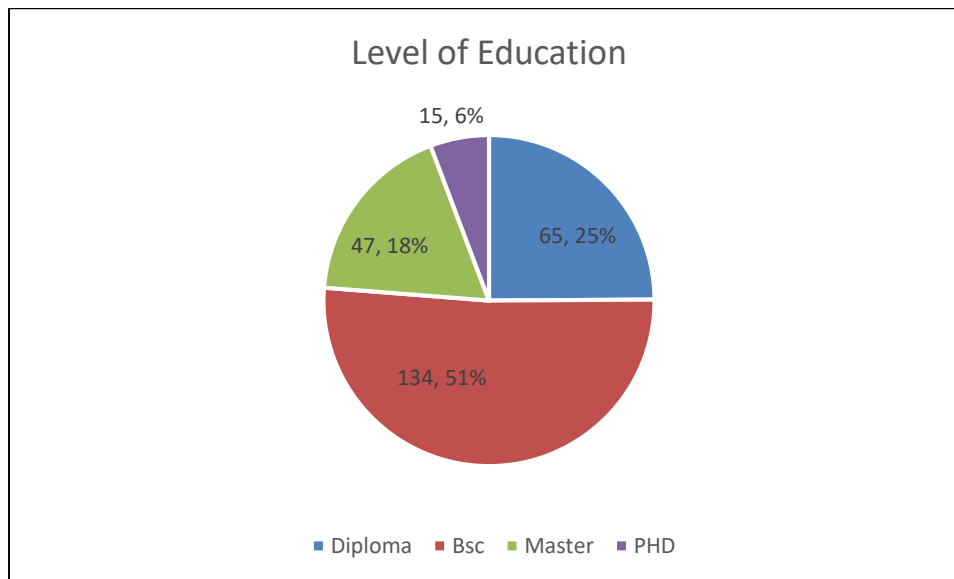


Figure 4.4: Levels of education of HCPs in all four CME programs

The participants were asked questions regarding their current workplace. The workplace was considered a factor affecting learning outcomes. They were to select one of the following three options: hospital, outpatient clinic, or other workplace. In total, 53% of the participants worked

in hospitals, while 18.8% and 12.5%, respectively, worked in outpatient clinics and other clinical workplaces such as school health departments or home care.

Variable	Items	CME Program 1 (N = 90)	CME Program 2 (N = 63)	CME Program 3 (N = 43)	CME Program 4 (N = 81)	All Programs (N = 277)
Current place of work <i>Count (Valid percentage)</i>	Hospital	55 (61.1%)	36 (57.1%)	23 (53.5%)	51 (63%)	165 (59.6%)
	Outpatient Clinic	25 (27.8%)	18 (28.6%)	11 (25.6%)	18 (22.2%)	72 (26%)
	Others	10 (11.1%)	9 (14.3%)	9 (20.9%)	12 (14.8%)	40 (14.4%)

Table 4.6: CME participants' sample place of work.

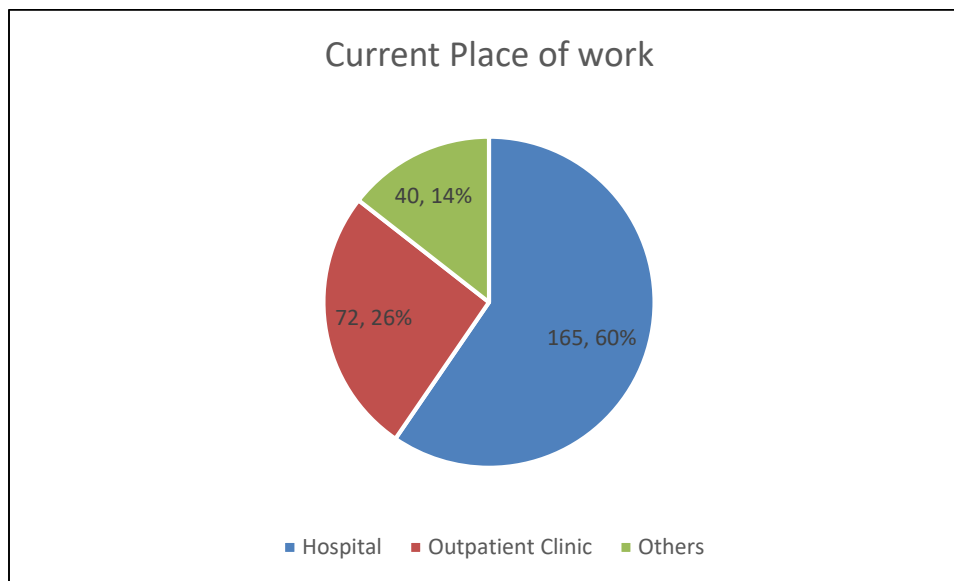


Figure 4.5: CME participants' sample place of work

The next question was regarding the total number of years spent by the participants in healthcare clinical practice. The work experience (number of years of practice) of the HCPs was considered a factor affecting the learning outcomes of CME programs. The participants were asked to write the number of years in the empty space provided. In total, 247 participants responded to this question, and the percentages of the HCPs from each category are listed in Table 4.7.

Years of Practice Groups	Count	Percentage
0–5	37	13.5%
6–10	63	23.0%
11–20	92	33.6%
21–30	53	19.3%
More than 30	29	10.6%
Total	274	100%

Table 4.7: Number of years of practice.

The participants were then asked about the approximate average number of patients they dealt with or treated in a week. The aim of this question was to estimate the workload of the participants in their current workplace in order to determine the time constraints they faced. Time constraints can adversely affect HCP participation in CME programs. In total, 223 participants responded to this question. Most of the HCPs dealt with an average of 0–50 patients per week. Table 4.8 presents data regarding the patients dealt with or treated per week by the HCPs.

Patients Seen Per Week	Count	Percentage
0–50	76	34.1%
51–100	53	23.8%
101–150	33	14.8%
151–200	20	9%
More than 200	41	18.4%
Total	223	100%

Table 4.8: Average number of patients dealt with or treated by the HCPs per week.

4.2.3 CME audience learning expectations:

The research question for which answers were sought was ‘To what extent, if at all, have the UAEU-accredited CME programs met the attending HCPs’ learning expectations?’

The aim of this question was to test whether the CME programs provided the HCPs with the type of information, knowledge, and skills that the attending HCPs expected to obtain. Accordingly, the participants were asked to provide response for 10 statements before attending the CME program and respond to the same statements after the program. The participants responded using a 7-point Likert scale on which 1 and 7 represented the minimum and maximum expectations, respectively, from the CME program. The 10 items are listed in Table 4.9.

	Expectation and Perception Items	Expectation Code	Perception Code	Minimum Value	Maximum Value
1	Address my most pressing questions	Exp1	Perc1	1	7
2	Address competencies identified by my speciality	Exp2	Perc2	1	7
3	Provide fair and balanced content	Exp3	Perc3	1	7
4	Provide clear evidence to support content	Exp4	Perc4	1	7
5	Include opportunities to learn interactively	Exp5	Perc5	1	7
6	Provide me with supporting materials or tools	Exp6	Perc6	1	7
7	Include opportunities to solve cases relevant to my work	Exp7	Perc7	1	7
8	Translate evidence to practice	Exp8	Perc8	1	7
9	Address barriers to optimal performance	Exp9	Perc9	1	7
10	Allow me to assess what I have learnt	Exp10	Perc10	1	7

Table 4.9: Expectation and perception items

Among the 279 participants who returned the pre-CME questionnaires, only 248 completed the expectation part of the survey. By contrast, among the 233 participants who returned the post-CME program questionnaires, only 229 completed the perception part of the survey. Overall, only 194 participants filled both questionnaires. Thus, all further analysis and findings will be reported using the responses of these 194 participants. The mean (\pm SD) of the total scores on items out of 70 for expectation and perception item responses were 54.6 (\pm 10.6) and 57.5 (\pm 9.6), respectively. These values were converted to percentages to facilitate understanding. Hence, the percentages of the expectations and perceptions were 78% and 82.1%, respectively. The overall score for HCP perception (post-CME) was significantly higher than that for HCP expectation

(pre-CME). Moreover, the pre- and post-CME questionnaires were identical. Hence, the HCPs rated the items higher after attending the programs than before them. This indicates that the CME programs met the learning expectations of the HCPs. Another finding worth reporting is that the expectation scores of 50% of the participants were above 55 and below 70. However, the perception scores of 50% of the participants was above 60 and below 70. Table 4.10 shows the distribution of expectation and perception scores for all items. The box plot in Figure 4.6 corresponds to the same. This indicates that the learning expectations of at least 50% of the participating HCPs were met.

		Total Expectation Score	Total Perception Score
	N	194	194
Mean		54.6	57.5
Standard Deviation		10.6	9.6
Minimum		20	20
Maximum		70	70
Percentiles	25	50	51
	50	55	60
	75	61	64

Table 4.10: Distribution of expectation and perception scores for all items

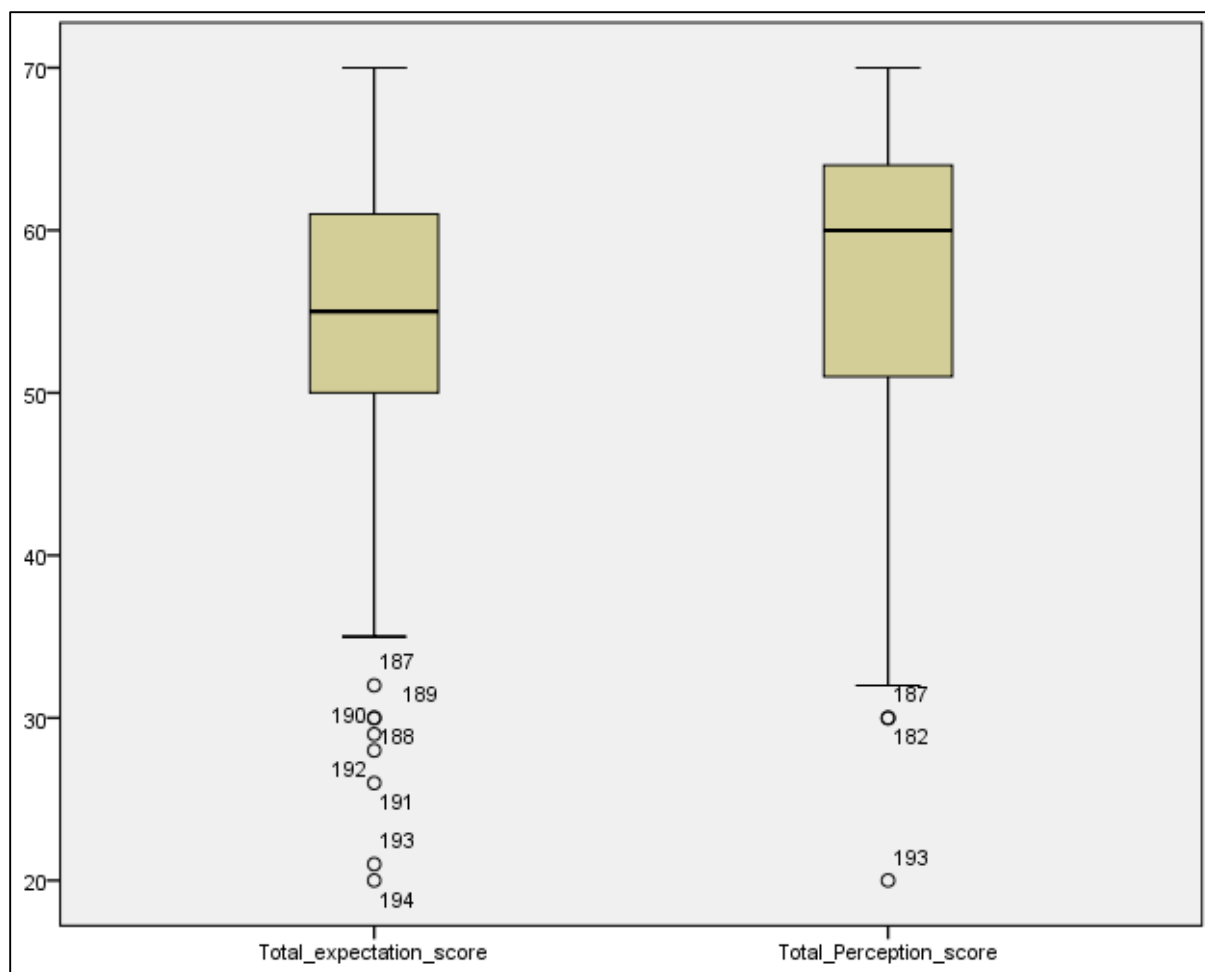


Figure 4.6: A box plot depicting distribution of expectation and perception scores for all items.

A paired-samples t-test was conducted to compare the total score for participant's expectations and perceptions. As presented in Table 4.11, the results of the paired-samples t-test reveal a significant difference in the mean of total scores for perception items ($M = 57.5$, $SD = 9.6$) and expectations items ($M = 54.6$, $SD = 10.6$) at $t(193) = 4.6$ and $P = 0.0001$. On average, the total perception score was approximately 2.9 points higher than the total expectation score, which indicates that CME program met the learning expectations of the HCPs.

Outcome	Total Expectation Score		Total Perception Score		n	95% CI for Mean Difference		
	M	SD	M	SD		r	t	df

54.6	10.6	57.5	9.6	194	1.65, 4.14	.628*	193*	193
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* P < 0.05.

Table 4.11: Descriptive statistics and t-test results for total expectation and perception scores.

Another paired-samples t-test was conducted to compare participants' expectation and perception scores for each item on the pre- and post-CME questionnaires (Table 4.12). The perception scores were significantly higher ($P < 0.05$) than the expectation scores for all the items except item 6. This indicates that the CME program met the learning expectations of the HCPs for all items except supporting materials. This table indicates that the use of supporting materials is an area that may require improvement because the learning expectations of the HCPs were not met for this item.

Outcome	Expectation Score		Perception Score		n	95% CI for Mean Difference	r	t	df
	M	SD	M	SD					
Address questions	5.3	1.302	5.62	1.109	194	0.175, 0.465	0.65*	4.35*	193
Address competencies	5.28	1.181	5.63	1.099	194	0.206, 0.495	0.60*	4.79*	193
Fair content	5.48	1.116	5.77	1.008	194	0.151, 0.426	0.59*	4.14*	193
Evidence of content	5.58	1.104	5.89	0.968	194	0.176, 0.453	0.56*	4.49*	193
Learn interactively	5.55	1.12	5.85	1.056	194	0.145, 0.443	0.53*	3.88*	193
Supporting materials	5.50	1.201	5.64	1.184	194	-0.026, 0.305	0.52	1.66	193
Solve cases	5.47	1.188	5.71	1.087	194	0.076, 0.398	0.50*	2.91*	193
Evidence to practice	5.5	1.188	5.79	1.064	194	0.126, 0.452	0.48*	3.49*	193
Performance barriers	5.46	1.139	5.77	1.04	194	0.148, 0.471	0.45*		193
Learning assessment	5.5	1.157	5.86	1.053	194	0.195, 0.516	0.48*	4.37*	193

* P < 0.05.

Table 4.12: Descriptive statistics and t-test results for expectation and perception scores for items

An interesting finding was noted regarding the participants' responses in terms of both expectations and perceptions of all items. The total scores of participants' expectations and perceptions were stratified according to the professions of the HCPs. The total scores of the participants' expectations and perceptions were compared using the paired-samples t-test. The results of the t-test (Table 4.13) showed the mean total perception scores of the doctors, nurses, and other HCPs were significantly higher than their mean total expectation scores ($P < 0.05$); however, this trend was not observed in the pharmacists. The CME programs did not meet the learning expectations of the pharmacists to the extent that they met the learning expectations of doctors, nurses, and other HCPs. These results indicate that the profession of the participating HCPs can affect the outcomes of the CME programs.

Outcome	Total Expectation Score		Total Perception Score		n	95% CI for Mean Difference	r	t	df
	M	SD	M	SD					
Doctors	57.7	10.4	59.5	9.2	67	0.06, 3.6	0.74*	2.06*	66
Nurses	52.9	10.5	56.5	10.5	93	1.6, 5.5	0.59*	3.6*	92
Pharmacists	55.4	7.3	55.6	7.2	19	-3.6, 4.1	0.39	0.12*	18
Other HCPs	49.0	12.9	56.4	7.5	13	1.02, 13.7	0.59*	2.5*	12

* $P < 0.05$.

Table 5.13: Descriptive statistics and t-test results for total expectation and perception scores stratified by profession.

4.2.4 Achievement of CME learning objectives stated by the organisers:

The second research question was as follows: To what extent, if at all, have the UAEU-accredited CME programs achieved the organisers' stated learning objectives?

To answer this question, the participants were asked to evaluate five objectives for each CME program by using a 5-point Likert scale (strongly disagree = 1 through strongly agree = 5). In total, 208 participants completed the evaluation of five objectives. To analyse the results, the responses of each participant for the five objectives were added to form a new variable that represented the evaluation of all objectives with the minimum and maximum scores being 5 and 25, respectively. Table 4.14 shows that the mean score is 20.4 (± 4.2). In terms of percentage, the four CME programs achieved 81.6% of the learning objectives stated by the organisers. Similar analysis for each CME program showed that programs 1 to 4 achieved 84.4%, 82.8%, 76.6%, and 76.6%, respectively, of the learning objectives stated by their organisers.

	CME Program 1	CME Program 2	CME Program 3	CME Program 4	All CME Programs
	74	59	24	51	208
Mean	21.1	20.7	19.4	19.4	20.4
SD	4.5	3.7	4.8	3.7	4.2
Median	21	20	20	20	20
Minimum	5	5	5	8	5
Maximum	25	25	25	25	25

Table 4.14: Descriptive statistics for the total scores for achievement of learning objectives of the CME program stated by the organizers.

4.2.5 Factors determining selection and attendance of CME programs:

In the pre-CME program survey, the participating HCPs were asked regarding the factors that encouraged them to register for the programs selected for this study. The questionnaire provided 10 options (factors) to the participants, and the HCPs could select more than one option. The last option was 'others'. In total, 276 responded to this question by selecting a single or multiple factors. Among the HCPs, 63.6% and 49.3% selected the need for CME hours to renew their license and the scientific content of the CME program, respectively. The CME program location, faculty, date, fee, schedule, and reputation of the organiser were selected by 29.5%, 11.3%, 17.9%, 12.3%, 11.9%, and 11.9%, respectively, of the participants. Location was a factor motivating 29.5% of the participants. They selected CME programs that were conducted near their residences.

HCP Motivation to Attend CME Programs	Count	Percentage
Need for CME hours	192	63.60%
Content	149	49.30%
Location	89	29.50%
Date	54	17.90%
Fee	37	12.30%
Schedule	36	11.90%
Reputation of organiser	36	11.90%
Faculty	34	11.30%
Invitation	25	8.30%
Other causes	5	1.70%

Note: N = 276

Table 4.15: Descriptive statistics for HCP motivation to attend the CME programs.

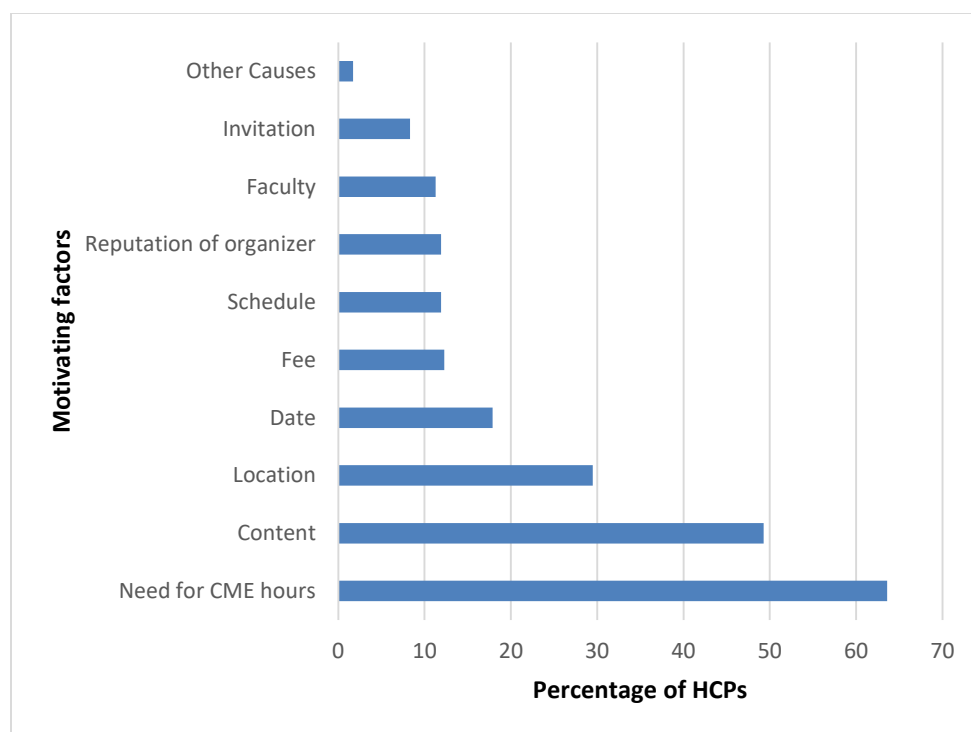


Figure 4.7: Bar chart for HCP motivation to attend the CME programs

The aim of this study was to determine the actual factors affecting the attendance of CME programs by HCPs. It determined whether HCPs only attended the programs for seeking CME hours or whether other factors also motivated them to attend the CME programs. We examined the number of participants who selected only one factor as their motivating factor and the percentage for each factor among this group. Table 4.16 shows that 121 participants (40.1%) selected only one factor. This group of factors includes only six selected factors. ‘Need for CME hours’ was predominantly selected as the only factor (by 49.6% of the participants), and the scientific content of the programs was the second most commonly selected factor (by 31.4% of the participants). The remaining four factors were collectively selected in total by 17.2% of the participants. CME program fee, schedule, and date were not selected by participants as the only factors motivating them to attend the programs.

HCP Motivation to Attend CME Programs	Count	Percentage
Need for CME hours	61	49.6%
Content	38	31.4%
Location	4	3.3%
Reputation of organiser	3	2.5%
Faculty	5	4.1%
Invitation	10	8.3%

Note. N = 121

Table 4.16: Descriptive statistics for HCPs who selected one motivation factor to attend the CME programs

Furthermore, the analysis of the two major groups (need for CME hours and CME content) according to the professions of the HCPs showed that 34 (representing 55.7%) among the 61 participants who selected ‘need for CME hours’ were nurses. The remaining participants were 11 doctors (18.0%), 10 (16.4%) pharmacists, and 6 (9.8%) other HCPs. Figure 4.8 illustrates the stratification according to profession, while Table 4.17 presents the descriptive statistics.

