DEVELOPMENT OF A PRIMARY CARE CURRICULUM FOR MEDICAL UNDERGRADUATES IN MALAYSIA A DELPHI STUDY

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FACULTY OF MEDICINE
UNIVERSITY OF MALAYA
KUALA LUMPUR

2019

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RESEARCH PROJECT SUBMITTED IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE DEGREE OF MASTER OF MEDICAL EDUCATION

FACULTY OF MEDICINE
UNIVERSITY OF MALAYA
KUALA LUMPUR

2019

UNIVERSITY OF MALAYA

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Matric No: MQE180001

Name of Degree: Master of Medical Education

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In Malaysia. A Delphi Study.

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DEVELOPMENT OF A PRIMARY CARE CURRICULUM FOR MEDICAL UNDERGRADUATES IN MALAYSIA. A DELPHI STUDY

ABSTRACT

Over the last few decades, primary care has been recognized as a cornerstone for an efficient and effective healthcare system. However, the discipline is now facing challenges like the shortage of primary care doctors, which has been attributed to the hidden curriculum of undergraduate medical programs. The aim of this project is to develop a primary care curriculum for medical undergraduates in Malaysia. A Delphi survey, which consisted of three iterative rounds with feedback, was used for this research project. The participants consisted of primary care experts who are also involved with undergraduate primary care teaching. The experts were selected based on criteria which were developed with two senior academicians in undergraduate primary care medical education. The final developed curriculum contained 34 core clinical topics and 15 core Entrustable professional activities (EPAs). The developed curriculum provides a list of core clinical topics that should be taught as part of undergraduate primary care curriculum and the expected EPAs of a new graduate on the first day of entering the primary department as a houseofficer. This work may inform policies and guidelines, and also influence undergraduate primary care education at various medical schools. This may promote and encourage more doctors to choose primary care. Furthermore, it addresses the gap in knowledge about education in primary care in Malaysia.

Keywords : curriculum development, primary care, entrustable professional activities, Delphi, medical education

PEMBANGUNAN SEBUAH KURIKULUM PERUBATAN KELUARGA BAGI TAHAP SARJANA MUDA DI MALAYSIA. SEBUAH PENYELEDIKAN DELPHI

ABSTRAK

Sejak beberapa dekad yang lalu, bidang perubatan keluarga telah diiktiraf sebagai salah bidang yang membantu untuk menghasilkan sistem penjagaan kesihatan yang cekap dan berkesan. Walau bagaimanapun, bidang ini kini menghadapi pelbagai cabaran seperti masalah kekurangan doktor perubatan keluarga. Masalah in telah dikaitkan dengan kurikulum tersembunyi dalam program sarjana muda perubatan. Kurikulum tersembunyi dipercayai mengurangakan minat doktor-doktor untuk memilih bidang ini. Tujuan projek penyelidikan ini adalah untuk membangunkan sebuah kurikulum perubatan keluarga di tahap sarjana muda melalui penyelidikan. Teknik Delphi telah digunakan untuk penyelidikan ini. Tiga pusingan Delphi telah digunakan untuk projek penyelidikan ini. Para peserta untuk penyelidikan ini terdiri daripada pakar-pakar perubatan keluarga yang terlibat dengan pengajaran di peringkat sarjana muda perubatan. Para pakar ini dipilih berdasarkan kriteria yang dikembangkan bersama dengan dua orang ahli akademik kanan yang juga merupakan pakar dalam dua bidang iaitu bidang pendidikan perubatan dan bidang perubatan keluarga. Kurikulum yang dibangunkan melalui penyelidikan in mengandungi 34 topik klinikal teras dan 15 tugasan profesional yang boleh dipercayakan "Enstrustable Professional Activities" (EPAs). Topik-topik klinikal dalam kurikulum yang dibangunkan ini merupakan topik-topik teras bagi bidang perubatan keluarga dan harus diajar di peringkat sarjana muda. Kurikulum yang dibangunkan ini juga mengandungi senarai EPA yang patut ada dimiliki oleh setiap siswazah baru yang akan memulakan tugas sebagai doktor di jabatan perubatan keluarga. Di harap bahawa hasil penyelidikan ini akan membantu dalam pembentukan dasar- dasar atau garis panduan dan juga akan mempengaruhi kurikulum sarjana muda perubatan. Tambahan pula, hasil

penyelidikan in akan menambah ilmu pengetahuan mengenai bidang perubatan kelaurga dan juga pendidikan perubatan.