	Profession				Total
	Doctors	Nurses	Pharmacists	Other HCPs	
Need for CME hours only (Count)	11	34	10	6	61
% Need for CME hours only	18.00%	55.70%	16.40%	9.80%	100.00%
% Within profession	11.10%	26.60%	30.30%	35.30%	22.00%
% of total	4.00%	12.30%	3.60%	2.20%	22.00%

Table 4.17: Descriptive statistics for HCPs who selected only one motivation factor to attend the CME programs

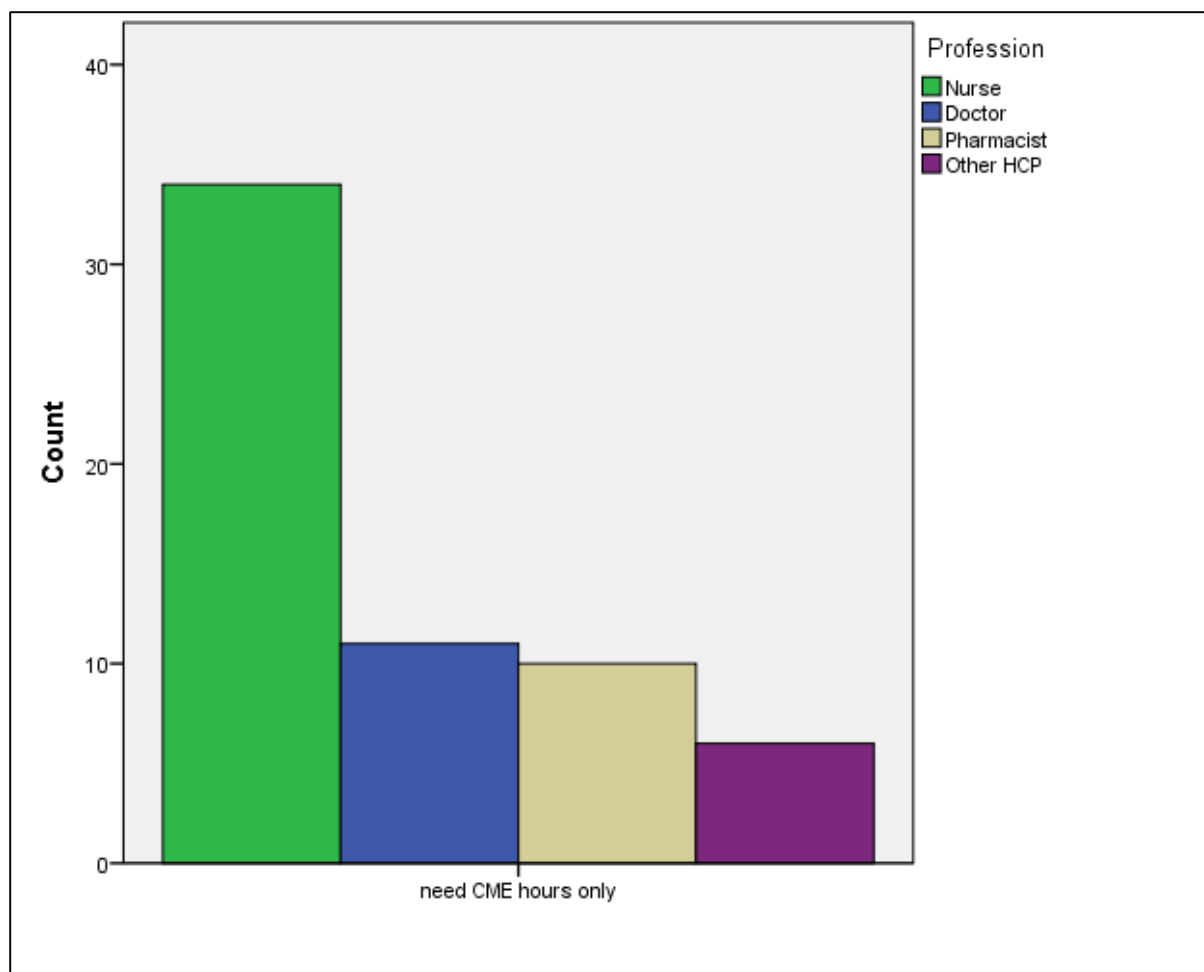


Figure 4.8: Percentages of professions of the participants who selected need for CME hours as the only motivation factor to attend the CME programs

A chi-square test of independence was performed to examine the relation between the nominal (categorical) CME participant's profession and the need for CME hours as the only reason for attending CME programs. The relation between these variables was significant, $\chi^2 (3, N = 61) = 11.46$, $P = 0.009$. Nurses were more likely to attend CME programs to seek CME hours than were HCPs of other professions (Table 4.18).

	Value	df	Asymp. Sig. (2-sided)
Pearson chi-square	11.462a	3	0.009*

Likelihood ratio	12.243	3	0.007
Linear-by-linear association	9.627	1	0.002
No. of valid cases	277		

* P < 0.05

Table 4.18: Chi-square test results for the relation between CME participants' profession and the need for CME hours as the only reason for attending CME programs.

By contrast, out of 38 participants who selected CME content as the only factor for motivation to select and attend the CME programs, the participants' profession distribution was as follows: 22 (59.5%) doctors, 11 (29.7%) nurses, and 4 (10.8%) pharmacists. Table 4.19 presents the results, and the bar chart in Figure 4.12 illustrates this stratification.

	Profession				Total
	Doctors	Nurses	Pharmacists	Other HCPs	
CME program content only	22	11	4	0	37
% Within CME program content only	59.5%	29.7%	10.8%	0.0%	100.0%
% Within profession	22.2%	8.6%	12.1%	0.0%	13.4%
% of total	7.9%	4.0%	1.4%	0.0%	13.4%

Table 4.19: Descriptive statistics for HCPs who selected one motivation factor to attend the CME programs.

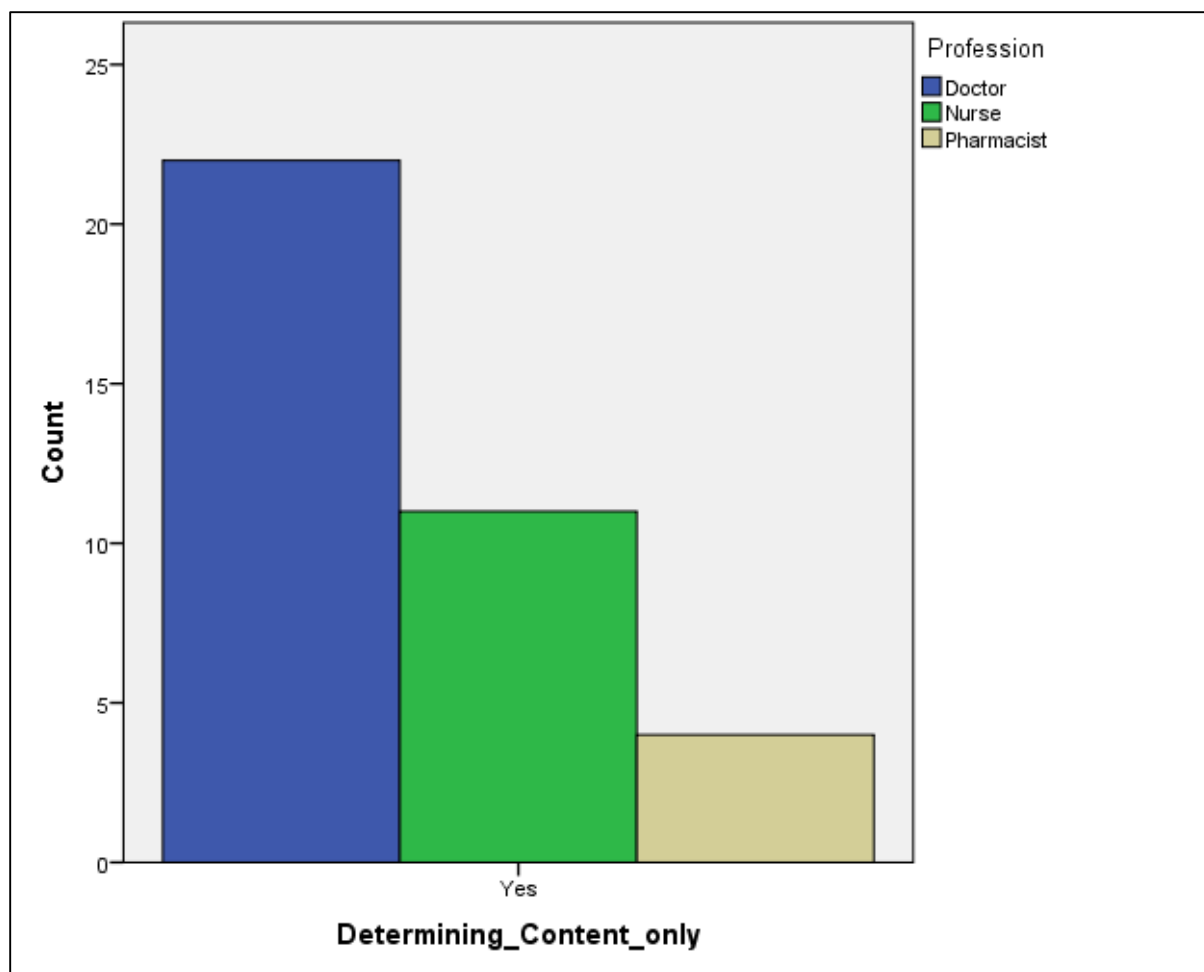


Figure 4.9: Percentages of professions of participants who selected program content as the only motivating factor to attend the CME programs.

A chi-square test of independence shown in Table 4.20 was performed to examine the relation between CME participants' professions and 'CME content' as only reason for attending CME programs. The relation between these variables was significant, $\chi^2 (3, N = 37) = 11.89$, $P = 0.008$. Doctors were more likely to attend CME programs based on the scientific content than were HCPs of other professions.

	Value	df	Asymp. Sig. (2-sided)
Pearson chi-square	11.897 ^a	3	.008*

Likelihood ratio	13.516	3	.004
Linear-by-linear association	8.263	1	.004
No. of valid cases	277		

* P < 0.05.

Table 4.20: Chi-square test results for the relation between CME participant's profession and CME program content as the only reason for attending CME programs.

4.2.6 Evaluation of CME speakers' performance:

As stated in the chapter on methodology, the total number of speakers in the four selected CME programs in this study was 17 (5, 5, 3, and 4 speakers in the CME programs coded 1, 2, 3, and 4, respectively). The speakers were evaluated after the CME program by asking the participants to respond to 10 items representing three aspects of speaker performance characteristics during the program. The participants responded using a 5-point Likert scale (from 1 to 5; representing strongly disagree through strongly agree, respectively). In total, 217 participants evaluated the speakers in the four CME programs, 68, 56, 26, and 67 participants in each CME program respectively. Some of these participants partially evaluated the speakers; however, only the participants who had responded to all 10 items were included in the analysis. Because each speaker was evaluated by each participant, the participants evaluated all the speakers in the CME program. To consider the evaluation of each speaker by each participant in each program, the value of N (Table 4.22, N = 292 in program 1) has been included in the analysis of speakers' performance.

Speaker evaluation includes three aspects: speaker style, consisting of three items with a total minimum and maximum scores of 3 and 15, respectively; presentation content, consisting of three items with a total minimum and maximum scores of 3 and 15, respectively; and the use of

presentation aids, consisting of four items with a total minimum and maximum scores of 4 and 20, respectively. The total minimum and maximum scores of the speaker were 10 and 50, respectively. In the descriptive analysis, the mean of the scores for the three aspects were 13.4, 13.5, and 17.8, respectively, these numbers equals to 89.3, 90, and 89 out of 100 respectively, and the total score for all categories was 44.6 (89.2 out of 100). Notably, 50% of the participants assigned the speakers >14 for speaker style and presentation content and >18 for the use of presentation aids. Hence, the total score was >45. Table 4.21 presents the evaluation of all speakers' in three aspects and the total scores, while Table 4.22 includes the descriptive statistics for the scores in the three speakers' evaluation aspects and total scores according for each CME program. Finally, Table 4.23 includes the descriptive statistics for each speaker evaluation aspect and total scores for each CME program. From the total scores, the speakers' performance in CME program 3 was higher than that in the other programs. In all three aspects, the speaker's performance in CME program 2 was lower than that in the other programs. In Table 4.23, in CME program 1, Speakers 1 and 4 had considerably low mean scores in the aspects speaker style (2.7) and speaker presentation (1.7), respectively. These findings indicate the need for the training of speakers to improve the outcomes of CME programs.

		Speaker Style Score*	Speaker Presentation Content Score*	Speaker Presentation Aids Score**	Speaker Total Score***
	N	845	845	845	845
Mean		13.4	13.5	17.8	44.6
Median		14.0	14.0	18.0	45.0
SD		1.77	1.67	2.37	5.38
Minimum		3.00	4.00	8.0	18.00
Maximum		15.00	15.00	20.0	50.0
Percentiles	25	12.0	12.0	16.0	40.0

50	14.0	14.0	18.0	45.0
75	15.0	15.0	20.0	50.0

Note. Maximum scores are *15, **20, and ***50

Table 4.21: Descriptive statistics for all speaker evaluation aspects and total scores.

		Speaker Style Score*	Speaker Presentation Content Score*	Speaker Presentation Aids Score**	Speaker Total Score***
CME Program 1	N = 292				
	Mean	13.4658	13.6632	17.7483	44.8893
	SD	1.84322	1.62417	2.61128	5.48814
CME Program 2	N = 250				
	Mean	13.2200	13.1960	17.5360	43.9520
	SD	1.79121	1.77601	2.37471	5.68356
CME Program 3	N = 73				
	Mean	13.6986	13.5479	17.8493	45.0959
	SD	1.46898	1.46288	1.98376	4.67904
CME Program 4	N = 230				
	Mean	13.4565	13.4913	17.9609	44.9087
	SD	1.72708	1.64474	2.14400	5.06598

Note. The maximum scores are *15, **20, ***50

Table 4.22: Descriptive statistics for speaker evaluation aspects and total scores for the four CME programs.

			Speaker Style Score*	Speaker Presentation Content Score*	Speaker Presentation Aids Score**	Speaker Total Score***
CME Program 1	N					
Speaker 1	63	Mean (SD)	2.7 (2.4)	13.1 (2.1)	17.0 (3.2)	42.9 (7.1)
Speaker 2	60	Mean (SD)	3.9 (1.5)	13.9 (1.5)	18.1 (2.4)	45.8 (4.9)
Speaker 3	59	Mean (SD)	13.8 (1.4)	13.7 (1.5)	17.9 (2.4)	45.4 (4.9)
Speaker 4	58	Mean (SD)	13.2 (1.8)	1.7 (2.5)	17.9 (2.4)	44.8 (5.0)
Speaker 5	52	Mean (SD)	13.9 (1.5)	13.9 (1.4)	17.9 (2.4)	45.8 (4.7)
CME Program 2	N					
Speaker 1	50	Mean (SD)	12.7 (2.06)	12.66 (2.1)	17 (2.7)	42.4 (6.5)
Speaker 2	52	Mean (SD)	14.2 (1.2)	14.0 (1.3)	18.4 (1.9)	46.6 (4.0)

Speaker 3	50	Mean (SD)	12.8 (1.7)	13.0 (1.7)	17.4 (2.3)	43.2 (5.6)
Speaker 4	49	Mean (SD)	13.0 (2.0)	13.0 (1.9)	17.4 (2.6)	43.4 (6.2)
Speaker 5	49	Mean (SD)	13.4 (1.6)	13.3 (1.6)	17.5 (2.2)	44.1 (5.1)
CME Program 3	N					
Speaker 1	25	Mean (SD)	13.7(1.4)	13.6 (1.4)	18.0 (1.9)	45.3 (4.5)
Speaker 2	24	Mean (SD)	13.7(1.6)	13.4 (1.7)	17.7 (2.2)	44.8 (5.3)
Speaker 3	24	Mean (SD)	13.8(1.4)	13.6 (1.4)	17.8 (1.8)	45.2 (4.4)
CME Program 4	N					
Speaker 1	58	Mean (SD)	12.9 (2.2)	13.1 (2.1)	17.5 (2.6)	43.5 (6.4)
Speaker 2	60	Mean (SD)	13.5 (1.6)	13.4 (1.4)	17.9 (2.0)	44.7 (4.5)
Speaker 3	55	Mean (SD)	13.6 (1.5)	13.8(1.3)	18.2 (2.0)	45.6 (4.5)
Speaker 4	57	Mean (SD)	13.9 (1.5)	13.7 (1.6)	18.3 (1.9)	45.8 (4.4)

Note. The maximum scores are *15, **20, and ***50

Table 4.23 Descriptive statistics for the speaker evaluation aspects and total scores in the four CME programs.

4.2.7 CME program evaluation:

The participants were asked to evaluate four dimensions of the CME programs that they attended namely content, impact, structure, and organisation. The CME program content was evaluated by asking participants to assess the value of the lectures, the value of clinical case presentations, and whether the CME program updated the participant's knowledge in a specific clinical topic. The CME program impact was evaluated using the participants' responses to four statements representing an improvement in knowledge, diagnostic skills, the use of diagnostic investigations, and teaching skills. The CME program structure was assessed using the participants' evaluation of length of the course, agenda, number of lectures , number of clinical cases presented in the program, lecture duration, and time given for discussion . Finally, course organisation was assessed using the participants' evaluation of the registration procedure, certification, food and beverages, and classroom facilities. The participants evaluated all the aforementioned items on a scale of 1 to 10 (representing minimum and maximum satisfaction,

respectively). In the four CME programs, 191 (88.7%) participants completed the evaluation part of the survey. Tables 4.24 through 4.27 present descriptive statistics for the four CME program evaluation score items. The mean of the scores for CME program content evaluation items ranged from 8.03 (80.3%) for the value of clinical case presentation in CME program 2 to 8.59 (85.9%) for the same item in CME program 1. The mean scores for the CME program impact evaluation items ranged from 7.7 (77%) to 8.5 (85%), while those for the CME program structure evaluation items ranged from 8.0 (80%) to 8.6 (86%). Finally, the mean scores for the CME program organising evaluation items ranged from 7.8 (78%) to 8.8 (88%).

		N	Percentiles								
	Variable		Mean	SE	Median	SD	Min	Max	25	50	75
CME Program 1	Value of lectures	70	8.46	0.20	9	1.66	1	10	8	9	10
	Value of clinical	71	8.59	0.19	9	1.63	1	10	8	9	10
	Specific topics	71	8.48	0.19	9	1.58	1	10	8	9	10
CME Program 2	Value of lectures	59	8.07	0.22	8	1.67	4	10	7	8	9
	Value of clinical	58	8.03	0.22	8	1.65	4	10	7	8	9
	Specific topics	57	8.05	0.22	8	1.66	4	10	7	8	9
CME Program 3	Value of lectures	28	8.36	0.24	8	1.28	5	10	8	8	9
	Value of clinical	28	8.46	0.23	9	1.23	6	10	8	9	10
	Specific topics	28	8.54	0.22	9	1.17	6	10	8	9	9
CME Program 4	Value of lectures	66	8.50	0.16	9	1.32	4	10	8	9	9
	Value of clinical	66	8.38	0.17	9	1.38	4	10	8	9	9
	Specific topics	65	8.31	0.18	8	1.44	3	10	8	8	9

Table 4.24: Descriptive statistics for the ‘content’ evaluation items of the four CME programs.

		N	Percentiles								
	Variable		Mean	SE	Median	SD	Min	Max	25	50	75
CME Program 1	Knowledge	72	8.5	0.2	9.0	1.6	1	10	8.0	9.0	10.0
	Diagnostic skills	70	8.4	0.2	9.0	1.7	1	10	8.0	9.0	10.0
	Diagnostic investigations	67	8.4	0.2	9.0	1.6	1	10	8.0	9.0	10.0
	Teaching skills	68	8.3	0.2	9.0	1.7	1	10	8.0	9.0	9.8

CME Program 2	Knowledge	58	8.0	0.2	8.5	1.7	3	10	7.0	8.5	9.0
	Diagnostic skills	58	7.7	0.2	8.0	1.8	3	10	6.8	8.0	9.0
	Diagnostic investigations	57	7.8	0.2	8.0	1.9	3	10	6.5	8.0	9.0
	Teaching skills	59	7.7	0.2	8.0	1.8	3	10	7.0	8.0	9.0
CME Program 3	Knowledge	28	8.6	0.2	9.0	1.2	6	10	8.0	9.0	9.8
	Diagnostic skills	28	8.4	0.3	8.5	1.4	4	10	7.3	8.5	9.8
	Diagnostic investigations	28	8.4	0.2	8.5	1.3	6	10	7.3	8.5	9.8
	Teaching skills	28	8.3	0.3	9.0	1.5	4	10	8.0	9.0	9.0
CME Program 4	Knowledge	65	8.3	0.2	8.0	1.4	3	10	8.0	8.0	9.0
	Diagnostic skills	65	8.0	0.2	8.0	1.6	3	10	7.0	8.0	9.0
	Diagnostic investigations	65	7.8	0.2	8.0	1.7	3	10	7.0	8.0	9.0
	Teaching skills	64	8.0	0.2	8.0	1.6	3	10	7.0	8.0	9.0

Table 4.25: Descriptive statistics for the ‘impact’ evaluation items of the four CME programs.

		n	Percentiles								
Variable		Mean	SE	Median	SD	Min	Max	25	50	75	
CME Program 1	Length of course	71	8.3	0.2	9.0	1.7	2	10	8.0	9.0	9.0
	agenda	71	8.5	0.2	9.0	1.5	2	10	8.0	9.0	10.0
	No. of lectures	70	8.5	0.2	9.0	1.6	2	10	8.0	9.0	10.0
	No. of clinical	72	8.5	0.2	9.0	1.6	2	10	8.0	9.0	10.0
	Duration	71	8.5	0.2	9.0	1.6	2	10	8.0	9.0	10.0
	Discussion time	70	8.6	0.2	9.0	1.5	3	10	8.0	9.0	10.0
CME Program 2	Length of course	58	8.1	0.2	8.0	1.7	3	10	7.0	8.0	9.0
	agenda	59	8.2	0.2	9.0	1.8	2	10	8.0	9.0	9.0
	No. of lectures	59	8.2	0.2	8.0	1.6	4	10	8.0	8.0	9.0
	No. of clinical	59	8.0	0.2	8.0	1.9	2	10	7.0	8.0	10.0
	Duration	58	8.2	0.2	9.0	1.8	2	10	7.8	9.0	9.0
	Discussion time	59	8.3	0.2	9.0	1.7	3	10	8.0	9.0	10.0
CME Program 3	Length of course	28	8.6	0.2	9.0	1.0	6	10	8.0	9.0	9.0
	agenda	28	8.6	0.2	9.0	1.1	6	10	8.0	9.0	9.0
	No. of lectures	28	8.6	0.2	9.0	1.1	6	10	8.0	9.0	9.0
	No. of clinical	28	8.6	0.2	9.0	1.1	6	10	8.0	9.0	9.0
	Duration	28	8.6	0.2	9.0	1.0	6	10	8.0	9.0	9.0
	Discussion time	28	8.6	0.2	9.0	1.0	6	10	8.0	9.0	9.0

CME Program 4	Length of course	65	8.4	0.2	9.0	1.5	4	10	7.5	9.0	10.0
	agenda	66	8.5	0.2	9.0	1.5	5	10	8.0	9.0	10.0
	No. of lectures	65	8.4	0.2	9.0	1.5	4	10	8.0	9.0	10.0
	No. of clinical	63	8.3	0.2	9.0	1.5	4	10	7.0	9.0	10.0
	Duration	64	8.5	0.2	9.0	1.6	3	10	8.0	9.0	10.0
	Discussion time	64	8.4	0.2	9.0	1.6	3	10	8.0	9.0	10.0

Table 4.26: Descriptive statistics for the ‘structure’ evaluation items of the four CME programs.

		n	Percentiles								
Variable			Mean	SE	Median	SD	Min	Max	25	50	75
CME Program 1	Registration	71	21.0	8.5	0.2	9.0	2.0	1	10	8.0	9.0
	Certificates	68	24.0	8.8	0.2	9.0	1.6	1	10	8.0	9.0
	Food	71	21.0	8.7	0.2	9.0	1.7	1	10	8.0	9.0
	Facilities	70	22.0	8.6	0.2	9.0	1.7	1	10	8.0	9.0
CME Program 2	Registration	59	12.0	8.3	0.3	9.0	1.9	2	10	7.0	9.0
	Certificates	57	14.0	8.4	0.2	9.0	1.6	4	10	7.0	9.0
	Food	56	15.0	7.8	0.3	8.5	2.2	2	10	7.0	8.5
	Facilities	57	14.0	8.0	0.3	9.0	2.1	2	10	7.0	9.0
CME Program 3	Registration	28	15.0	8.8	0.2	9.0	1.1	6	10	8.0	9.0
	Certificates	28	15.0	8.8	0.2	9.0	1.1	6	10	8.0	9.0
	Food	27	16.0	8.7	0.2	9.0	1.1	6	10	8.0	9.0
	Facilities	28	15.0	8.8	0.2	9.0	1.1	6	10	8.0	9.0
CME Program 4	Registration	65	31.0	8.5	0.2	9.0	1.6	1	10	8.0	9.0
	Certificates	60	36.0	8.5	0.2	9.0	1.3	4	10	8.0	9.0
	Food	65	31.0	7.8	0.3	8.0	2.2	1	10	7.0	8.0
	Facilities	66	30.0	7.9	0.2	8.0	1.9	1	10	7.0	8.0

Table 4.27: Descriptive statistics for the ‘organising’ evaluation items of the four CME programs.

The overall score (evaluation) for the CME programs was calculated as the addition of the scores for the four dimensions of evaluation for each program. The overall satisfaction mean was converted to a ratio of satisfaction out of 100 for simplicity. From Table 4.28, the overall satisfaction ratios were 85.8, 82.5, 85.4, and 81.6 for CME programs 1, 2, 3, and 4, respectively.

Programs 1 and 3 showed the highest scores in the four dimensions and the highest satisfaction ratios. Although Program 4 has a relatively high score for content, it has the lowest overall satisfaction score. This finding is interesting because ‘CME program content’ is the second most commonly reported factor motivating HCPs to participate in these programs.

		Content Evaluation*	Impact Evaluation**	Structure Evaluation***	Organising Evaluation**	Overall Program Evaluation****	Satisfaction out of 100
	n	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)	Score
CME Program 1	69	24.5 (4.8)	33.7 (6.2)	51.2 (9)	34.8 (6.9)	145.8 (25.2)	85.8
CME Program 2	57	24.2 (4.8)	31.6 (6.4)	48.8 (9.9)	23.9 (6)	140.2 (22.2)	82.5
CME Program 3	28	25.3 (3.6)	33.6 (5.2)	51.6 (6)	35 (4.3)	145.1 (18.1)	85.4
CME Program 4	65	25.1 (3.9)	32.1 (5.8)	50.5 (8.8)	32.7 (5.9)	138.7 (22.8)	81.6

Note. The maximum scores are *30, **40, ***60, and ****170

Table 4.28: Descriptive statistics for the dimension and overall satisfaction evaluation of the four CME programs.

The response of the participants to each evaluation item in Figure 4.10 indicates the percentage of participants dissatisfied with the item. From the figure, the highest percentage of participants were dissatisfied with the items teaching skills, diagnostic investigation, diagnostic skills, and classroom facilities. These data are valuable to the organisers of CME programs because the aforementioned items represent areas of improvement. The dissatisfaction with teaching skills once again indicates the need to provide training to speakers. Moreover, dissatisfaction with diagnostic investigation and diagnostic skills as well as classroom facilities indicates that course design and technological support are areas of improvement for the CME programs.

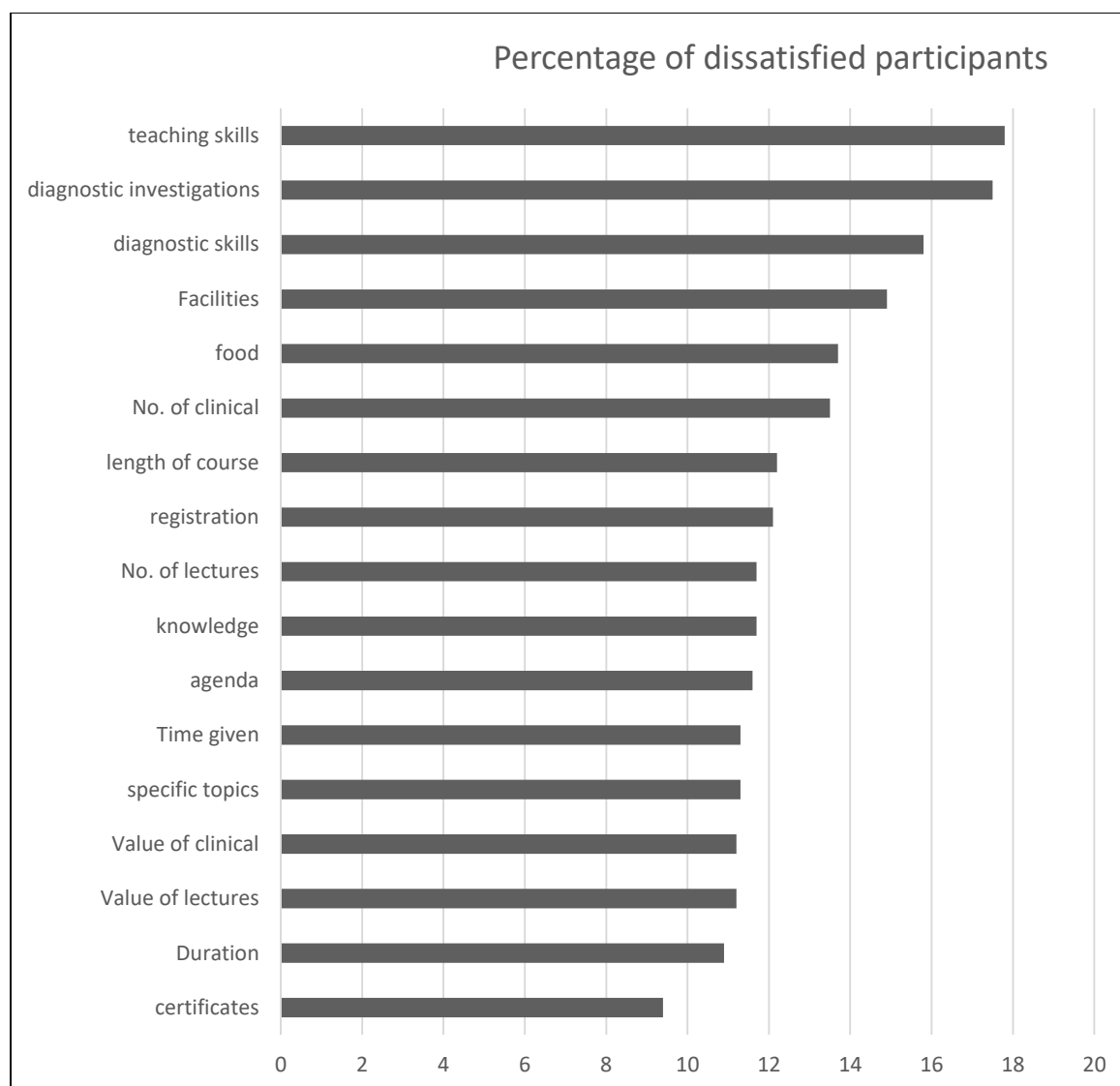


Figure 4.10: Percentages of dissatisfied participant's responses regarding the 17 evaluation items.

4.2.8 Change in CME audience knowledge:

The pre-CME knowledge questionnaire was distributed to all the participants, and 254 (84.1%) participants completed the pre-test exam. The post-test knowledge questionnaire was completed by 216 participants (71.5% of the attending participants). In total, 191 participants filled both the pre- and post-CME questionnaires completely. Because the aim of this study was to evaluate the

learning outcome of the CME program in terms of improvement in knowledge of the participants after attending the program, regardless of the topic, all the pre- and post-CME results were combined and analysed. The total mean pre- and post-CME scores (number of correct answers out of 5) were 1.8 and 3.1, respectively, for the four CME programs. From Figure 4.11, before the CME programs, the scores of 50% of the participants were between 0 and 2; however, after attending the programs, the upper limit of the participants' scores increased to 3. Furthermore, the scores of 50% of the participants increased from between 2 and 5 before the CME program to between 3 and 5 after attending the program. Hence, an improvement in knowledge is observed as an outcome of the CME program.

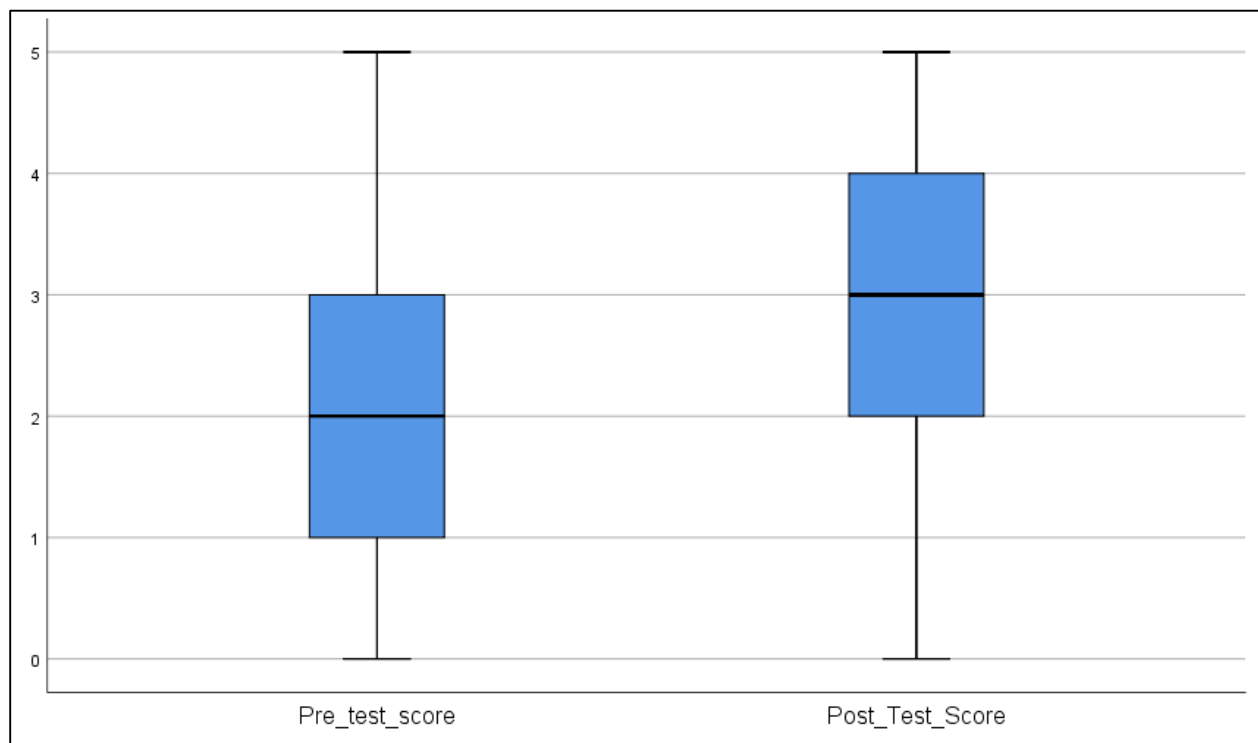


Figure 4.11: A Box blot for the Mean pre- and post-test scores of the participants attending the four CME programs.

A paired-samples t-test was conducted to compare the pre- and post-CME knowledge scores of the participants. The mean post-CME (3.1 ± 1.2) test scores were significantly higher than the pre-CME (1.7 ± 1.4) scores ($t [12.6] = 12.6$, $P = 0.0001$; Table 4.29).

Outcome	Post-test Score		Pre-test Score		n	95% CI for Mean		r	t	df
	M	SD	M	SD		Difference				
	3.07	1.22	1.78	1.37	191	1.09, 1.50		.404*	12.6*	190

* $P < 0.05$.

Table 4.29: Descriptive statistics and t-test results for pre-and post-CME knowledge test scores.

A paired-samples t-test was also conducted to compare the pre- and post-CME knowledge test scores of the participants stratified by their' profession. In all the groups, the post-CME scores were significantly higher than the pre-CME scores (Table 5.30). The increase in the scores ranged from 0.9 in the 'Doctors' group to 1.6 in the nurses group. Among the participants, the nurses, pharmacists, and other HCPs exhibited a relatively high improvement in knowledge compared with the doctors.

Outcome	Post-test Score		Pre-test Score		n	95% CI for Mean		r	t	df
	M	SD	M	SD		Difference				
Doctors	3.3	1.1	2.4	1.4	66	0.575, 1.182		0.552*	5.78*	65
Nurses	3.1	1.2	1.5	1.1	95	1.34,1.88		0.365*	11.8*	94
Pharmacists	3.1	1.3	1.7	1.4	15	0.257,2.54		-0.14	2.63*	14
Other HCPs	2.3	1.4	0.9	1.3	12	0.540,2.292		0.446	3.56*	11

* $P < 0.05$.

Table 4.30: Descriptive statistics and t-test results for pre- and post-CME knowledge test scores stratified by participants' profession.

To isolate the positive change in participants' knowledge, the responses to pre- and post-CME program knowledge questions were classified as shown in Table 4.31. The distribution and

percentage of each group are illustrated in Figure 4.12. This classification ends up with three major groups: group 1 includes: the similar results in pre- and post-test indicate that the knowledge did not change after the CME program, group 2: includes the positive change in knowledge, which includes the answers that were wrong or don't know before the CME program and became the right answer in the post-CME program test, and group 3: includes the negative effect of the CME program over participants' knowledge in which the answers were right before the CME program and became wrong or don't know after the program. The descriptive statistics for the previous groups showed that 54.6% of the answers were provided by group 1, 31.6% in group 2, and 13.8% in group 3. As listed in Table 4.31 and illustrated in the bar chart of Figure 4.13.

Knowledge Change Group	Pre-CME Answer	Post-CME Answer	Frequency	Percentage
No change in knowledge	Right	Right	287	30.1
	Wrong	Wrong	194	20.3
	Don't know	Don't know	34	3.6
	Wrong	Don't know	6	0.6
				54.6
Total				
Positive change in knowledge	Wrong	Right	165	17.3
	Don't know	Right	137	14.3
				31.6
Total				
Negative change in knowledge	Right	Wrong	53	5.5
	Right	Don't know	1	0.1
	Don't know	Wrong	78	8.2
				13.8
Total				
Grand total			955	100.0

Table 4.31: Descriptive statistics for the participant's answers to pre- and post-CME knowledge questions.

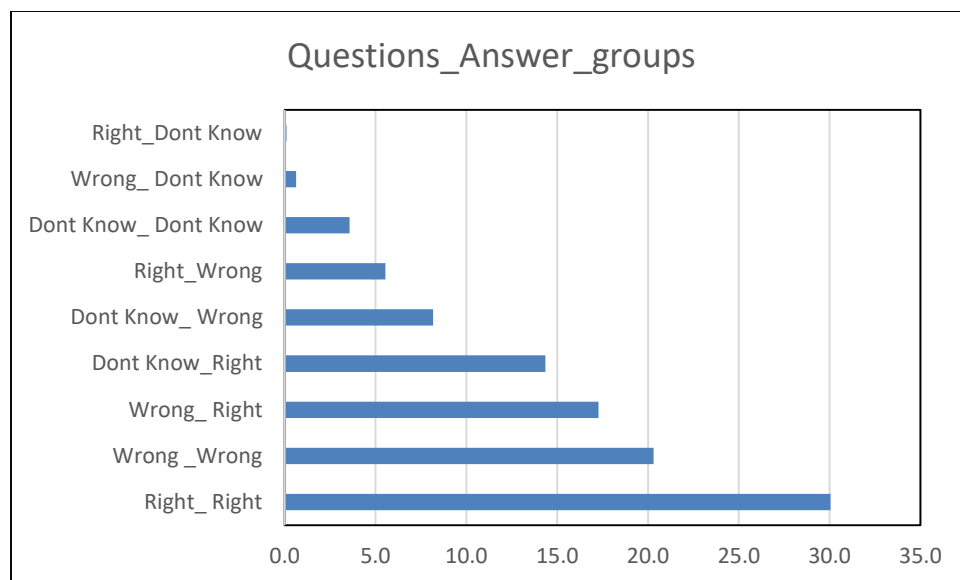


Figure 4.12: Combinations of the pre- and post-CME responses of the participants.

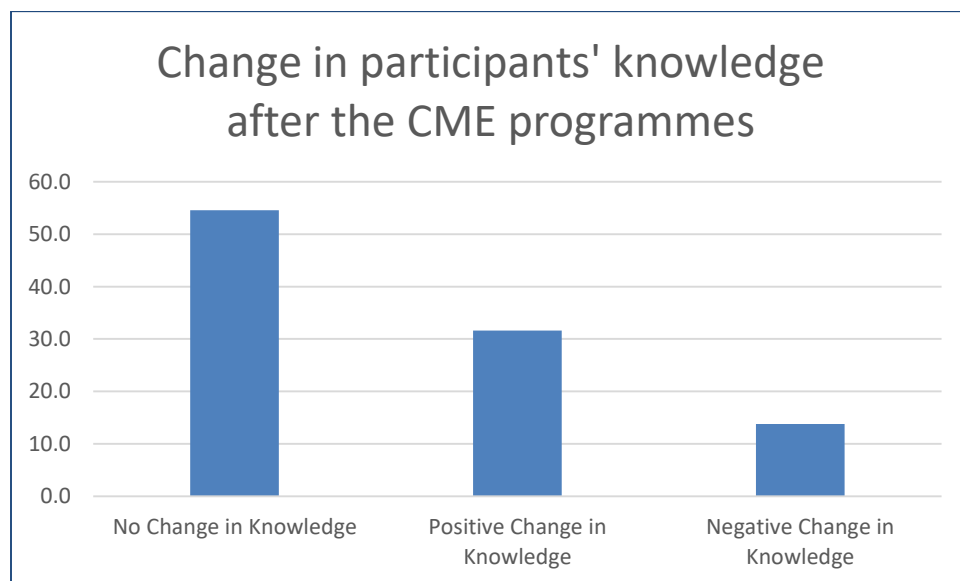


Figure 4.13: Change in participants' knowledge after the CME programs.

Further analysis was conducted over the change in the participants' knowledge groups after the CME program to compare the change in knowledge groups by participant's profession. Cross tabulation shown in Table 4.32 results showed the positive change in knowledge among the profession groups; 24.8%, 35.4%, 38.7%, and 32% of doctors, nurses, pharmacists, and other

HCPs, respectively, showed a positive change. Across HCP professions, the percentage of participants in the ‘no change’ group was the highest. The extent of positive change is a positive learning outcome of the CME programs and an indication that the participants’ knowledge has improved due to the programs. Accordingly, the knowledge of nurses, pharmacists, and other HCPs appears to have improved due to the CME programs.

		Change in Knowledge			
Profession		No change	Positive change	Negative change	Total
Doctor	Count	212	82	36	330
	% within profession	64.2%	24.8%	10.9%	100.0%
Nurse	Count	243	168	64	475
	% within profession	51.2%	35.4%	13.5%	100.0%
Pharmacist	Count	30	29	16	75
	% within profession	40.0%	38.7%	21.3%	100.0%
Other HCPs	Count	25	22	13	60
	% within profession	41.7%	36.7%	21.7%	100.0%
Total	Count	510	301	129	940
	% within Profession	54.3%	32.0%	13.7%	100.0%

Table 4.32: Cross tabulation for participants’ profession and change in knowledge after the CME programs.

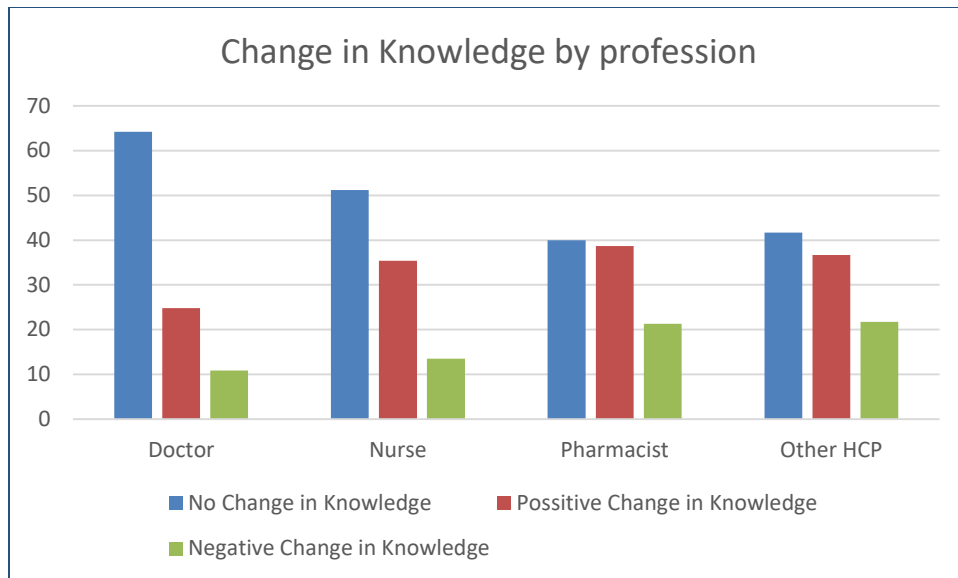


Figure 4.14: Clustered bar chart for change in knowledge after CME programs by participant profession.

The relationship between the need for CME hours being the only factor motivating participants to attend the CME programs and the change in the knowledge of these participants after the programs. The cross tabulation by using both variables, change in knowledge as the dependent variable and the need for CME hours as the independent variable, showed that among the 185 questions answered by participants who attend the CME program only to claim CME hours, 60 (32.4%) questions were related to positive change in knowledge. The bar chart in Figure 4.15 depicts all percentages in the three groups. A chi-square test was performed and no relationship was found between CME hours needed by participants being a determining factor for attending CME programs and the change in participants' knowledge after the programs, $\chi^2 (2, N = 185) = 2.06, P = 0.356$.

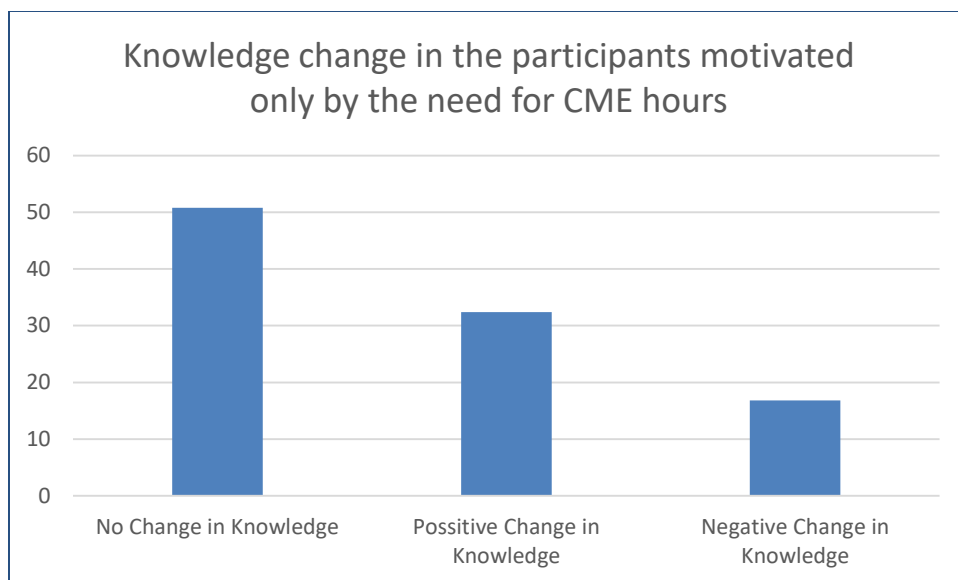


Figure 4.15: Bar chart depicting the change in knowledge after CME programs based on the questions answered by the participants for whom the need for CME hours was the only determining factor for attending the programs.

4.2.9 Other questions related to HCP knowledge acquired from CME programs:

The participants were asked to provide an estimate (in percentage) of the new knowledge in the content of the CME programs evaluated in this study. From Table 4.33, the mean estimate of new content was 55.56% ($\pm 23.59\%$).

	N	Mean	SD	Minimum	Maximum
% New content	196	55.56	23.59	0	100

Table 4.33: Percentage of the new knowledge in the content of the CME programs estimated by the participants.

Participants were asked about patient management as follows: If disease management was discussed in this activity, what is the approximate percentage of your patients that you would manage for the disease(s) discussed in this activity? From Table 4.34, the mean percentage of patients (estimated by the participants) who may benefit was 59.93 with a SD of 24.8.

	N	Mean	SD	Minimum	Maximum
Patient management	149	59.93	24.8	2	100

Table 4.34: Descriptive statistics for the estimated percentage of patients with the disease(s) discussed (in the CME programs) managed by the participants

The participants were asked if they expect that their management strategies to change based on their new learning acquired from the CME programs. The participants provided responses by using a 7-point Likert scale (the scores 1 and 7 represent the minimum and maximum scores, respectively). From Table 4.35, the mean for strategy change score was 5.28 with a SD of 1.232.

	N	Mean	SD	Minimum	Maximum
Strategies change	194	5.28	1.232	1	7

Table 4.35: Descriptive statistics for the expected strategy change in the participants' workplace based on CME program learning

The participants were asked if they would to share the experience and information obtained from the CME program with their colleagues at workplace. The participants provided responses by using a 7-point Likert scale (the scores 1 and 7 represent the minimum and maximum scores, respectively). From Table 4.36, the mean score for intention to share the experience obtained from the CME programs at the participants' workplace was 5.84 with a SD of 1.082.

	N	Mean	SD	Minimum	Maximum
Intentions to share CME experience	204	5.84	1.082	1	7

Table 4.36: Descriptive statistics for the participants' responses for intention to share CME program learning at their workplace.

4.2.10 Barriers to transfer of learning from CME to the workplace:

To explore the barriers anticipated by the participants in implementing the new learning from the CME program experience in their workplace, the participants were asked to select from a list of five expected barriers and the sixth option was 'other'. The participants were informed that they could select more than one choice. In total, 187 participants responded to this question, and 134 (71.6%) of them selected one barrier, 38 (20%) selected two barriers, and the remaining selected up to five barriers. Figure 4.16 shows the percentages of each selected barrier. The results showed that the need for training, patient non-compliance, and insurance cost were the major barriers; these barriers were selected by 95% of the participants.

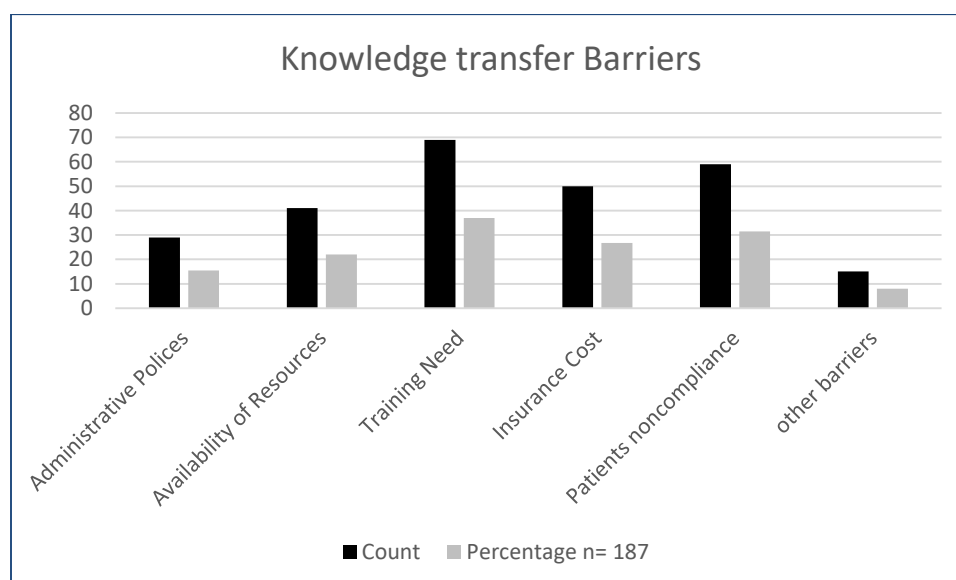


Figure 4.16: Bar chart for the barriers anticipated by participants in implementing CME learning in their workplace.

4.2.11 Summary:

Data of the demographic characteristics as well as the HCPs' perceptions on various aspects of the CME programs, including meeting their learning expectations, evaluation of the content and impact of the CME programs, and barriers to the transfer of new learning to the workplace, were collected. These data provided insights into the viewpoint of participating HCPs regarding the CME programs offered to them and the factors affecting their participation in these programs. In addition, the analysis of data revealed the outcomes of the CME programs in terms of changes in the knowledge and workplace behaviour of the HCPs.

The participating HCPs were mainly aged between 25 and 50 years; this is likely to be the age interval consisting of actively practicing HCPs. They attend the CME programs to renew their licenses to practice and retain their jobs. Furthermore, an almost equal proportion of Arab and non-Arab nationals participated in the CME programs. Nurses constituted the majority of HCP participants. The HCPs, particularly nurses, attended the CME programs primarily because they required CME hours. The second most common reason for HCPs, particularly doctors, to attend the programs was new content. These data answered the research question regarding the factors motivating the HCPs to participate in the CME programs. The demographic data enabled the stratification of the motivating factor data according to profession.

The research question whether the CME programs met the learning expectations of the HCPs was answered by comparing the pre- (expectation) and post-CME (perception) program scores assigned by the HCPs to statements about the functions of the program. The mean post-CME

scores were (82.1% vs 78%) significantly higher than the mean pre-CME scores. The analysis showed that the learning expectations of at least 50% of the participants were met. However, the data also showed that the learning expectations of the pharmacists (among the participating HCPs) were not met probably because pharmacists require CME programs that are highly specific to their work to renew their licenses. The research question regarding the achievement of program objectives stated by the organisers required the HCPs to rate the fulfilment of these goals using a 5-point Likert scale. According to the participants' responses, CME programs 1 to 4 achieved 84.4%, 82.8%, 76.6%, and 76.6%, respectively, of the stated objectives.

The HCPs also evaluated the CME programs in the domains of content, impact, structure, organisation, and speaker performance to answer the research question regarding their satisfaction with the programs in these domains. The results revealed that the overall satisfaction ratios were 85.8, 82.5, 85.4, and 81.6 for CME programs 1, 2, 3, and 4, respectively. However, low satisfaction with teaching skills of the speaker and the use of supplementary material indicate the need for training speakers to conduct high-quality CME programs. These data provide some answers to the research question regarding the strengths, weaknesses, and areas of improvement of the CME programs.

The learning outcomes of the CME programs were assessed using the pre- and post-CME test scores. Overall, the mean post-CME scores were significantly higher than the mean pre-CME scores (3.1 vs 1.8 out of 5), which indicated a positive change in knowledge. According to the HCPs' ratings, new content comprised 55.56% of the CME course content. Moreover, the HCPs' ratings revealed that they believed that the newly acquired knowledge would affect their management of approximately 60% of their patients. The data of learning outcomes provided

answers to the research question regarding the change in knowledge of the participants on the topics covered in the CME programs.

4.3 Analysis of and findings from qualitative data:

4.3.1 Introduction:

In this study, 14 purposefully sampled HCPs who attended the UAEU-accredited CME programs, consisting of 8 physicians, 4 nurses, 1 laboratory technician, and 1 research assistant, were interviewed. The semi structured interviews were conducted in a conversational format, where the participant was free to answer according to his own view instead of that of the interviewer. The questions asked in the interview were pertaining to the research questions. The main aim of this section of the study was to determine the effectiveness of the CME programs and assess how they help to improve the knowledge among healthcare professionals. The data obtained from the interviews were thematically analysed. For qualitative analysing of the data, the themes and subthemes related to the research questions were obtained from the interview transcripts. The subthemes in this study consisted of some predetermined subthemes as well as those that emerged from the data (collected during the interviews).

The following are the themes and subthemes collected from the transcripts:

Benefits of CME programs	Updating knowledge
	Less time-consuming
	Increase CME hours for licensing
Professional development of HCPs	Implementation of new knowledge
	Improvement of skills

Medical science advancement	Improved knowledge regarding infection control
	Increased knowledge regarding first aid care
	Enhanced knowledge regarding the treatment of diseases
	Latest knowledge regarding stem cells and their uses in human bodies
Practical advantages of CME programs in healthcare systems	Easy to understand diagnosis of patient
	Better health education
	Patient–nurse interaction
	Improvement in basic life-support methodologies
Most innovative CME program	Cancer program
	Understanding of the patient behaviour
	Cardiology
	ECG in paediatrics
	Advance dermatology treatment
	Diabetes-related education
	Updated information about respiratory medicine
	Meetings by pharmaceuticals companies targeting specific individuals
Barriers in implementing knowledge	Decision of the management and policy of the organisation
	Parents' approval for children's medication
	High cost of equipment

	Lack of information sharing
	Reluctance towards adopting change
	Unavailability of new equipment
Obstacles in attending CME programs	Inconvenient program timings
	Lack of paid leave
	Duration of the program
	High cost of CME programs and conferences
	Lack of focus on specific group
	Inability to attend CME programs on weekdays
	Inconvenient location
Suggestions to improve CME programs	Use of statistical data
	Interactive lectures
	Teaching school nurses
	Lectures by highly experienced doctors
	Reduction in the fees of CME programs
	Active clinical workshops
	Availability of online CME certification
	Contribution from the private sector
	Encouraging HCPs to pursue higher studies
Views on specialised CME program	Not helpful if focused on individual development
	Helpful if focused on groups
Change in patient outcome	Accurate diagnosis of the problem

	High satisfaction of patients
	Identification of appropriate treatment

Table 4.37 List of qualitative data themes and subthemes collected from the transcripts.

4.3.2 Benefits of CME programs:

Owing to advancements in technology, HCPs are expected to be aware of the latest developments in healthcare. During interviews, all the respondents agreed that the CME programs provided benefits. Most HCPs (or interviewees) stated that the programs enable them to update their knowledge. For example, Participant 4, a doctor, noted that some of the knowledge provided in CME programs is new and updated. Participant 1, a haematology laboratory technician, stated that “CME programs considerably reduce the time required obtaining updated knowledge”. Participant 5, a doctor, said that “CME programs improved the knowledge of doctors because the programs are a means by which experienced and renowned doctors share their practical knowledge with the participants”. This knowledge is more useful than the theoretical knowledge obtained from books. CME programs and conferences enrich the knowledge of medical professionals and enable an organisation to become innovative and to develop competencies that provide an edge over its competitors. Furthermore, Participant 7, a CME professor, said that “CME programs are necessary for doctors to update their knowledge regularly primarily because medical science is a rapidly evolving field and doctors may not find time to read about and search for information on new developments”. Moreover, HCPs need CME hours to obtain the HADD license. Nurses and doctors require approximately 20 and 40 CME hours, respectively, to renew their HADD license.

Thus, CME programs are associated with many benefits. In the present scenario, most HCPs experience time constraints; consequently, they may not be able to read books, journals, and websites to learn about new technology and advancements in the field of science and medicine. Therefore, CME programs provide HCPs with opportunities to enhance their knowledge on various subjects without spending much time. However, some HCPs attend these programs only to claim CME hours. CME certification tests should be conducted to discourage attendance solely for claiming CME hours.

4.3.3 Professional development of HCPs:

In the current study, at a personal level, HCPs implemented the skills and techniques that they learnt in the CME programs. Participant 3, a school nurse, said that “HCPs can apply the information obtained from CME programs when they are attending to their patients”. Increase in knowledge supports the HCPs in the achievement of their professional goals. It also contributes to the progress of their workplace or work environment. Technologically sound and progressive professionals provide high-quality service to patients. Participant 1, a haematology laboratory technician, noted that CME programs improve the knowledge and skills of laboratory technicians because they could predict what they are likely to detect in the patients’ blood samples based on the doctor’s impression.

Most of the CME programs are not specific. They are common for all the HCPs, irrespective of whether the HCP is a doctor or a lab technician. Hence, every attending HCP is exposed to various topics, which increases the skills and knowledge of the attendees.

4.3.4 Medical science advancement:

CME programs have benefitted many HCPs in numerous ways. For laboratory professionals, these programs enhanced their knowledge about laboratory skills and helped them in understanding some medical conditions. Participant 1 reported that “some CME programs provide information regarding the clinical features and management of some diseases. Laboratory technicians can correlate clinical details with corresponding laboratory data to obtain a complete picture of the disease”. A CME program was also conducted for enhancing knowledge and awareness about infection control. Participant 2, a hospital nurse, reported that “the aforementioned CME program prepared the attendees to control infections in hospitals through a sufficient number of practice sessions”. Participant 3 reported that a CME program on first aid was relevant to school nurses because “they are primarily required to administer first aid to students”. CME programs also enhance the knowledge about the treatment of some conditions and diseases. Participant 4 reported that a CME program was conducted to provide updated information regarding the treatment of conditions such as “fractures and hypertension, diabetes, bronchial diseases, asthma, coronary diseases, and other chronic diseases”. A workshop was also conducted to provide information on stem cell techniques. Participant 9, a research nurse, stated that “a CME program on the latest trends in diabetes management provided knowledge regarding the use of stem cell techniques”. Stem cell techniques are being successfully used to treat patients in some hospitals in the UAE. Patients who enquire about the latest methods of diabetes treatment are informed about the stem cell technique.

The medical science is a rapidly advancing field, and new techniques and instruments are constantly being designed. Different approaches can be used to treat the same disease; hence; HCPs must be familiar with the latest and most effective treatment procedures and medicines.

4.3.5 Practical advantages of CME programs in healthcare systems:

A majority of the interviewed HCPs stated that CME programs facilitated their understanding of the diagnosis of diseases and provided advanced health education. Participant 1 noted that knowledge gained from CME programs “can be applied at the workplace”. For example, information from CME programs on cancer can enable HCPs to improve their diagnostic skills. CME programs also engender behavioural changes in participants. In the current medical scenario, HCPs must have updated knowledge to take correct decisions. Participant 2 reported that “CME programs facilitate the HCPs’ understanding of patient behaviour”. In addition, some CME programs comprised workshops related to stress and anxiety management. Psychological training is crucial for HCPs while interacting with patients and while performing clinical studies. Participant 4 stated that CME programs also “improved specific skills such as those required for basic life-support procedures and treating fractured bones appropriately”.

Hence, most interviewees attended CME programs to claim CME hours and applied the new knowledge to their practice and workplace behaviour. This also shows the willingness of HCPs to learn and apply new skills.

4.3.6 Most innovative CME program:

The CME programs are conducted at different venues and on different topics. Most of the respondents attended the programs in different places; therefore, they have different opinions about the most innovative CME program. For a lab technician working in the haematology department, the program about cancer awareness and its treatment was the most innovative program. The number of cancer patients is high and advancements in medical science facilitate early detection. This particular program improved the interviewee’s diagnostic skills and knowledge regarding cancer. However, for a hospital nurse, the most innovative program was the

program related to the behaviour of patients and strategies to handle distressed patients. One of the interviewees who was a school nurse noted that working in school health departments is different from working in hospitals because schools are mainly focused on children and their first aid needs. Therefore, these programs have helped the school nurse to stay abreast of the hospital situation and provide new information about topics such as cardiology. Participant 10, a paediatrician, stated that “the most innovative program was that on ECGs in paediatrics”. Participant 12, a hospital nurse, stated that “CME course on dermatology provided new and updated information on advanced treatments”.

An examination of the interview transcripts revealed that a program offering any new knowledge on common diseases is also considered innovative by the attending HCPs because it provides a different approach to treat the disease. Pharmaceutical companies organise CME programs to disseminate information regarding specific drugs for treating specific diseases.

4.3.7 Barriers in implementing knowledge:

Generally, change is not easily accepted; however, medical science is a dynamic and constantly changing field. In this study, respondents have mentioned various barriers in implementing the knowledge obtained from CME programs. The most common obstacle is the organisational management. According to the respondents, implementing the latest knowledge in the field requires time because every organisation or hospital has its own rules and regulations. Participant 5 stated that “HCPs working in an organisation cannot always implement updated methods or obtain new instruments because the organisation takes time to make changes”. In some cases, although the organisational management may be willing to accept the change in methods and technology, the necessary latest equipment, presented in the CME programs, may not be

available. Furthermore, nurses, doctors, and general practitioners are subject to local guidelines. The context of practice, whether private or public, and the rules and protocols that practitioners are expected to follow must be considered. Participant 10 noted that the “ministries of health of different countries have different regulations in accordance with the culture and policies of that country. Moreover, in the school scenario, medical professionals are not allowed to treat children without obtaining consent from their parents. This prolongs the treatment because HCPs have to explain the treatment to the parents before proceeding with it”. In some cases, the implementation of the technology introduced through CME programs can add to the overall expenses of hospitals, which includes high cost of equipment, cost of staff education, and establishment. An interviewee said that apart from the organisational management and cost, other obstacles such as “the lack of information sharing, reluctance towards adopting change, and unavailability of new equipment hinder the implementation of technology and techniques introduced through CME programs”. Several interviewees reported their inability to share the information obtained from CME programs in their workplaces because their colleagues lacked interest in acquiring new knowledge. In addition, reluctance to accept change was one of the barriers in implementation.

4.3.8 Obstacles in attending CME programs:

Most HCPs agreed that they faced difficulties while attending CME programs. The timing of the programs is one of the major issues. Respondents need to adjust their work schedule or take leave to attend CME programs. Adjusting work schedules is difficult for HCPs who work on weekdays and in shifts. However, some interviewees prefer to attend these programs on weekdays because they want to spend weekends with their respective families. Educational leave is not easily available for attending CME programs. Moreover, these medical programs are not

free of cost, and attending CME programs that are conducted at venues far away from the HCPs' residences further increases the expenditure incurred by the HCPs. Participant 13 stated that in Abu Dhabi or Dubai, HCPs are unlikely to spend time and money to claim a few CME hours or obtain useful knowledge. Furthermore, some of the respondents want these programs to be focused on specific groups. Participant 12, a hospital nurse, stated that "some CME courses are not suited to the education levels and professions of all the attending HCPs because the attendees include doctors, GPs, doctor specialist, consultants, nurses, and technicians". Consequently, all the participants may not be able to understand the content of the lecture. Thus, the duration of the program, location, timing, and availability of leave play crucial roles in the attendance of CME programs by HCPs.

4.3.9 Suggestions to improve CME:

HCPs belonging to different professions provided various recommendations for improving the quality of CME programs. A laboratory technician and nurse suggested the use of statistical data and interactive lectures to facilitate understanding of the topic. They also suggested that dynamic speakers who interact with the audience be invited to ensure two-way communication during CME sessions. Meanwhile, those working in school health departments suggested that specialised programs providing detailed information on first aid and cardiopulmonary resuscitation be conducted. Most respondents also suggested that active clinical workshops to facilitate the understanding of theoretical concepts be organised. In addition, pre-and post-CME tests will enable self-assessment of knowledge change by participants. Participant 13 noted that "most hospitals focus on sending doctors, nurses, and HCPs in their own fields to obtain advanced knowledge and on the achievements of the aforementioned categories of HCPs".

Moreover, some of the interviewees perceived that effective CME programs can be conducted by experienced doctors. The reason for this recommendation is that experienced doctors have ample knowledge and are updated with the latest information. Thus, they will be able to explain topics lucidly by stating examples from their professional life experiences.

It was also suggested that the cost of the mandatory CME programs should be incurred by the hospitals. This will not only help the hospital staff to gain information but also lead to its adoption for the improvement of the current hospital scenario. Participant 6 stated that “clinical workshops are a more interesting and dynamic means of disseminating information than are lectures and seminars”. Furthermore, private companies working in healthcare should be encouraged to conduct CME programs to provide knowledge to non-HCPs as well as HCPs.

4.3.10 Views on specialised CME programs:

The interviewees provided contradictory responses to this question; some interviewees were satisfied with programs targeting mixed groups, whereas some others were dissatisfied.

4.3.10.1 CME program having a mixed group of practitioners:

Some interviewees preferred to have common CME lectures, in which all the medical staffs work as a team. This arrangement is expected to facilitate the understanding of a problem from various perspectives because every department handles the same case using different approaches. Participant 1 said that the mixed group arrangement allows laboratory technicians, pharmacists, and nurses to work together as a team. Furthermore, some interviewees wanted interactive lectures targeting all the medical professionals including doctors, nurses, pharmacists, and laboratory technicians. This type of program can be beneficial because it can facilitate the understanding of various topics concerning different medical departments and assists in clearing

doubts. Some interviewees shared the medical information that they newly acquired from CME programs with the rest of their colleagues. This medical information may involve various subjects including neurology, cardiology, or dermatology. Moreover, a minimum number of CME hours is mandatory for every HCP in the UAE to obtain or renew HADD license. Participant 2 stated that a mixed group enables HCPs from different professions gain knowledge about other related healthcare professions. This improves the general awareness of HCPs regarding healthcare. If CME programs are organised specifically for each group of HCP, then all the HCPs may not be able to claim the required CME hours. Furthermore, finding speakers on very specific and narrow topics is difficult. The general CME events are concerned with safety measures, management, incubational health, risk management, and quality, which are common for all HCPs (from medical and clinical departments). Instead of considering the individual groups that attend the lectures, each lecture should emphasise a specific topic and explain that topic in detail.

4.3.10.2 CME program concerning an individual group:

The results of the study show that most HCPs are interested in specific and not general CME programs. These HCPs believe that conferences for every category of the HCPs and not multi-speciality conferences should be conducted. In conferences including all groups of HCPs, some of the participants may not be able to understand the topic being discussed; consequently, they may be unable to achieve the learning goal. Participant 10 stated that “every category of HCPs should have its own conference”. The level or type of discussion and presentation for nurses is different from that for doctors. A mixed group comprising HCPs from different levels (professors, junior doctors, senior doctors, students, or nurses) will always have a fraction that is unable to benefit completely from the program. For instance, if the subject of the CME program

is relevant to doctors, then the remaining participants may not be able to relate to the discussion. The type of presentation and discussion also varies with different groups. All HCPs may understand the basics of medical science, but they cannot be expected to understand each topic in detail. Participant 3 noted that in a mixed session for doctors and nurses, only the doctors actively participate in the discussion because the nurses are unable to understand the topic. Hence, the nurses are passively involved in the discussion. Furthermore, CME programs and conferences are associated with fees; hence, attending a program that is not helpful to an HCP wastes time and money. The only benefit of attending such a CME program is CME hours, and no relevant knowledge is obtained. In this study, senior doctors, junior doctors, medical students, nurses, lab technicians, and pharmacists attended the CME programs. To provide the complete benefit of the program to the audience, subspecialisation is necessary, and each subgroup of HCPs should have its own conference. The program should be tailored according to the audience to ensure its effectiveness. This will enable the participants to interact freely with the speakers and discuss the topic.

4.3.11 Change in patient outcome:

The results of this study reveal that the four UAEU-accredited CME programs improved the knowledge of the attending HCPs. In addition, these programs improved the patient outcomes. When questioned (during the semi structured interview) regarding the effectiveness of CME programs in terms of patient outcomes, Participant 2 expressed a high level of satisfaction. These programs also facilitated accurate and early diagnosis of diseases by the HCPs. The HCPs expressed moderate-to-high levels of willingness to apply the information obtained from the CME programs in the clinical setting as well as inform patients regarding relevant new developments. After learning the new skills, the HCPs intended to implement these skills in the

clinical and practical settings, which will in turn benefit the patients. Patient outcomes have been observed to improve. Participant 11 stated that the extent of improvement in patient outcomes is likely to depend on the design of the CME. Doctors also update their staff and nurses regarding the latest medical achievements, which guarantee the provision of advanced treatment to patients. Moreover, patients update their knowledge regarding advancements in the treatments of their disease by using the Internet and reading science magazines. This enables the patients to distinguish between conventional treatments and advanced or improved treatments. Therefore, in conclusion, CME programs have helped patients choose accurate treatments and keep abreast of progress in medical science.

4.3.12 Summary of qualitative data analysis:

Overall, the qualitative data obtained through semi structured interviews revealed that the CME programs provided updated information and knowledge to the attending HCPs within a relatively short time. The programs improved the skills of the HCPs and their interaction with patients. Organisational management was the most commonly reported barrier to implementing the newly acquired information in the workplace by the interviewed HCPs. The duration, location, and timing of the CME programs as well as unavailability of leaves were the most common barriers to attending the programs. The HCPs suggested the inclusion of interactive sessions and workshops in the programs as a method to improve these programs.

4.4 Results Conclusion:

In summary, the analysis of qualitative and quantitative data revealed the following:

The need for CME hours was the most common factor motivating HCPs to attend CME programs, followed by the content of the CME programs. The CME programs provide updated

knowledge to the HCPs within a short duration; the HCPs perceived that approximately 55.56% of the content of the CME programs selected was new. The programs met the learning expectations of at least 50% of the attending HCPs. The interviewees reported improvements in their knowledge, skills, and workplace management due to these CME programs. According to the attending HCPs, the inclusion of workshops and interactive sessions and training of speakers to deliver their knowledge effectively would improve the CME programs, Table 4.38 includes the research questions and objectives in this study and summary for the key findings that answer each question from both quantitative and qualitative data.

	Research question	Research objectives	Key Findings
1	To what extent, if at all, have the UAEU-accredited CME programs met the attending HCPs' learning expectations?	5 , 3, 4	<ul style="list-style-type: none"> The overall score for HCP perception (post-CME) was significantly higher than that for HCP expectation (pre-CME), were 54.6 (± 10.6) and 57.5 (± 9.6), respectively, which indicates that CME program meet and exceed the learning expectations of the HCPs
2	To what extent, if at all, have the CME programs achieved the learning objectives stated by the organisers?	6	<ul style="list-style-type: none"> The four CME programs in this study achieved 81.6% of the learning objectives stated by the organisers.
3	Which factors determine the selection and attendance of the CME programs by HCPs?	2, 1	<ul style="list-style-type: none"> Need for CME hours' was predominantly selected as the only factor (by 49.6% of the participants). The scientific content of the programs was the second most commonly selected factor (by 31.4% of the participants). Nurses were more likely to attend CME programs to seek CME hours than were HCPs of other professions Doctors were more likely to attend CME programs based on the scientific content than were HCPs of other professions.
4	To what extent, if	7	<ul style="list-style-type: none"> HCPs were 89.2% satisfied with speaker's

	at all, are the HCPs who attend the CME programs satisfied with this learning experience in terms of the following domains: program content, program structure, speakers' performance, and program setting?		<p>performance.</p> <ul style="list-style-type: none"> • CME program content: 80.3% -85.9%. • CME program impact: 77% - 85%. • CME program structure: 80% - 86%. • CME program organization: 78% - 88%. • The CME program overall satisfaction ratios were 81.6%- 85.8%.
5	To what extent, if at all, have the CME programs changed the HCPs' knowledge about the topics covered in the CME programs?	8, 9	<p>Significant improvement in knowledge is observed as an outcome of the CME program.</p> <p>The increase in knowledge test scores ranged from 0.9 in the 'Doctors' group to 1.6 in the nurses group.</p> <p>Among the participants, the nurses, pharmacists, and other HCPs exhibited a relatively high improvement in knowledge compared with the doctors</p>
6	What are HCPs' beliefs regarding the role of the CME programs in changing their knowledge (on topics covered in the program) and implementing newly acquired knowledge and skills at their workplaces and what are their recommendations to improve the CME programs in the UAE?	3, 9, 10, 11, 12	<p>HCPs' beliefs regarding the role of the CME programs:</p> <ul style="list-style-type: none"> • CME programs provide HCPs with opportunities to enhance their knowledge on various subjects without spending much time • Increase in knowledge supports the HCPs in the achievement of their professional goals. It also contributes to the progress of their workplace or work environment. • Most interviewees attended CME programs to claim CME hours and applied the new knowledge to their practice and workplace behaviour. This also shows the willingness of HCPs to learn and apply new skills. • Any CME program offering any new knowledge on common diseases is considered innovative because it provides a different approach to treat the disease. <p>Implementing newly acquired knowledge and skills at their workplaces</p> <ul style="list-style-type: none"> • The most common barriers in implementing the knowledge obtained from CME programs are: the organisational management, the necessary latest equipment, place work policies, and cost. • Duration of the program, location, timing, and availability of leave play crucial roles in the attendance of CME programs by HCPs.

			<p>HCPs' Recommendations to improve the CME programs in the UAE</p> <ul style="list-style-type: none"> • The use of statistical data and interactive lectures to facilitate understanding of the topic. • Dynamic speakers who interact with the audience be invited to ensure two-way communication during CME sessions. • The cost of the mandatory CME programs should be incurred by the hospitals. • The program should be tailored according to the audience to ensure its effectiveness.
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Table 4.38 Research questions and objectives with the key findings.

Chapter 5. Discussion, conclusion, and recommendations

5.1 Introduction:

The current development of countries due to globalisation and industrialisation has caused considerable changes in the environment as well as the occurrence of many diseases. Some years ago, these diseases did not exist. An expensive lifestyle is associated with considerable medical expenditure. Medical professionals or HCPs face new challenges every day. Hence, HCPs are expected to update their knowledge for treating patients with various complicated diseases and to efficiently provide relief to patients. CME programs have been established to enable HCPs to acquire new or updated knowledge and improve their skills. This will eventually improve healthcare systems and patient care worldwide.

Health authorities in the UAE, and healthcare facilities as well as educational institutions, such as UAEU, invest time, money, and energy in organising and accrediting conferences, symposiums, lectures, and seminars. The objective of the aforementioned initiatives is not only to ensure attendance by HCPs sharpen their professional skills but also to enable them to broaden their horizons, create new professional networks, and gain expertise in their fields. Although all CME organisers and stakeholders in the UAE are convinced of the benefits of CME programs for HCPs, the outcomes are often difficult to assess because the assessment requires the integration of all the efforts of all CME stakeholders, including the HCPs, and the involvement of experienced researchers from the early stages of planning of these CME programs. Moreover, the trend of linking the attendance of CME programs with relicensing certification in the UAE has motivated HCPs to select and attend these programs; however, the trend has also limited the achievement of the learning objectives of these programs.

The primary aim of CME programs in the UAE should ultimately be the improvement of clinical outcomes. However, many studies are still needed to examine the actual advantages of linking CME initiatives and relicensing certification, including the belief that attending CME programs improves the HCPs' chances of clearing recertification examinations. Butterworth concluded that CME significantly reduces the age-related decline in diagnostic performance of general practitioners. Recently, the results of recertification examinations in the USA revealed that examinees with inadequate updated knowledge or low attendance of CME-type exercises exhibited high failure rates. (Ahmed, 2013)

The current study involved an evaluation of the effectiveness of four UAEU-accredited CME programs by a total of 336 HCPs, including physicians, nurses, pharmacists, and other HCPs, in Al Ain city in the Emirate of Abu Dhabi. This study assessed whether the UAEU-accredited CME programs are effective in their current form. Mc David et al., (2013) stated that efficient program evaluation is expected to devise methods to assess dissemination of knowledge in the program and collect, analyse, and present data of the program. The evaluation method is used to determine whether the program under evaluation achieved its aims and whether the information collected and delivered to the participants in the program was grasped through an assessment of the learning outcomes of the program.

5.2 Kirkpatrick's training evaluation model:

The authorities responsible for CME delivery in the UAE understand the need for measuring CME effectiveness. Without a formal assessment of CME effectiveness, the return on the investment of training efforts spent in delivering CME programs cannot be ascertained. In this study, levels 1 (reaction) and 2 (learning) of Kirkpatrick's training evaluation model were used

to assess the effectiveness of UAEU-accredited CME programs based on the reaction- and learning-based responses of the participating HCPs. Kirkpatrick's evaluation model has been used extensively to evaluate the effectiveness of educational programs (Gill & Sharma, 2013), including CME programs.

Kirkpatrick (1998) stated that the aim of measuring a reaction is to ensure that participants are motivated and involved in planning and implementing learning experiences. The reaction level in the study was used to determine the baseline characteristics of the participants (HCPs) of four UAEU-accredited CME programs and whether they found the training satisfactory, relevant, useful, and easy to apply. In addition, the determining factors for attending the CME programs as well as the fulfilment of the learning expectations and perception of the HCPs, achievement of learning objectives by the program, program design, and speaker's performance were assessed in this study. This feedback from the participants of the programs enables researchers to assess whether further improvements are warranted. Gill and Sharma (2013) stated that Kirkpatrick's reaction level (level 1) evaluates how the learners feel about the program.

Kirkpatrick's level 2 measures 'learning outcomes' or the knowledge acquired by the learner by participating in the training program. The 'learning' level evaluates participants' experiences, participants' attitudes, and principals involved in the education process (Lynch et al., 2006). This level was used in the current study to investigate the change in the knowledge of the participating HCPs caused by attending the four UAEU-accredited CME programs. The change in knowledge was assessed in terms of expected change in the HCPs' workplace management strategies based on the new knowledge and the barriers anticipated by the HCPs to implementing new learning in workplace. Furthermore, this study identified the challenges that the HCPs faced in seeking and

attending the CME programs. Moreover, the recommendations of the HCPs to improve CME practice, in general, in the UAE were explored. Thus, quantitative and qualitative data were collected to achieve the research objectives.

To facilitate the understanding of practices in UAEU-accredited CME programs, questionnaires, including pre- and post-CME knowledge tests, were distributed to the participants before and after the CME programs. This method helped in understanding the learning expectations of the participants and reveal whether the CME programs met these expectations. It also facilitated the evaluation of the participant's opinion of the content and organisation of the CME programs in terms of speakers' performance and achievement of organiser-stated objectives. In addition, it facilitated measurement of the effect of CME programs in improving the participant's knowledge. According to Tian et al. (2007), systematic analysis of CME programs facilitates the analysis of the perception and satisfaction of the participants.

The total response rate (considering all four CME programs) in this study was 83.5%. The post-CME questionnaire was filled by 70% of the participants, which showed a high level of willingness of the participants to share their opinions regarding the CME program. The number of participants who filled out the pre-CME questionnaires was higher than that of the participants who filled out the post-CME questionnaires because filling out the pre-CME questionnaire was part of the registration process. Furthermore, the participants were encouraged to fill out the pre-CME questionnaire because the questionnaire was explained to each participant. However, the post-CME questionnaires were distributed to the participants while they were in the lecture room, and many participants were in hurry to leave because the programs had ended. Moreover, many participants left the programs before they ended, particularly after the lunch break. Each

CME program was 8 hours long and was conducted on a weekend. Some of the attending HCPs worked in the private sector, and weekends were their only rest days; consequently, many of these HCPs left the programs before they ended. Hence, a variation between the response rates to the pre- and post-CME questionnaires was observed.

5.3 Participants of the UAEU-accredited CME programs:

One of the factors used to measure the effectiveness of the UAEU-accredited CME programs in the reaction level of Kirkpatrick's evaluation model was the number of HCPs who participated in the CME programs. The total attendance of the four CME programs evaluated in this study was 334 HCPs, with an average of 84 participants in each CME program. This number is considered reasonably high because it constitutes 61% of the expected attendance stated by the organisers during application for CME accreditation. The UAEU-accredited CME programs attract HCP attendance because they are approved by an academic institution; this ensures that the content of the programs is scientific and that the speakers and topics of the programs have been selected carefully. Furthermore, the CME hours obtained by attending the UAEU-accredited CME programs are recognized by all healthcare authorities in the UAE; hence, these programs are popular among HCPs in the UAE.

According to Marinopoulos et al. (2007), the internal and external environments, such as hospital environment and education level, affect the outcomes of CME programs. Most HCPs in the UAE have different nationalities. Their educational degrees are provided by different universities. In addition, their native languages and places of work (professional experience) differ. This study further divided the participants based on various factors such as nationality, level of education, present job status, and workplace. This demographic distribution facilitated the complete

understanding of the participants' opinions. It was examined from the quantitative data that the participants in the CME program were distributed from all ages. Thus, the HCPs attending the CME programs were 20–80 years old (the highest number of participants were aged 25–50 years), and this finding is related to the need for CME hours for renewal of license to retain their jobs. Furthermore, the difference in the percentages of Arab (49.8%) and non-Arab (50.2%) participants was 0.4%. As discussed, the qualification of the participants also affected the success of the CME program. Most participants (51.4%) were BSc graduates and comprised 53% of the total participants working in hospitals. The average of experience of a CME program participant was 6–10 years. While 66% of them dealt with more than 50 patients weekly, 35.7% of the HCPs were doctors, 46.2% were nurses, 11.9% were pharmacists and the remaining 6.2% were other HCPs, including laboratory technicians and physiotherapists. The number of HCP participants in the CME programs other than doctors and nurses was relatively low because doctors and nurses constitute the majority of HCPs. Furthermore, other HCPs (such as laboratory technicians, X-ray technicians, and dentists) generally attend specialised CME programs because sometimes, the CME hours they claim from non-specialised programs are not recognised during relicensing unless they are directly related to their practice. For example, for dentists, only CME hours obtained by attending dentistry-related CME meetings or infection-control-related CME programs are recognised during relicensing.

5.4 Motivations for HCPs to attend the UAEU-accredited CME programs:

Another factor used to measure the effectiveness of the UAEU-accredited CME programs in the 'reaction' level of Kirkpatrick's evaluation model was the motivation of HCPs to attend UAEU-accredited CME programs. Ideally, HCPs should attend CME programs primarily to acquire knowledge and enhance their medical skills. However, the results of this study showed that the

need for CME hours to renew licenses and retain jobs was the main factor motivating the HCPs to attend the CME programs. The scientific content of the CME program was the second most common motivation for attending the CME programs. The location of the CME program was also an influential factor because most HCPs preferred to attend CME programs whose venues were close to their residence. The CME program location, faculty, date, fee, schedule, and reputation of the organiser were considered relatively minor factors affecting the HCPs' decisions to attend the program. The previous claims were supported by the results of the analysis of the objective qualitative data; however, the analysis of subjective qualitative data from the interviews revealed that the participants of the CME programs had different reasons for attending the CME programs. Most participants agreed that the CME programs facilitated their professional development by narrowing the knowledge gap. The HCPs also reported that they attempted to implement the latest knowledge, gained from the CME programs, in their practice. Most of the participants also accepted that the CME facilitated their understanding of topics quickly and conveniently in addition to providing updated knowledge and necessary CME hours. According to some of the participants, the use of traditional study methods, such as referring to books and journals, to study about the latest developments is highly time consuming, and HCPs cannot invest large amounts of time in studying. Therefore, HCPs prefer to attend CME programs, which deliver the latest information through less time-consuming methods. A review of the secondary literature revealed that CME programs facilitate constant learning and enhancement. They also help physicians to renew their licenses, improve their credentials, update professional memberships, and earn certificates from speciality boards.

In the UAE, in order to retain HAAD license, HCPs are required to earn a minimum number of CME hours. According to Luna Filho et al. (1999), nurses and doctors require an average of 20 and 40 CME hours per year, respectively, to retain a HAAD license.

Carrera et al. (2015) reported that every participant had different objectives while participating in CME programs. In this study, when the HCPs were stratified by profession, the nurses were more likely to show an interest in attending CME programs to obtain CME hours than were the doctors, pharmacists, and other HCPs. While doctors were more likely to show an interest in attending CME programs depending on the scientific content of the programs. This is because the nurses sought CME programs with reasonable cost. The doctors may have had opportunities to attend CME programs, which may have included international conferences, sponsored by pharmaceutical companies. However, pharmaceutical companies do not sponsor the CME program fees for nurses because they (the nurses) are not involved directly with drug prescription. In addition, only a few programs are organised specially for nurses, while most of the CME programs target physicians because the programs are funded and supported by healthcare facilities and pharmaceutical companies.

5.5 UAEU-accredited CME programs: HCP expectation vs. HCP perception:

The effectiveness of the UAEU-accredited CME programs was measured using the reaction level of Kirkpatrick's evaluation model. The achievement of UAEU learning goals and meeting HCPs' expectations were evaluated in this research along with HCPs' satisfaction with the CME program content and delivery. The HCPs joined the CME program with different expectations and learning needs, which depend on their experience, professional needs, and educational backgrounds. However, if the CME programs are designed without considering the diversity of

the participants' learning needs, dissatisfaction of the participants and incomplete achievement of the CME program educational objectives are inevitable.

In this study, the data collected from the participants in the four CME programs revealed that 76% and 84% of the CME program objectives were achieved; thus, a high percentage of the objectives were achieved. However, these percentages indicate the objectives achieved were general and were not those focused on the special needs of the participants, depending on their profession or speciality. Another positive finding is that the total perception scores (after attending the CME programs) of the participants were higher than their total expectation scores (before the programs) by 2.9 points; the total expectation and perception scores were 70 each.

The expectations of HCPs who attended the CME programs were as follows: addressing the HCPs' most pressing questions in their clinical subjects; addressing competencies specific to their speciality; providing fair and balanced content; providing clear evidence to support content; providing opportunities to learn interactively; providing the HCPs with supporting materials or tools; providing opportunities to solve cases relevant to their practice; translating evidence to practice; addressing barriers to optimal performance; and allowing them to assess what they learnt from the CME program attendance experience. The only aspect of the HCPs' expectations that was not met adequately was providing support materials during the CME program. The HCPs expected the CME program speakers to share all or some supporting materials with them during the lectures; however, the speakers in the four CME programs did not share supporting materials. The significant differences among the means of total scores for perception items in the responses of the doctors, nurses, and other HCPs support the observation that the CME programs were not tailored to meet the learning expectations and educational needs of HCPs of all

professions. Both Marinopoulos (2007) and Davis (1998) concluded that the CME organisers should design appropriate programs to meet the needs of participants in order to improve the effectiveness of their programs. Knowles theory of adult learning, which states that adults need to be involved in the planning and evaluation of their instruction, supports these findings.

Most participants in the qualitative interview said that the topics discussed in the CME lectures were concerned with the latest and innovative inventions related to the medical field. HCPs from different professions were interviewed; therefore, each of them expressed different opinions regarding advanced medical knowledge gained after attending the CME programs. Some HCPs reported that the information about the first aid care and infection control was new, whereas some others reported that the information of stem cells and their use in the treatment of human diseases was new. According to the German Medical Association (2007), CME provides information related to medical science and procedures that is necessary to improve the theoretical and practical knowledge of doctors.

5.6 Satisfaction of the HCPs attending the UAEU-accredited CME programs:

Feedback regarding behavioural changes in the HCPs is essential for assessing the effectiveness of the CME programs. The effectiveness of CME should be objectively evaluated by assessing the impact of the programs on the learning and performance of the HCPs (Ahmed, 2013). The satisfaction of the HCPs who attended the UAEU-accredited CME programs was assessed in terms of speakers' performance, the value of the CME program content, change in the clinical skills of HCPs due to the CME program, CME program structure, and organisation of the CME programs.

The results of this study showed that the participants expressed relatively high levels of satisfaction with the CME programs, and the overall satisfaction was 82%–86%. The HCPs expressed the highest level of satisfaction with the course content 85.9%. Their highest satisfaction was for the value of clinical case presentation, where the speakers present clinical cases and discuss them with the audience. The data conforms to Knowles' theory (1984), which emphasises that adults need to know why they need to learn something, and they are interested in subjects that have immediate relevance to their job or personal life. The theory also states that the orientation to learning and perspective changes from one of delayed application of knowledge to immediacy of application as a person matures; consequently, a subject-centred orientation changes to a problem-centred one. Thus, HCPs, who are adult learners, learn best when the subject learnt yields immediate value. They will not spend time learning a new skill, fact, or idea if it does not immediately add value to their career or personal practices. According to the analysis of subjective qualitative data, most of the participants (interviewees) reported an improvement in their practical skills due to the CME programs. According to some of the participants, participation in the CME program improved their diagnostic skills by enhancing patient–nurse or patient–practitioner interaction. These programs taught the HCPs methods to improve their interaction with the patients. A survey of secondary literature revealed that communication gaps between patients and HCPs might result in incorrect diagnosis and inefficient treatment.

One such method to improve communication and diagnoses implemented in the hospitals is hiring multi-lingual professionals. When a patient is admitted, the staff inquires about the language that the patient is fluent in, and a physician is assigned accordingly. This helps the patient to discuss the issues clearly and comfortably with the physician. For some of the

participants, the practical knowledge gained enhanced knowledge regarding the use of basic life support systems. Gibb (1960) in his developed functional theory of adult learning stated that learning that is based on the problems that learners face and relies on experience is meaningful and fruitful for the learners.

The effectiveness of the CME program also depends on the structure of the course, which consists of course length, course duration, time given for discussion, course agenda, number of lectures, and number of clinical case presentations. Some topics require longer durations for completion than do others; hence, lectures in CME programs should be planned appropriately to cover all the information related to the subject. The quantitative analysis revealed that the range of the participants' satisfaction was 81%–86% with the length, agenda, number of lectures, duration, number of clinical case presentations, and time given for discussion. The participants of the UAEU-accredited CME programs reported a low level of satisfaction with the length of the course; this could be because the duration of these programs was approximately 8 hours including the breaks and prayer times. Moreover, the programs were conducted on weekends, which contributed to the low satisfaction level of the HCPs, especially those working in the private sector.

Another aspect determining the efficiency of the UAEU-accredited CME programs was the degree of satisfaction of the participants with the speakers. The speakers were evaluated by the participants at the end of the programs for speaker style, presentation content, and use of presentation aids. The participants evaluated the speaker's performance with a mean (total) score of 89.2 out of 100. The satisfaction with speaker style, presentation content, and use of presentation aids was 89.3%, 90%, and 89%, respectively.

The results indicate that teaching methods, educational materials, audio-visual equipment, and physical and organizational arrangements need to be adjusted according to the needs of CME participants. Any educational activities not based on the actual needs of the participants waste the time and money of the participants and provide a frustrating teaching experience to the CME program speakers, who spend time and effort in preparing the scientific content of their lectures to share crucial knowledge and experience with the participating HCPs. All the efforts of the speakers are futile if the participants are not satisfied with the topic or the way the speaker's present.

A study conducted by Shehab et al. (2012) confirmed that some organisations evaluate CPD programs conducted by various universities, hospitals, and other organisations. The secondary literature showed that the CPD committee accredits CME programs conducted by UAEU. Proper registration and certification ensure the authenticity of the CME program. The certification increases the value associated with the program and attracts numerous participants. The satisfaction level (expressed in percentage) of the participants with the registration and certification were 85% and 86%, respectively, which actually reflect the highest satisfaction score. The scores are high because of the procedure followed by the organisers. The registration procedure was simple and required the participants to fill in basic information on a readymade form and submit it to the registration desk. The information was then entered into computers during the lectures. The certificates were printed and distributed manually at the end of the CME programs. By contrast, some other CME programs (not included in this study) assured participants that their certificates would be sent to them after they have left the CME program venue; however, the participants reported having to wait for many days to receive the certificate or spending time in tracing them.

ACCP insists on measuring the effectiveness of CME programs in terms of impact on knowledge, attitudes, skills, practice behaviour, and clinical practice outcomes (Cervero & Gaines, 2015). In this study, various attributes (behaviours) of the participants were affected by the CME program, which, in turn, affected the clinical skills of the participants. The participants reported that the CME programs were effective in terms of improving their knowledge because they evaluated this item with a mean score of 83 out of 100; however, this score was low when they were asked about the role of the CME programs (they had attended) in improving their diagnostic skills and investigation. These results indicated that the topics discussed during the CME program focused mainly on providing the participants with information rather connecting the information to its application in the participants' workplace. The results are supported by an assumption that adult learning is problem-centred rather than content-oriented (Kearsley, 2010).

Analysis of all the qualitative data revealed that the basic aim of the CME programs was to update the knowledge and skills of the HCPs. Most participants also agreed with this finding. According to a study by Beshyah, et al (2012), the objective of CME programs are the development and maintenance of the information and skills required by medical professionals to remain competitive in the changing medical environment.

Improvement of the teaching skills of the participants received the lowest evaluation score because the agenda of the four evaluated CME programs did not involve case presentations by the participants and exercises to assess their teaching skills. Tommaso and Pietro (2014) stated that HCPs must be well-informed and prompt in applying their theoretical and practical knowledge as well as communication skills to stay abreast of the constantly changing scenario in medical science. The technological and medical innovations lead to improvements in clinical and

biomedical learning. Therefore, enhanced knowledge helps HCPs to be efficient. Moreover, CME programs act as a self-learning course for the HCPs.

5.7 Acquiring knowledge from the UAEU-accredited CME programs:

Level 2 (learning) of Kirkpatrick's evaluation model was used to determine the extent of learning by the HCPs participating in the UAEU-accredited CME programs. The key focus was to observe visible results (CME participant's knowledge gain) that were directly attributable to the training experience obtained from the CME programs. The required gain would be an increase in the HCPs' knowledge. In this study, the participants reported that approximately 56% content in the UAEU-accredited CME programs evaluated in this study contained new knowledge. This result reflects the value of the content of the CME programs for the participants in terms of supplying them with new updates in the medical field concerning the program topics and guidelines. However, this high percentage may have resulted from the focus of the programs and discussed topics being physicians who represented only 36% of the participants. The nurses and other HCPs who constituted the majority of the attendance were either not familiar with or could not understand these topics.

Rouse (2011) suggested the development of a pre- and post-test to assess the effect of the training program on the participants' actual knowledge on the subject before and after the training program. In this study, four UAEU-accredited CME programs were studied. Change in the knowledge of each participant was assessed by determining the difference between the percentage of questions answered correctly on the pre-CME questionnaire, immediately prior to the participation in the CME programs, and the percentage of questions answered correctly on the post-CME questionnaire, taken immediately after participation in the UAEU-accredited CME

programs. Using the pre- and post-test method, participant's learning resulting from each individual program was demonstrated.

A measurable increase in HCPs' knowledge was observed approximately 32% of the times. A significant increase in the mean knowledge exam score after the CME program was observed in the HCPs of all professions. These results were similar in the HCPs who attended CME programs only to claim hours. This type of knowledge gain is not seen in traditional CME programs, where competency (knowledge gained) after the program is assessed using a post-test in which a minimum passing grade is required. In these cases, after the program, a particular level of competency may be observed, but determining whether the observed competency is related to the CME program (and not pre-existing knowledge) is impossible. Moreover, determining whether the program resulted in an actual gain in knowledge is impossible. In this study, the participants answered the same questions before and after the program. Furthermore, the questions were directly related to the content of the program; hence, any increase in knowledge observed was a direct result of the CME program.

With regard to the variation between HCPs in the improvement of knowledge gained through the programs, nurses showed an increase in knowledge 35% of the times, while doctors showed an increase 25% of the times. The difference in the increase of the knowledge of nurses and doctors is significant. The gain in knowledge was higher in the nurses group because the pre-existing knowledge of nurses regarding the topics discussed during the CME activity was lower than the physicians who were already aware of much of the scientific content of the lectures. Regarding the pharmacists and other HCPs, the high scores in knowledge improvement of 39% and 32%, respectively, may be due to the smaller sample size of these groups of professionals in this study.

All the participants were from the healthcare background; thus, the HCPs had a basic understanding of the CME topics. The participants from different HCP professions are believed to possess different levels of intelligence, which was evident from the pre- and post-test scores. However, stratification by educational levels showed results contrary to belief. A difference of only 0.16 was observed between the pre-test 'don't know' scores of diploma and Ph.D. holders. These findings indicate that sometimes the knowledge of individuals does not depend on their educational degree. No significant differences were observed in the pre- and post-test scores on all the parameters based on the nationality.

Different attributes related to the knowledge gained by HCPs after attending the CME programs were studied. These attributes included the implementation and sharing of the newly acquired knowledge in participants' workplace and the expected contribution of this new knowledge to improving patient outcomes. In addition, the CME participants anticipated barriers in implementing what they learn from CME programs into their daily practice.

From the analysis, CME programs appeared to influence not only the HCPs' knowledge but also patient outcomes. The implementation of the newly acquired knowledge by the HCPs had resulted in an increase in the number of satisfied patients. The participants in the CME programs reported that 60% of their patients may benefit from their new knowledge acquired by attending the programs, particularly when disease management is discussed in detail, including diagnosis, investigation, and treatment.

From the secondary literature, sharing of the CME knowledge with patients has improved the selection of appropriate treatments by the patients and the communication between the patients and concerned medical practitioners. According to Bloom (2005), CME programs have

improved the health of patients and the care provided by the healthcare practitioners. The expertise obtained from the CME programs assist HCPs in recommending the discontinuation of outdated diagnostic and therapeutic practices. In the study conducted by Cervero and Gaines (2014), CME enhanced the practical performance of medical practitioners and patient outcomes. A survey of the secondary literature revealed that CME facilitates improvement in the diagnosis of diseases, which results in high levels of patient satisfaction. Gercenshtein (2002) concluded that systematic reviews of educational interventions have shown that CME can improve clinical performance and patient outcomes by changing doctors' behaviour. The most effective methods described in these reviews include learning linked with clinical practice, interactive educational meetings, and strategies that involve multiple educational interventions.

5.8 Transfer of learning:

After attending CME programs, medical professionals should discuss the new techniques and designs learnt to improve the present medical practices (ARVO, 2017). The participants of the UAEU-accredited CME programs were enthusiastic and motivated during and after the CME programs. This enthusiasm was evident from their response that their clinical management strategies in their workplaces would change based on what they learnt in the CME programs (75% of the times) and that they intended to share their CME experiences and knowledge gained with their colleagues in the workplace (83% of the times). These responses showed the willingness of the participants to share their knowledge with their colleagues and to apply their newly acquired knowledge and skills in professional settings. These results are supported by Vygotsky's Sociocultural Theory (1978). This theory involves constructing new knowledge through social interactions; thus, interaction plays a fundamental role in the development of cognition. This development depends on the zone of proximal development, which is the

distance between the level of actual development, as determined by independent problem-solving, and the level of potential development, as determined through problem-solving under adult guidance or in collaboration with more capable peers (Vygotsky, 1978, p. 86). Analysis of the qualitative data revealed that most participants agreed that lack of knowledge sharing considerably reduced the usefulness of CME programs. The participants implied that disinterest of their colleagues to learn and absorb the latest knowledge discouraged the participants from sharing their newly acquired information. From the secondary literature, a large proportion of the HCPs showed reluctance towards adopting change. Many people are content with and functional in their old and ongoing practices. The introduction of anything unusual in an established environment causes friction between the professionals, thus causing an unwillingness to accept advanced CME knowledge. Gitonga (2007) proposed a conceptual model to explore transfer of learning in CME and explained this phenomenon. Transfer partnership factors involve trainee managers and colleagues before, during, and after training programs to enhance accountability and transfer of understanding in CME because incorporating new knowledge is a repetitive and transformative process and not a direct transfer of information from one context to another.

5.9 Transfer of learning barriers:

Price et al. (2010) reported in a recent study that clinicians report formidable barriers to applying CME knowledge in practice. The identification of such barriers is an essential first step towards devising strategies and solutions to promote the effective practical implementation of CME activities (Price, 2010). In this study, I explored the workplace barriers anticipated by the participants in implementing the new learning from the CME experience. The participants reported that the need for training in their workplace, patient noncompliance, and insurance costs were the major barriers. These barriers were selected by 95% of the participants. Other

organisational barriers were also identified; they were related to clinicians' priorities, workload, shortage of staff, lack of access to supplies, weak inter professional relationships, and uncertainties about cost. The complexity of patient cases and lack of adherence to prescribed treatments were also identified as other issues posing barriers to implementing CME knowledge in practice in this study. These findings are consistent with those of a review of the literature on transfer of learning (Merriam & Leahy, 2005). Newstrom (1992) reported that the hierarchy of organizational management and political culture in workplaces were frequent barriers for the transfer of learning.

After careful analysis of the qualitative data collected by interviewing the participants in this study, many obstacles in implementing the information gained from the CME were identified. Most participants reported hospital or clinical management as the main obstacle to implementation. From the secondary literature, changing the system or introducing anything new to it is difficult in any organization. All organizations have their rules and regulations, and every new idea has to undergo various stages of development before being implemented. Some participants also reported that sometimes the organizations were willing to apply CME-derived knowledge regarding treatments and instruments in practice, but the unavailability and high cost of equipment acted as barriers. According to Fahal (2007), in general, the CME programs are dynamic and advanced; HCPs who practice traditional methods face difficulties in understanding the new information and skills. Moreover, new and inexperienced trainers, who may not be able to explain the subject satisfactorily, conduct some of the CME programs. Furthermore, a majority of speakers experience language barrier, a major drawback, which causes a communication gap while conducting the CME program. An examination of the literature also revealed that the lack of monetary investments in medical education by the (central and state)

government is responsible for the poor performance of CME programs in some areas. The lack of funds can adversely affect the learning and teaching environment. Gitonga's transfer of learning model (2006) identified inadequate tools, equipment, materials, and/or resources; time pressures; and workplace management resistant to change as the major work environment factors affecting the transfer of learning.

5.10 Participant-reported issues:

Analysis of qualitative data revealed that the participants had faced many issues while attending the CME programs. Most participants were working professionals. Inadequate time and other time-related concerns were the major barriers for attending the programs. Most participants expressed their displeasure in attending CME programs during their working hours because of the leave issues. Most of the participants took leave from their work for attending the CME programs. Moreover, a large number of the participants reported the non-availability of paid leaves. Some of the participants expressed their discontentment in attending these programs on weekends, while others showed their dissatisfaction to participate on these programs during weekdays. The secondary literature revealed that HCPs cannot spend quality time with their families. Therefore, the participants' dissatisfaction at attending CME programs on weekends is understandable.

The qualitative data also revealed that most participants did not prefer common CME programs conducted for a mixed group of HCPs. The interviewed participants stated that in mixed-group CME programs, only some of the participants would understand the subject being discussed, while the other participants would be spectators or passively involved in the discussion. However, some of the participants showed interest in attending mixed-group CME programs to

enrich their knowledge about fields related to their own fields and gain the latest medical knowledge.

In addition, most participants reported the cost of CME programs as one of the main factors determining their attendance. All CME programs charge fees. For some of the participants, attending CME programs at locations far from their current residence was associated with an additional cost of accommodation and traveling as well as unpaid leave. These factors burdened the participants financially. If the participants are only passively involved in a mixed-group CME program (associated with the aforementioned financial burden), their levels of dissatisfaction with the program are high. Therefore, an examination of all the qualitative data revealed that participants had mixed views on specialized CME programs.

6.11 Participants' suggestions for improving CME practice in the UAE:

To make the CME programs effective, strategies for improving the levels of comfort in doctor–patient interactions should be developed. Contradictory results were obtained when the participants were asked about specialized or profession-specific CME programs. Most participants demanded to have CME programs for a particular group, whereas some of the participants showed interest in attending mixed-group CME programs. The participants who were in favour of mixed-group programs believed that the programs would expose them to new medical information apart from that in their own fields. According to Van Nieuwenborg et al. (2016), CME programs should include effective learning and teaching strategies to overcome the obstacles experienced by the participants. One strategy is ensuring flexibility of the program objectives; CME programs should be planned so that they can be modified or adjusted as required. Moreover, programs on a specific topic should cover every vertical to provide complete

updated knowledge to the participants. The secondary literature revealed that the main issue related to the CME program was the heterogeneity among participants. Consequently, the topic of the CME program does not match the professional requirement of a particular section of participants. This will cause dissatisfaction among the participants because attending a CME program requires resources, leave, and time.

Furthermore, all the participants suggested various ways for improving the CME program, such as interactive CME classes, use of statistics to explain data appropriately, and interactive clinical workshops. Gitonga (2007) recommended that CME programs be planned after considering the work environments and characteristics of the participants and by using a suitable course design.

An examination of the secondary literature revealed that active clinical workshops enable HCPs to improve practical skills in addition to their theoretical knowledge. Most of the participants responded positively when asked about reduction in the cost of CME programs. Furthermore, some participants suggested that CME lectures be conducted by experienced lecturers to make the course more effective. Thematic analysis revealed that most of the participants wanted CME programs to encourage the HCPs to pursue higher studies. Hatta et al. (2015) stated that the subject of CME programs should be relevant to the present medical conditions and teach the participants about the latest practical methods, thereby preparing them to face medical challenges.

The secondary literature revealed that the introduction of online CME programs and online CME certifications would increase the number of participants. The availability of these online CME programs will eliminate the barrier of distance and overhead expenses. Online learning will be convenient for the HCPs and will enhance the efficiency of the learning process. Most

participants also suggested that if private sector organisations participate in conducting CME programs, the quality of the programs will improve. The participation of private sector organisations will also enhance the visibility of CME programs across different regions and attract sponsors, thereby reducing the registration cost of the CME program.

5.12 Conclusion:

The primary objective of this research was to evaluate the effectiveness of CME programs accredited by UAEU in terms of changing the HCPs' knowledge and meeting their learning expectations; levels 1 and 2 of Kirkpatrick's training evaluation model were used for this assessment. The literature review for this study examined various factors relevant to the study, such as the need for CME programs, benefits of CME programs, expectations of the participants, and their opinion towards CME programs. Furthermore, the review contained an account of the current practice of CME policies and accreditation procedures in the UAE. The opinions of the participants towards CME programs, such as understanding of the CME program content, program duration, settings of the CME program, and competence of the speaker in explaining the topic.

The participating HCPs were mainly aged between 25 and 50 years; this is likely to be the age interval consisting of actively practicing HCPs. These data provided insights into the viewpoint of participating HCPs regarding the CME programs offered to them and the factors affecting their participation in these programs. For example, the most crucial motivation for attending CME programs was the need for CME hours. However, this was not true for HCPs of all professions. The availability of demographic data enabled stratification according to profession. In addition, the analysis of data revealed the outcomes of the CME programs in terms of changes

in the knowledge and workplace behaviour of the HCPs. The study also analysed whether the learning expectations of the HCPs were met. The scores (indicating satisfaction) were significantly higher in the post-CME (perception) than in the pre-CME (expectation) assessment (81.2% vs 78%), and the overall score (evaluation) for the CME programs (82.5%-85.8%). Thus, the learning expectations of the HCPs were met. Additionally the four CME programs achieved 81.6% of the learning objectives stated by the organizers.

This study provides evidence that UAEU-accredited CME programs are popular among HCPs because they attract a reasonable number of attendees and meet the learning expectations of the attendees, who are satisfied mainly because of the speakers' performance and organisation of the program. The popularity is mainly due to the academic position of UAEU and the availability of CME programs that are accessible to all HCPs from in the UAE. However, the results showed that the need for CME hours to renew HCPs' license is the primary factor motivating them to attend the CME programs. The scientific content of the CME program is the second most commonly stated motivating factor. Nurses were more likely to be motivated to attend CME programs to claim CME hours, whereas physicians were more likely to be motivated by the scientific content. This difference in motivation is mainly because of the lack of funding to support nurses in attending CME meetings. The UAEU-accredited CME programs achieved their learning objectives and slightly exceeded all the expectations of the participants' except for the expectation of providing support materials during the CME program. The participants were satisfied with the CME programs, and the overall satisfaction was as high as 86%; the participants exhibited the highest levels of satisfaction with the value of the scientific content and clinical case presentation.

Furthermore, this study proved that the UAEU-accredited CME programs provide new knowledge and updates in the medical field. Moreover, the programs were also found to be effective in terms of changing HCPs' knowledge. However, the changes in HCPs' knowledge of diagnostic skills and investigations were relatively small. Knowledge improvement after attending the CME programs was noted in the HCPs of all professions, particularly in nurses and physicians. Furthermore, even the participants who attended the programs only to obtain CME hours also exhibited an improvement in knowledge. Three major barriers hindered the transfer of learning through CME programs to the HCPs' workplaces, namely need for training in the workplace, patient noncompliance, and insurance cost. Overcoming these barriers may allow HCPs to successfully share their new learning with their colleges and improve patient outcomes. In the section on qualitative analysis, various suggestions (provided by the HCPs) to improve the CME course were also mentioned along with the improvements in patient outcomes.

Finally, the data revealed that the availability of paid education leave and online certification can increase the number of HCPs participating in the UAEU-accredited CME programs. Furthermore, separate CME focusing on the specific group, that is, programs specifically for doctors, nurses, pharmacists, and other HCPs will be more effective than mixed-group CME programs. This will also enable the participants to understand their specific CME subjects easily and raise their queries when required.

In conclusion, this study claim an evidence that UAE university accredited CME programs were effective in mean of improving health care professionals knowledge and meeting the learning objectives of their attendance and their satisfaction, the CME mandatory policy in UAE can be

considered as an effective motivation factor for health care professionals to seek for an updated knowledge and skills related to their clinical practice, study results can be summarized as follow:

- This study provides evidence that UAEU-accredited CME programs are popular among HCPs
- The UAEU-accredited CME programs achieved their learning objectives and slightly exceeded all the expectations of the participants' except for the expectation of providing support materials during the CME program.
- The participants were satisfied with the CME programs, and the overall satisfaction was as high as 86%; the participants exhibited the highest levels of satisfaction with the value of the scientific content and clinical case presentation.
- The need for CME hours to renew HCPs' license is the primary factor motivating them to attend the CME programs.
- The scientific content of the CME program is the second most commonly stated motivating factor.
- Nurses were more likely to be motivated to attend CME programs to claim CME hours, whereas physicians were more likely to be motivated by the scientific content.
- This difference in motivation is mainly because of the lack of funding to support nurses in attending CME meetings.
- Furthermore, this study proved that the UAEU-accredited CME programs provide new knowledge and updates in the medical field. Moreover, the programs were also found to be effective in terms of changing HCPs' knowledge. However, the changes in HCPs' knowledge of diagnostic skills and investigations were relatively small.

- Even the participants who attended the programs only to obtain CME hours also exhibited an improvement in knowledge.
- Three major barriers hindered the transfer of learning through CME programs to the HCPs' workplaces, namely need for training in the workplace, patient noncompliance, and insurance cost.
- The availability of paid education leave and online certification can increase the number of HCPs participating in the UAEU-accredited CME programs.

5.13 Study Implications:

As mentioned earlier in this thesis, in the UAE context there are only a few studies on CME and scant academic resources on the concept and practise of CME. Accordingly, the first major practical contribution of the present research is that it provides much needed empirical and depth data about CME practise in this area of the world. Such data can be used as a reference for future studies in this field.

A second important implication of our study derives from the results obtained from this study; these results support the efforts of health authorities and UAE University in recognizing the importance of learning and acquiring skills for HCPs through CME programs. Simultaneously, this research will facilitate UAE health authorities to support HCPs in acquiring educational development through well designed CME programs. Additionally, this research results provides HCPs, CME accreditors, health regulatory authorities, and CME organisers with evidence regarding the usefulness of CME programs. Consequently, this provide proved rational for the mandatory nature of the CME programs in UAE and the burdens over institutions and attendees, and patients.

The third implication of the this study , it provides the CME organisers with clear feedback from the HCPs who attended the CME programs about the strengths and weaknesses of the programs as well as suggestions for improvement, mainly in meeting the HCPs' expectations regarding learning objectives, speakers performance, and programs design. In this sense, I believe that this study provides the CME-accreditation bodies and the CME programs organisers in the UAE a tested evaluation tool and method that measures the effectiveness of the UAEU-accredited CME programs and the opportunities to improve them that can be modified according to the CME program content.

A fourth implication stems from the content of this study, this content based on comprehensive review of CME literatures and a strong scientific and theoretical methodology, implementing the mixed method approach in this study optimise the validity of the results and maximise the possibility of generalisation with sufficiently strong support from the findings, these findings contributes to support many educational and professional development theories.

Finally, this study provides evidence that Kirkpatrick evaluation model can be an effective guiding model for evaluation CME programs.

5.14 Study limitations:

- The study scope and findings are restricted only to the UAEU-accredited CME. However, for accessibility and convenience, CME programs accredited by other accreditation bodies, such as HAAD and DHA, were also included for comparison and generalisation of the study results.
- This research was conducted in Abu Dhabi, particularly Al Ain only.

- The target population of the evaluated CME programs included practicing physicians, residents, medical students, nurses, and pharmacists. Diversity among participants attending the same educational event poses a challenge because of the differences in specialities, backgrounds, and levels of education. In addition, the differences in the levels of expectations and evaluation of effectiveness among these groups varied with stratification by specialities, backgrounds, and levels of education.
- This study should have included CME stakeholders other rather than HCPs, such as leaders, organisers, educators, funding bodies, patients, and health regulatory authorities. Viewpoints from different stakeholders would have made valuable contributions to the study, and consequently to the effectiveness of the programs; however, this was not feasible owing to time and manpower constraints.
- The researcher was the interviewer who collected the qualitative data, which might have introduced a bias, thereby affecting the results.
- The studied CME programs were not promotional medical education programs, although such programs are being conducted in the UAE. Hence, the research findings will not be applicable to promotional CME programs where pharmaceutical companies are involved.
- Another limitation is that ‘satisfaction’ with the program is liable to subjectivity and might be affected by many individual factors such as motivation and interests.
- This study evaluated the effectiveness of UAEU-accredited CME programs by using levels 1 and 2 of Kirkpatrick’s evaluation model. However, levels 3 and 4 of the same model were not used owing to time and manpower constraints. These levels represent the truest assessment of a program’s effectiveness; however, they were not included in this study. In addition, evaluating patients or health outcomes (variables in level 4) and

attributing these results solely to the training program would have been extremely difficult.

- The period of qualitative data collection is a limitation because an extensive number of interviews need to be conducted in different sites, which was not followed in this study.
- Other factors and causal variables operating at levels 1 and 2 of Kirkpatrick's model may also have changed during health outcome evaluations and developed after the CME intervention. This limitation may have affected mainly the qualitative data. Causal variables can confound the outcomes and complicate the isolation of training effects (Faber et al., 2005; Van Zyl et al., 2004; Gask et al., 2004; Razavi et al., 2003; Bland et al., 2003; Flores et al., 2002; Ray et al., 2001; Gielen et al., 2001; Curtis et al., 2000; Haug et al., 2000; Thompson et al., 2000).

5.15 Recommendations:

However, to further improve the effectiveness of CME programs and as pointers for future studies, I present the following points for consideration:

- The design of UAEU-accredited CME curriculum should be based on public health problems and should be planned in accordance with the actual and specific needs of HCPs to contribute to their development. The focus of CME programs should depend on evidence, new guidelines, healthcare service objectives, and outcome statistics.
- The CME system should be revised and simplified to cater to the needs of specific audiences. Healthcare facilities and healthcare authorities should develop CME programs for their staff. These programs can be designed to meet the special and individual

learning needs of their staff, and the outcomes of these programs can be evaluated using competency and professional appraisals.

- The use of effective, dynamic, and interactive educational methods in CME programs is necessary. Online CME programs will eliminate the barrier of distance and overhead expenses. Furthermore, CME program-based linkages between CME accreditors and healthcare authorities in the UAE are recommended. The adoption of multimedia and instructional techniques such as online CME, videoconferencing, virtual education, and self-directed learning by scientific medical associations and community hospitals is recommended.
- Standards for the comprehensive evaluation of CME effectiveness should be developed.
- The limits of professional expertise should be recognised. The present study revealed that people have mixed views regarding specialised and generalised CME programs. General CME programs can be attended by all HCPs, including doctors, nurses, laboratory technicians, and pharmacists. All these HCPs have different expertise, and the level of understanding of the HCPs varies with their profession. Therefore, including topics that are common and can be understood by every participant is appropriate for general CME programs. Some of the topics that can be covered in general CME programs are diabetes, hypertension, sanitation, depression, disorders related to allergies and dermatology, migraine, and headache.
- CME programs should also include information about the use, effects, and side effects of various drugs. Furthermore, sessions on nutrition, obesity, first aid, and public health can be included in general CME programs. This will help HCPs from all professions to understand the topic of the CME program quickly and will enable them to ask questions

or clarify their doubts without any hesitation. By contrast, specialised programs should focus on professionals belonging to particular groups. For instance, separate programs only for doctors or only for nurses can be included under specialised CME programs.

- The topics that can be included in specialised CME programs for doctors and nurses are autoimmune diseases, emergency care, cardiovascular ailments, arthritis, gastrointestinal problems, surgery, oncology, ear–nose–throat disorders, geriatric disorders, endocrinology, and infectious diseases. Topics on renal disorders, prostate cancer, and hormonal therapy can also be included in specialised CME programs.
- To make the program more effective in terms of practical application, doctors and nurses working in the same department can attend the programs together. This will not only save time but also facilitate information sharing. For pharmacists and laboratory technicians, CME topics can be related to vaccines, drugs, radiation therapy, and pain management.

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Appendixes

Appendix 1 . Ethical Approval from research ethics committee at The British university in Dubai

الجامعة
البريطانية في
دبي



The British University
in Dubai

'The

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	Awad Mansour Al Essa
Contact telephone No.	0505736549
Email address	2013121006@student.buid.ae
Date	28 Nov 2016

ii. Summary of Proposed Research:

<p>BRIEF OUTLINE OF PROJECT (100-250 words; this may be attached separately. You may prefer to use the abstract from the original bid):</p>	<p>The current study will be a doctoral research about the effectiveness of CME programs in the UAE, through applying an evaluation of CME accredited programs by the UAE University. The main goal of this intended study will be to evaluate and examine the effectiveness of the UAE university accredited CME programs in mean of meeting HCP participant's expectations, satisfaction and knowledge improvement as per level I and level 2 in Kirkpatrick Evaluation Mode.</p> <p>Specifically, in my project, I will be looking ^{Whether} weather CME meets participant's expectation? achieved the organizer's stated learning objectives? are the participants satisfied with the CME programs? Do CME programs changed the HCP knowledge? In addition to their recommendations to improve the CME programs in UAE.</p>
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	<p>This study will adopt a Pragmatic, sequential, mixedmethod approach; Through combining the qualitative and the quantitative methodologies, benefits can be</p>
--	---

gained from both the validity of quantitative analysis (answering the "what") as well as the depth of understanding of qualitative analysis (answering the "how" and "why").

The quantitative part of this method will be by collecting information about participants' satisfaction with the CME program and the gap between their expectations and findings of the CME programs, meeting stated objectives for the CME program. All these will be collected through surveys, and through pre and post-test questionnaires related to the topics presented in these programs for measuring the change in participants' knowledge.

The qualitative part will be by collecting information by semi-structured interviews with the CME programs participants, benefitting from the challenges they face and the recommendations given to improve the educational programs to meet their expectations.

This study will be the first of its kind in UAE, in addition it drain its importance from the following reasons:

This study will rely on strong scientific and theoretical methodology and approach that includes most of the CME related theories (Learning theories, professional development theories, and Evaluation theories).

The mixed method approach used in this study will enable the researcher to optimize the validity of the

	<p>results and reach for the maximum generalization possibility with strong support for the findings.</p> <p>The results of this study for the effectiveness of the CME programs over HCP knowledge and the</p>
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	satisfaction of participants with their recommendations for CME programs improvement might use as an input for CME programs designers and policy makers.
MAIN ETHICAL CONSIDERATION(S) OF THE PROJECT (e.g. working with vulnerable adults; children with disabilities; photographs of participants; material that could give offence etc	The data will be collected from health care professionals who are attending ^{continuous} medical education (CME) programs, before and after attending the CME program. No ethical concerns or materials that may offend the participants will be in the study.
DURATION OF PROPOSED PROJECT (please provide dates as month/year):	December 2016- March 2017
Date you wish to start Data Collection:	15 December 2016
Date for issue of consent forms:	The same date of data collection prior filling the questionnaires.

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 BUID Ethics Committee. I am fully aware of the timelines and content for participant's information and consent.

Appendix 2 . Ethical application and Approval from research ethics committee at UAE University



Social Sciences Research Ethics Committee -Research Ethics Review Form-

A. Title of Study

Participant's Evaluation of the effectiveness of Continuing Medical Education Programs
Accredited by UAE University

B. Principle investigator (and co-investigator(s))

- | | |
|--|------------------------------|
| 1. Name of PI: | Awad Mansour Al Essa |
| Department (if within UAE University): | College of Medicine |
| Organization/Department/Unit (if other than within UAE University): | Internal Medicine Department |
| Phone: | 0505736549 |
| Email: | a.alessa@uaeu.ac.ae |
| | |
| 2. Name(s) of co-investigator(s):* | None |
| Department(s) (if within UAE University): | |
| Organization(s)/Department(s)/Unit(s) (if other than within UAE University): | |
| Phone: | |
| Email: | |

**Copy and paste (2) as needed.*

C. Abstract

(Give a brief abstract of the proposed research (not more than one page))

With the huge investment in developing training strategies, the question is no longer "Should we train?" but rather "Is training worthwhile and effective?" Mann (1996:14). this assumption is supported by many scholars and researchers who insist on the necessity to measure the effectiveness of continuing educational programs. While educationalists and others have been looking more critically at the provision of Continuing Medical Education (CME), there has been rising consensus on how health care professionals (HCP) learn and acquire skills (Eraut, 2001). While most CPD experiences might be considered as a means of introducing or enhancing knowledge, skills and attitudes, it cannot be assumed that goals and aims are achieved. Shrestha 2013 agreed with Lawn et al. 2010 that implementation of CME programs for HCP should be followed by a moderate improvement in knowledge and practices in

hospital settings.

The current study will be a doctoral research about the effectiveness of CME programs in the UAE, through applying an evaluation of CME accredited programs by the UAE University. The main goal of this intended study will be to evaluate and examine the effectiveness of the UAE university accredited CME programs in mean of meeting HCP participant's expectations, satisfaction and knowledge improvement as per level 1 and level 2 in Kirkpatrick Evaluation Mode.

Specifically, in my project, I will be looking whether CME meets participant's expectation? achieved the organizer's stated learning objectives? are the participants satisfied with the CME programs? Do CME programs changed the HCP knowledge? In addition to their recommendations to improve the CME programs in UAE.

This study will adopt a Pragmatic, sequential, mixed-method approach; Through combining the qualitative and the quantitative methodologies, benefits can be gained from both the validity of quantitative analysis (answering the "what") as well as the depth of understanding of qualitative analysis (answering the "how" and "why").

The quantitative part of this method will be by collecting information about participants' satisfaction with the CME program and the gap between their expectations and findings of the CME programs, meeting stated objectives for the CME program. All these will be collected through surveys, and through pre and post-test questionnaires related to the topics presented in these programs for measuring the change in participants' knowledge.

The qualitative part will be by collecting information by semi-structured interviews with the CME programs participants, benefitting from the challenges they face and the recommendations given to improve the educational programs to meet their expectations.

This study will be the first of its kind in UAE, in addition it drain its importance from the following reasons:

This study will rely on strong scientific and theoretical methodology and approach that includes most of the CME related theories (Learning theories, professional development theories, and Evaluation theories).

The mixed method approach used in this study will enable the researcher to optimize the validity of the results and reach for the maximum generalization possibility with strong support for the findings.

The results of this study for the effectiveness of the CME programs over HCP knowledge and the satisfaction of participants with their recommendations for CME programs improvement might use as an input for CME programs designers and policy makers.

--

4. Is this a retrospective study (yes/no)? If yes, explain.
Yes <input type="checkbox"/>
No <input checked="" type="checkbox"/> X

5. Type of study:
descriptive experimental

6. Will there be direct contact with the participant?
Yes <input checked="" type="checkbox"/> X
No <input type="checkbox"/>

7. Will you obtain written consent from each participant? If yes, explain how.
Yes <input checked="" type="checkbox"/> X
No <input type="checkbox"/>
The written consent will be signed before filling the questionnaire after reading the study information.

8. Will you tell participants that their participation is voluntary? If yes, explain how.
Yes <input checked="" type="checkbox"/> X
No <input type="checkbox"/>

9. Will you tell participants that they may withdraw from the research at any stage? If yes, explain how.
Yes <input checked="" type="checkbox"/> X
No <input type="checkbox"/>

10. Will you tell participants that their confidentiality will be maintained and if published, the data will not be identifiable as theirs? If yes, explain how.
Yes <input checked="" type="checkbox"/> X

Yes	<input checked="" type="checkbox"/>
No	<input type="checkbox"/>
The first page of the survey will be information for participants about this study including their role and their rights in addition to study goals.	

12. Will you tell participants you can and will answer any questions they may have on the study? If yes, explain how.	
Yes	<input checked="" type="checkbox"/>
No	<input type="checkbox"/>
In the information sheet the participants will be informed that they can ask any question related to the study and all their questions will be answered	

13. Will you ensure that your study will not deliberately mislead participants? If yes, explain how.	
Yes	<input checked="" type="checkbox"/>
No	<input type="checkbox"/>
The questions will be straight and the choices are clear so there will be no misleading	

14. Are you confident that there is no realistic risk of any participant experiencing either physical or psychological distress or discomfort? If yes, explain why.	
Yes	<input checked="" type="checkbox"/>
No	<input type="checkbox"/>
The survey is an evaluation of the CME, it does not include any physical activity or any discomfort.	

15. To whom and how do you plan to disseminate the results of the study (e.g. to participants, to faculty, to scientific community)?	
This is PHD research thesis , the results will be published and discussed in British university in Dubai	

I certify that all information provided above is correct and that it will apply throughout the performance of the proposed research and that I shall be responsible for safeguarding the confidentiality of participants involved.

I am aware of the confidential nature of this information and will vouch for any person, other than myself, who will work with this information under my direction.



 Signature of Principal Investigator

20/11/2016

 Date

Signature of co-investigator(s) (if applicable):

 Investigator 1:

 Date

 Investigator 2:

 Date

Investigator 3:

Date

DR. ABDULAI ABUKARI



20/11/2016

Name and Signature of Head
of Department of Principal Investigator*

Date

** If the PI is a student, then the name and signature of student's supervisor/advisor are required.***NB: Please make sure all the documents (if applicable) in the Checklist below (Appendix B) accompany the present application. Incomplete submissions will not be considered.**

Appendix A

List of Investigators

Principle Investigator

Name:	Awad Mansour Al Essa
Title/position:	Research Nurse
Affiliation:	UAEU-CMHS- Internal Medicine Department
Address:	UAEU-CMHS- Internal Medicine Department
Tel.:	0505736549
Email:	a.alessa@uaeu.ac.ae

Co-Principle Investigator (if any)

Name:	
Title/position:	
Affiliation:	
Address:	
Tel.:	
Email:	

Additional Investigators (if any)**Additional Investigator 1*:**

Name:	
Title/position:	
Affiliation:	
Address:	
Tel.:	
Email:	

*(*Copy and paste the above as needed)*

Social Sciences Research Ethics Committee - Division of Research and Graduate Studies
Ethics Approval System



جامعة الإمارات العربية المتحدة
United Arab Emirates University

Social Sciences Research Ethics Committee
-Approval-

Proposal number: ERS_2016_5474

Title of Project: Participant's Evaluation of the effectiveness of Continuing Medical Education Programs Accredited by UAE University

PI: Awad Mansour Al Essa

Co-PI: _____

The above proposal has been reviewed by:

- ☒ one member of the Social Sciences REC
☐ two members of the *Social Sciences REC*

And the decision is:

- ☒ Favourable
☐ Favourable with Additional Conditions
☐ Provisional Opinion
☐ Unfavourable Opinion
☐ No Opinion (Proportionate Review* only)

Reason:

After evaluating this proposal, we see no major ethical concerns. Therefore, the proposal is approved for the duration of the research study.

Name Clara Morgan
(Chair or designee): _____

Clara Morgan

Signature

December 10, 2016
Date

The decisions available to the Committee are defined as follows:

“Favourable with standard conditions” means that the study has ethical approval to proceed, as long as local management approval is in place prior to the study starting.

“Favourable with Additional Conditions” means that the study has ethical approval in principle but there are certain issues, which need to be addressed prior to the study starting such as a minor change to participant documentation. It is the responsibility of the Principal Investigator to ensure that additional conditions are met.

“Provisional Opinion” means that there are more substantial changes, which need to be made before the study starts. These changes would require further ethical review on the basis of which a favourable or unfavourable opinion would be given by the Ethics Committee.

Unfavourable Opinion means that the study does not have ethical approval to proceed and a further application would need to be submitted should the applicant choose to proceed with the study. Advice and guidance will be provided by the Committee setting out the reasons for their decision and suggesting changes which would mean that a favourable opinion on resubmission would be more likely. For applications processed through the Proportionate Review* Service an unfavourable opinion is only given where the application is of such poor quality that it is probable that an unfavourable opinion would be given if it were to be reviewed at a full meeting.

No Opinion (Proportionate Review* only), means that the Proportionate Review sub-committee (3 members) have deemed that the proposed study does have material ethical issues and will therefore need to be reviewed by a full committee.

**The aim of proportionate review is for studies which present minimal risk or burden for participants to be reviewed by a proportionate review sub-committee within 14 days of receipt of a valid application.*

Appendix 3. No objection letter from CME & CPD committee in college of medicine and health sciences in UAE University



Date: 18/12/2016

Dear Mr. Awad Al Essa:

I have reviewed the copies of your letters and ethical approval of your study related to your plan to have PhD done at The British University in Dubai. The Social Sciences Research Ethics Committee, UAE University had approved your prospective study titled "participants Evaluation of the effectiveness of Continuing Medical Education Programs Accredited by UAE University" under the proposal number ERS_2016_5474.

The CME office at The College of Medicine and Health Sciences, UAE University has no objection to conduct this research over the CME events accredited through our Committee.

This letter issued on Mr. Awad Al Essa's request.

Regards

Professor Elhadi H. Aburawi

A handwritten signature in black ink, appearing to read 'Elhadi H. Aburawi'.

Chair of the CME & PD Committee,
College of Medicine and Health Sciences,
United Arab Emirates University

Appendix 4. Questions for CME program evaluation and relevant assessment tools

Given below is an elaborate explanation of the instruments that were used to collect data pertinent to each research question:

Question 1: To what extent, if at all, have the UAEU-accredited CME programs met the attending HCPs' learning expectations?

While reviewing literature, I found many tools that were used to measure whether the CME programs met the participants' expectations. Many of these tools are not validated; however, Shewchuk et al. (2007) developed a tool for level-2 outcomes, based on expectation disconfirmation theory, to measure the performance of a CME program by using 10 indicators. This tool named CMEQUAL (based on SERVQUAL) is a widely used approach for evaluating perceptions of service quality in other fields. It was adapted for CME by eliciting perspectives from consumers and providers of CME programs through nominal group techniques. The indicators were assessed using a 7-point scale. The same survey was filled-in by participants before the program and at the end of the program to describe their expectations and perceptions, respectively.

Although this tool is only one of the methods to measure these factors, its validity has been tested. The use of a validated instrument helps to ensure that the data collected supports the objective of assessment, as opposed to capturing information that is highly affected by varying interpretations and biases of respondents. Kimberlin et al. (2008) concluded that using an existing instrument that has substantial evidence of reliability and validity over a wide range of populations is a more cost-effective alternative than developing a new instrument and validating it. Moreover, use of a validated instrument would allow for greater consistency in measurement across CME providers, which permits the data pooling necessary to advance our understanding of CME characteristics such as interactivity and multifacetedness (Olivieri et al., 2013).

Question 2: To what extent, if at all, have the UAEU-accredited CME programs achieved the learning objectives stated by the organisers?

The participants' views regarding the extent to which the CME programs met the stated learning objectives were collected using a list of five main goal statements for each program. The participants responded for each statement through a questionnaire after the CME program. The five choices on the Likert scale were coded as follows: strongly agree (5), agree (4), neutral (3), disagree (2), and strongly disagree (1).

Question 3: What are the determining factors for the HCPs' selection and attendance of the UAEU-accredited CME programs?

The determining factors for HCPs' attendance of the CME program was evaluated through one question in the survey. The question was designed to provide multiple options for the HCPs to select one or more possible factors that determine their selection of CME programs. The options were as follows: CME program content, location, faculty, schedule, fee, date, the need for CME hours, reputation of organiser, invitation, and any other factor (not in the list of options provided).

Question 4: To what extent, if at all, are the HCPs who attend the UAEU-accredited CME programs satisfied with this learning experience with respect to the following domains: CME program content, CME program structure, speakers' performance, and CME program setting?

The satisfaction of participants with CME events in this study was determined through the post-CME program satisfaction survey. This survey mainly relied on the first two levels of Kirkpatrick's four-level evaluation model, which is the most commonly used model in the context of evaluating training programs. This model was explained by Moore et al. (2007); the model describes a satisfaction outcome as the degree to which participant expectations regarding CME setting and delivery are met without identifying specific expectations. This questionnaire was self-designed and distilled from extensive literature reviews. The questionnaire was designed using inputs from varied resources and my experience in the field of organising CME activities. The questionnaire was reviewed by a panel of CME educators and HCPs.

The survey that was conducted through questionnaires was mainly divided into two main sections; the first section involved the evaluation of speaker's performance and the second section involved the evaluation of CME program effectiveness, content, structure, and

management. Sometimes, a respondent may provide a negative reply for a question without actually intending to because the survey question cannot provide the option of a positive answer and the option of a negative answer is not available; such a situation poses considerable challenges to the respondents. This limitation can be overcome by using the 5-point Likert scale, which facilitates the assessment of collected data with pragmatic tools (Wilson, 2014).

In the first section, the HCPs' responses for the evaluation of speakers' performance were measured using a Likert scale. This scale is commonly used in evaluating participants' responses on a 1–5 range, in which 1 depicts the opinion 'strongly disagree' and 5 depicts 'strongly agree' (Teddle & Tashakkori 1998). In the second section, the HCPs' responses were measured using an extended scale of 1–10, where 1 and 10 represent 'poor' and 'excellent', respectively. The extended scale was used to accurately record the evaluation of the CME program content, effectiveness, design, and management; these items represent the core evaluation of CME programs.

Question 5: To what extent, if at all, did the UAEU-accredited CME programs change the HCP knowledge regarding the topics covered in the CME program?

To measure the changes in the HCP knowledge regarding the topic of the CME programs, pre and posttest questionnaires were distributed to the attending HCPs before and after the program, respectively. Five MCQs were defined by the trainers according to program content and objectives. MCQs have been validated as an assessment method in health sciences and clinical education. If MCQs are meticulously designed, they contribute to test reliability and validity and enable the assessment of critical thinking (Norcini et al., 1985; Case et al., 1998; McCoubrie, 2004; Ellaway, 2008).

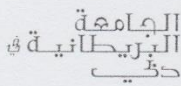

However, evaluation using this method can be difficult to plan and execute (Lynch, 2002; Martineau, 2004) because program evaluators must obtain the support of stakeholders' to obtain reliable measures (Martineau, 2004). Moreover, repeated measurement and developing sensitive instruments to detect small program outcomes are associated with several challenges (Lynch, 2002). Therefore, using this method alone may provide insufficient information regarding program effectiveness; hence, this method was used in combination with other questions involved in the survey as supporting information.

Appendix 5

Sample of Complete Survey (Pre and post CME program survey)

Pre

UAEU College of Medicine
and Health Sciences

 الجامعة
البريطانية
في
دبي
 The
British University
in Dubai
www.buid.ac.ae

**[Participant's Evaluation of the effectiveness of Continuing
Medical Education Programs Accredited by UAE University]**

Researcher:
Awad Al Essa ,
Research Specialist, CMHS. UAE University
Doctorate Student - British University in Dubai

Research No 21

1 | Page

4

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Pre

Consent to Participate in a Research Study-

Please read carefully before signing the Consent Form!

[Participant's Evaluation of the effectiveness of Continuing Medical Education Programs Accredited by UAE University]

You will be asked to provide or deny consent after reading this form.

Topic of the Research: Participant's Evaluation of the effectiveness of Continuing Medical Education Programs Accredited by UAE University

Researcher: Awad Mansour Al Essa

You have been invited to take part in a study to investigate the effectiveness of Continuing Medical Education Programs Accredited by UAE University over health care professional's knowledge and their satisfaction with the educational programs provided to them as part of their professional development. This study will be conducted by Mr. Awad Al Essa in Internal Medicine department in College of medicine and health sciences in UAE University. This study will be a doctoral research in Education from British University in Dubai.

The study will take place at the CME events venue according to its location in Al Ain or Abu Dhabi. Participation in this study will take 10 minutes to fill the pre CME questionnaire before attending the CME event and 20 minutes to fill the post CME Event questionnaire. Although you will receive no direct benefits from this study, this research may/will help us better understand the importance and effectiveness of the CME programs conducted for health care professionals in UAE.

There will be no risk over you physically, psychologically or your job status for participating in this study.

If you decide to take part you will be given this information sheet to keep and be asked to sign a consent form, and you will remain free to withdraw at any time without giving a reason. This will not affect your participation in the CME program.

All information which is collected about you will be kept strictly confidential. Any information will be published will not include your name or number so that you cannot be recognized from it.

Thank you very much for taking part in this study,

Date:

Version number:1/ 2016

For Further Information, you can contact: Awad Al Essa , 0505736549


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Pre

Informed Consent

1. I confirm that I have read and understood the above information sheet and have had the opportunity to ask questions.
2. I understand that my participation is voluntary and that I am free to withdraw.
3. I understand that my data will be kept confidential and if published, the data will not be identifiable as mine.

I agree to take part in this study:

✓ A M 
(Name and signature of participant)

16/12/2016
(Date)

Mohd Doguz
(Name and signature of person taking consent)

16.12.16
(Date)

Awad AL ESSA
(Name and signature of witness (if participant
unable to read/write)

16/12/2016
(Date)

(Name and signature of parent/guardian/next of
kin (when participant unable to give consent due
to age or incapacity)

(Date)

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Pre CME Program Survey

Pre

Research ID:

Dear Participant:

Please fill this questionnaire before attending the CME program, this is 2 pages questionnaire.

1. Age:.....59.....
2. Nationality:.....Indian.....
3. My present status is: ☐ Doctor ☒ Nurse ☐ Pharmacist ☐ Others.....
4. Level of Education : ☒ Diploma ☐ Bsc ☐ Master ☐ PhD
5. Specialty:.....
6. My current Work place is:
☒ Hospital ☐ Outpatient clinic ☐ Others
7. Number of years in practice? 20
8. How many patients do you see each week? 60
9. Number of CME hours you earned so far in year 2015:1.....
10. What were the determining factors for registering for this course?
☒ Content ☒ Location ☐ Faculty ☐ Schedule ☐ Fee
☒ Date ☒ The need for CME hours ☐ Reputation of organizer ☐ Invitation ☒ Others
11. Would you like to be involved in the qualitative part of this study (Includes semi structure interview to explore your opinion about the CME programs in Abu Dhabi):
☐ Yes ☒ No
12. If yes: Please Provide the following information:
13. Name:.....
14. Phone Number.....
15. E mail Address:.....
16. Place of work:.....
- Possible time Available:.....

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Pre

Assessing Physician Expectations of Continuing Medical Education

Please complete the following evaluation of: **Infectious Diseases Rapid Review Course /Dec 2016**

I expect from this program to:

	My Expectation	Minimally..... Completely						
		1	2	3	4	5	6	7
1	Address my most pressing questions	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
2	Address competencies identified by my specialty	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
3	Provide fair and balanced content	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
4	Provide clear evidence to support content	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
5	Include opportunities to learn interactively	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
6	Provide me with supporting materials or tools	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
7	Include opportunities to solve cases relevant to my work	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
8	Translate evidence to practice	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
9	Address barriers to optimal performance	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
10	Allow me to assess what I have learned	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>

21

Pre

Pre CME Knowledge Assessment

This is not a test, please answer the following questions based on what you know, if you don't know the answer you can select "don't know"

Q1. Which organism is Tigecycline (Tygacil) typically **NOT** effective against?

- A. Pseudomonas aeruginosa.
- ☒ B. Klebsiella pneumoniae.
- C. E. Coli.
- D. Don't Know

Q2. Which ONE of the following pathogens has been strongly linked with **Guillain-Barre syndrome**?

- ☒ A. Campylobacter jejuni.
- B. Salmonella typhi.
- C. Shigella flexneri.
- D. Don't Know

Q3. Which one of the following antibiotics does NOT typically have anti-pseudomonal activity?

- ☒ A. Ceftazidime (Fortaz, Tazicef, Tazidime).
- B. Ceftriaxone (Rocephin).
- C. Piperacillin-tazobactam (Zosyn).
- D. Don't Know

Q4. Which one of the clinical scenarios would Daptomycin be considered inappropriate?

- A. A serious MRSA skin and soft tissue infection.
- B. MRSA nosocomial pneumonia.
- ☒ C. MRSA bacteremia.
- D. Don't Know

Q5. 38-year-old pregnant woman with hepatitis B surface positive (HbsAg positive), her liver enzyme were significantly high. Which of the following should be managed her newborn baby?

- A. HBV vaccination alone.
- B. HBV Vaccine & Immunoglobulins at the same site within one week.
- ☒ C. HBV Vaccine & HBV Immunoglobulins at different sites within 12-24 hours of birth.
- D. Don't Know

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Post CME Program Survey

POST

Research ID:

Dear Participant:

Please fill this questionnaire after attending the CME program, this is 4 pages questionnaire.

Please complete the following evaluation of : **Infectious Diseases Rapid Review Course /Dec 2016**

I attend this CME program, I found from that this program to:

	My Perception	Minimally..... Completely						
		1	2	3	4	5	6	7
1	Address my most pressing questions	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
2	Address competencies identified by my specialty	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
3	Provide fair and balanced content	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
4	Provide clear evidence to support content	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
5	Include opportunities to learn interactively	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
6	Provide me with supporting materials or tools	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
7	Include opportunities to solve cases relevant to my work	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
8	Translate evidence to practice	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
9	Address barriers to optimal performance	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
10	Allow me to assess what I have learned	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Were the conference objectives met?

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
1 Review: Vaccinations,TB,URTI,Skin Infections, UTI	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2 Learn updates in ID medicine and management	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3 Understand intervention based on investigation and imaging	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
4 Be aware of common Antibiotics using problems	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
5 Learn how to deal with Infectious diseases in Primary setting	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Strongly Disagree Strongly Agree

Overall, the objectives specified by the CME provider were achieved 1 2 3 4 5 7

Post CME Knowledge Assessment

This is not a test, please answer the following questions based on what you learn today, if you don't know the answer you can select "don't know"

Q1. Which organism is Tigecycline (Tygacil) typically **NOT** effective against?

- E. Pseudomonas aeruginosa.
- F. Klebsiella pneumoniae.
- ☒ G. E. Coli.
- H. Don't Know

Q2. Which ONE of the following pathogens has been strongly linked with **Guillain-Barre syndrome**?

- ☒ E. Campylobacter jejuni.
- F. Salmonella typhi.
- G. Shigella flexneri.
- H. Don't Know

Q3. Which one of the following antibiotics does NOT typically have anti-pseudomonal activity?

- E. Ceftazidime (Fortaz, Tazicef, Tazidime).
- ☒ F. Ceftriaxone (Rocephine).
- G. Piperacillin-tazobactam (Zosyn).
- H. Don't Know

Q4. Which one of the clinical scenarios would Daptomycin be considered inappropriate?

- E. A serious MRSA skin and soft tissue infection.
- ☒ F. MRSA nosocomial pneumonia.
- G. MRSA bacteremia.
- H. Don't Know

Q5. 38-year-old pregnant woman with hepatitis B surface positive (HbsAg positive), her liver enzyme were significantly high. Which of the following should be managed her newborn baby?

- E. HBV vaccination alone.
- F. HBV Vaccine & Immunoglobulins at the same site within one week.
- ☒ G. HBV Vaccine & HBV Immunoglobulins at different sites within 12-24 hours of birth.
- H. Don't Know

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POST

Speakers Evaluation:

Please evaluate speaker performance according to given criteria by writing the number represent your Rating upon this scale:

Strongly Agree Agree Neutral Disagree Strongly Disagree

5 4 3 2 1

	Aqeel Saleem	Rayhan Hasemi	Mahmoud Sheik	Asad khan	Abdulla Shehab	
SPEAKER STYLE						
Spoke loud enough and/or used a microphone well	4	5	4	4	4	
Spoke clearly and at a good pace	4	5	4	4	4	
Used good eye contact, body language, and non-verbal communication skills	4	5	4	3	4	
PRESENTATION CONTENT						
The Topic was useful and of interest to me personally	4	5	4	4	5	
The Material was well-organized and easy to follow	4	4	5	5	4	
The Speaker was prepared and knowledgeable on the topic	4	5	4	4	4	
PRESENTATION AIDS						
The presentation aids were effective and contributed to the presentation	5	5	4	5	4	
The presentation aids were relevant	4	4	5	4	4	
The quality of the aids was excellent	4	5	5	4	4	
Aids were integrated into the content of the presentation and used well	4	4	4	5	5	

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POST

D. Course Evaluation:

	Poor -----Excellent									
	1	2	3	4	5	6	7	8	9	10
COURSE CONTENTS										
Value of lectures	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Value of clinical case presentations	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
Updating you in specific topics of Internal Medicine	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
HOW WILL YOUR CLINICAL SKILLS CHANGE										
Improved knowledge	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
Improved diagnostic skills	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
Improved use of diagnostic investigations	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Improved teaching skills	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
COURSE STRUCTURE										
Length of course ()	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
Day schedule (Agenda)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
Number of lectures	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
Number of clinical case presentations	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
Duration of lectures	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
Time Given for discussion	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
GENERAL										
Registration procedure	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
Certificates	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
Food & Drink, Tea / Coffee Breaks	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
Classroom facilities, Light, Temperature, Seats, A/V	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>

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POST

- What percent of the content was new to you?40.....%
- If disease management were discussed in this activity, what is the approximate percent of your patients that you manage for the disease/s addressed by this activity?60.....%
- I expect my management strategies to change based on what I learned in this activity:
Definitely will not change..... Definitely will change ✓
1 2 3 4 5 6 7
- What barriers do you anticipate in implementing the information you gained at today's program?
- | | | |
|---------------------------|-------------------------------|-------------------|
| 1 Administrative Policies | 2 Needed Resources/Technology | 3 Needed Training |
| 4 Insurance Costs | 5 Patient Noncompliance | 6 Others |
- Compared to all other CME activities you have participated in over the past year how would you rate this program?
Needs serious improvement.....A model of its kind ✓
1 2 3 4 5 6 7
- Will You share your experience and information learned from the CME program today with your college in the workplace :
Strongly Disagree Strongly Agree ✓
1 2 3 4 5 6 7

Appendix 6

Semi structured Interview Guide for participants

Research ID: I.....

Date:.....

Duration:.....

Location:

Interviewee Background Information:

Qualifications:

Specialty:.....

Place of work:.....

Number of patients you see daily:.....

Years of experience:

Years in current job:.....

Questions:

CME Programs effectiveness:

1. How did your participation in CME programs change your knowledge, can you give examples?
2. How did your participation in CME programs change your skills, can you give examples?
3. How did your participation in CME programs change your practice behaviour? Can you give examples from your practice?
4. How did your participation in CME programs change your practice outcomes, can you give examples?
5. How did your participation in CME programs contribute to improvements in patient or service outcomes? Can you give examples from your practice?

CME programs practices in UAE

6. Can you identify examples of good or innovative practice in CME?
7. Can you identify examples where CPD may have contributed to changes to an individual's practice and/or changes to the way care is provided either by a team or individual?

CME Challenges and improvements

8. Can you identify examples of barriers encountered by individuals or organizations when implementing aspects of or learning from CME and how these barriers were overcome?
9. Can you identify the challenges they face in attending the CME programs in Abu Dhabi?
10. What are your suggestions to improve the CME programs in Abu Dhabi?

Appendix 7
Sample of Transcript from qualitative data

Transcripts of interview No.14

[00:00:01.17] Q: This is interview number 14, with a Doctor Haematologist oncologist; we would like to welcome Doctor in this interview

[00:00:14.27] A: Thank you

[00:00:16.20] Q: My name is Awad El Essa, this interview is part of PhD study which is conducted to study the effectiveness of Medical Education Programs conducted in UAE and accredited by UAE University mainly. Before we start let me tell you that you participation is voluntarily and you can withdraw at any time during the interview, additionally you have the right not to answer any question if you don't like them, your information and your personal data will not be used and will not identified and all this data will be kept confidential.

So do you agree Doctor to participate?

[00:01:01.04] A: Yes I do agree.

[00:01:05.07] Q: First I would like to ask you what your qualifications are.

[00:01:07.19] A: I am a consultant haematologist oncologist and Professor of Medicine in the college of Medicine in UAE University.

[00:01:17.17] Q: For how long you are practicing?

[00:01:25.04] A: Total about 30-35 years

[00:01:27.07] Q: and in this country?

[00:01:29.05] A: About 17 years.

[00:01:32.20] Q: How many patients do you in average see per week?

[00:01:39.08] A: 15 patients.

[00:01:45.10] Q: I know that you are already involved in Medical Education Programs here in UAE, you attend conferences, meetings and since you are here long time, from your opinion do you believe that the attendance of the healthcare professionals for Medical Education Programs is influencing or increasing their knowledge?

[00:02:16.27] A: I think that Continuing Medical Education do affect the knowledge of participants to a literally a small degree.

[00:02:27.04] Q: Why do you believe this?

[00:02:28.27] A: Well that's my general impression from what I have seen, and one of the main problems that the topic of these meetings not always tailored properly to the needs of participants, because the participants in the meeting coming with different backgrounds and different type of practices may not be appropriate match for the content of the CME meeting.

[00:02:59.15] Q: what about skills Doctor? Do you think it contribute to the skills of healthcare professionals Medical Education Programs?

[00:03:07.14] A: Depending on the type of the meeting that is organized, the meeting that teach you to use different skills I don't think that I have much experience with, and I have not been part of this a such meeting. The meeting that I have attended are mostly convey you the new updated knowledge in a way if you think that the skill is how to approach certain problem, in terms of taking history, doing the examination, ordering the test, how finding out about new investigations in that regard you can maybe say that the skills are improved to a small degree but skills are not usually taught in CMEs.

[00:03:59.28] Q: Clinical practice? And the patient outcome?

[00:04:08.03] A: "Clinical practice is affected", is difficult to say I think my behaviour may be effected in few instances in few cases by some past medical meetings and educational sessions but I am not really sure how much a meeting or education actually affect your behaviour because part of my education is also reading very much perhaps much more than what I get in CME meetings and therefore is difficult to say how much is actually CME education session affecting my behaviour.

[00:04:59.03] Q: Can you identify any program you attend or you hear about and you think this is a good or innovative practice in Medical Education Programs in UAE here.

[00:05:17.00] A: I found meetings that are organized by some pharmaceutical companies that are targeting very specific illness disease or particular type of treatment as a part of today promotion are targeted to specific individuals specialist who actually deal with these type of problems and these meetings can be useful because there is a good match from what is said and what is presented in this meeting and the needs of the participants. So that is one of the meetings that I think that more useful on average than others.

[00:06:08.15] Q: The healthcare professionals when they attend a program and they got new knowledge or skills whatever and they would like to back to their workplace and implement what they learn there, they usually face some barriers. What do you think are the barriers you may individually face before or you think that healthcare professionals they might face, when they want to implement what they learn new in their workplace?

[00:06:42.12] A: This is a good question. The barriers actually so should be to change people minds, how they have behaved up to this point. If you want to introduce the new treatment for example, you have actually to influence not only the bureaucrat but also many other physicians who are the decision making in institution and who may not be familiar with the new knowledge,

so what you have to produce a small educational sessions for these other physicians who are actually decision makers.

I have experience in one hospital, I wanted to change treatment, drug which is used in a treatment in one disease and that is much better have much better profile in safety profile and effectiveness and it involved months of effort to actually change minds of different typed of decision makers, for example 5 or 6, 7 different physicians and other medical health specialists in this area.

[00:08:03.00] Q: What about policies and procedures? Do you think it support that change

[00:08:07.04] A: The policies and procedures existing in institutions have to exist and have to be followed and in my experience, this is required some effort but it is doable.

[00:08:20.16] Q: The cost? Do you think the cost is a barrier?

[00:08:27.05] A: It is a barrier in term of time and effort that you have to put you also have to know that there is a lot of money in medicine especially in therapeutics and there is a lot of influence and behind it so the people have sometimes certain investing interest in doing the things the way they are doing it and maybe redacting to change because they sustains losses.

[00:08:56.29] Q: you know it is like the market here in UAE, it is full of medical education programs, conferences, you can hear every week a lot of conferences which are running in Abu Dhabi, Al Ain , Dubai... and many healthcare professionals they join these programs ir they plan to join these programs what o you think it is the challenge they are facing these healthcare professionals when they decide to join any medical education program.

[00:09:31.03] A: To join as participant or as organizer?

[00:09:37.10] Q: As a participant, they want to attend these programs, what do you think? or from yourself? You are a member and you would like to join any medical education programs what usually you think that the challenge that you face?

[00:09:47.12] A: Well, the Continuous medical education programs can become big money making business so the number of the CME the educational meeting conferences increasing, the question is what is their quality? The quality appropriate and suitable for general physician's population? And in one side, you have this motivation to organize this meeting it is multi plate by profit and in the other side, you have the desire of the health authorities to keep physicians updated and properly educated and the intersection of this two forces is what is the quality of these sessions or continuing medical education session that physicians and other professionals attend? And that's the big issue. What is the difficulty in attending to this meeting, first I think the price of some meeting is roundly high, the second is that it is difficult to actually find the most appropriate meeting because this information is somehow produced at hock in a short advanced notice and timing should be better and we should have a single point of information for the country especially this small country so we can go and get all type of sessions that they coming up and we can use in the near future.

[00:11:53.06] Q: You know there are two statements which are now rooming around the healthcare professionals about the medical education. The first one is " most of healthcare professionals, they are attending the medical education programs to collect CME hours for renewing their license" Do you agree with this? What is your opinion?

[00:12:20.13] A: Yes, I agree with that, I think that many physicians attend CME sessions just to get CME points in order to get real license without much attention being given about the appropriate CME session and to find the appropriate CME session this is again question of

diversity of this session, availability, pricing of this meetings as well as timely announcement if this meeting so people can plan their educational session in advance and I think there is a lot of things need to be done around that.

[00:13:05.10] Q: The second statement they are saying that these medical education programs which are organized they are targeting broadcast of healthcare professional, like you will find physicians, nurses, specialists, pharmacists, all they are attending the same programs, they are all attending the same lecture and they are all getting the same certificates, while other programs they are targeting special group of healthcare professionals. So which one do you prefer and why?

[00:13:46.07] A: That's a valid point, it is a big problem, having physicians and nurses and different type of technicians listening to the same lecture and presentation, because it is obviously it is difficult to achieve certain density of proper information, physician without making less nurse or a technician unable to understand so if you want everybody to understand it the label of the tell has to go down and in this situation for example the new knowledge may not be presented for the physician while at the same time may be inappropriate for technician or a nurse so mixing up these individuals with different level of competencies for the one type of problem, I don't think is appropriate.

[00:14:54.26] Q: What are your recommendations in general, if we want to create an innovative medical education program here in UAE, what are your recommendations? How do you think that the ideal programs or the ideal medical education program, its organization, content and procedure should go through, the accreditation?

[00:15:28.04] A: I think the central board for Continuous medical education should be formed, that should be actually designed a plan how these CME will be conducted nationwide

[00:15:50.05] A: Who will lead this, you think, who is the best authority to lead this?

[00:15:54.29] A: I think this is role is something should be decided by Emirates Society of I think medical society MHS, and this centre should be discussed and their level but it will also require a separate finding.

[00:16:20.16] Q: I heard you before you have like comments and concern regarding the accreditation, do you think the accreditation for CME hours and connect this with the licensing of the physicians, is it the right way to encourage physicians to get their medical education?

[00:16:42.06] Q: To link licensing with education, I think it is appropriate in the rapid expansion of the new medical knowledge and I think the Medical Education program should be accredited and the accreditation profits should be governed by single body that is proper be structured and created funded for that purpose.

[00:17:12.06] Q: But how can we overcome the issue of the as you said before that most of physicians they are attending to collect CME hours so they are not seeking for knowledge, they are interested in medical Education programs and this means that we already now cancel the main goal of setting this roles regarding the accreditation and regarding the correction of CME hours, so how we can overcome this?

[00:17:45.07] A: There is a lot of coordination that needs to be done for this purpose that physicians of a certain profile should be tagged and this tag should be match with the CME meetings that we approved and accredited by the central body, so the general physicians should go to the CME meeting that accredited educate them, the specialist should be going to the meeting that different type that accredited to be used by this type of specialist and so on, but this has to be designed and coordinated it is probably not easy task but it requires a central effort and national effort in which healthcare services should be involved.

[00:18:36.21] Q: Thank you Doctor would you like add something?

[00:18:42.14] A: One of the CMEs most effectively used is by online system is designing the specific questions for general physicians for specialist that they should actually answer it and then providing a credential CME point to these physicians only if they correctly answer the questions so by answering the questions you make sure that the participant learn and understand the new knowledge that needs to be dissimulated in the population of physicians.

[00:19:20.18] Q: Thank you Doctor.