Kata kunci : pembangunan kurikulum, perubatan keluarga, tugasan profesional yang boleh dipercayakan, Delphi, pendidikan perubatan.

ACKNOWLEDGEMENTS

First of all, I would like to thank University Malaya for allowing me to do my masters at this great establishment.

I am very grateful to my supervisors Dr Foong Chan Choong and Dr Hong Wei Han from MERDU, Faculty of Medicine, University of Malaya, for their ever-valuable suggestions, comments and guidance. This project would not be possible without their constant support and encouragement.

Special thanks to Dr.Veena Joshi, my Head of Department of Primary Care Medicine at MAHSA University and Professor Dato' Dr.Ravindran Jegasothy, Dean of Faculty of Medicine & Biomedical Sciences, MAHSA for being very supportive with my masters journey.

I am ever grateful to Prof. Lee Pei Yin, Professor of Family Medicine, University Putra Malaysia and Assc. Prof. Dr.Vinothini, Department of Primary Care Medicine, MAHSA University, for their support and assistance with this project.

A special mention must go to my parents (Mr Narayanan and Mrs Thanaletchimy) and my brothers (Anand & Navin). They had been a tremendous pillar of support throughout my masters journey.

I dedicate this project to my wife, Priya; my son, Anesh and my daughter, Sonisha. Thank you for all the understanding and sacrifices that you have given to me.

I am also grateful to several people whom I have not mentioned in person here. Thank you very much, everyone.

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LIST OF SYMBOLS AND ABBREVIATIONS

AAMC	:	Association of American Medical Colleges
AFPM	:	The Academy of Family Physician Malaysia
CBME	:	Competency-based medical education
EPA	:	Entrustable Professional Activities
ICPC-2	:	International Classification of Primary Care classification, 2nd Edition
ICPC-2E	:	International Classification of Primary Care classification, 2nd Edition, Electronic version
MMC	:	The Malaysian Medical Council
MOH	:	Ministry of Health
NMCS	:	National Medical Care Survey
NSR	:	National Specialist Register
RPE	:	reason per encounter
UKM	:	University Kebangsaan Malaysia
UM	:	University Malaya
USM	:	University Sains Malaysia

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CHAPTER 1: INTRODUCTION

1.1 Primary Care Medicine in Malaysia

Primary health care, primary care, general practice and family medicine are terms that often being used interchangeably (World Health Organization Regional Office for Europe, 2019). Primary care is a medical discipline which provides community-based, continuing, comprehensive, preventive care, in a personalised manner to patients of all ages and gender, and their families, regardless of the presence of disease or the nature of the presenting complaint (The Academy of Family Physicians of Malaysia, 2016). This discipline is undeniably an essential aspect of an efficient and effective health care system because of the ability to reduce the cost of care and to improve health care quality (Salman Rawaf, 2018).

The Alma-Ata Declaration of 1978 by the World Health Organization was a major milestone in the twentieth century, which called for a revamp of the health services and focus on primary care (World Health Organization, 1978). This declaration led to the birth of modern primary care, and it also started the reorganisation of the health services in Malaysia (Thomas, Beh, & Nordin, 2011). These events and the increasing need for primary care led to the introduction of the first undergraduate primary care or family medicine curriculum in 1989. The postgraduate specialist training for primary care came into the picture around 1990 (Anis Safura Ramli et al., 2019).

In the Malaysian healthcare system and most healthcare system in the world, the majority of patients are seen by the primary care system. Currently, Malaysia has a dual public-private primary health care system, which functions as a gatekeeper. Primary care doctors are the gatekeeper to secondary, tertiary care or other healthcare providers. The public sector has an extensive network of 2,871 which comprises of health clinics, community clinics, 1Malaysia clinics and mobile clinics for the urban, rural and remote

area throughout the country (Milton Lum, 2019). This network provides about 60% of primary care (Milton Lum, 2019; Rifat Atun, Peter Berman, William Hsiao, Emily Myers, & Wei Aun Yap, 2016). Meanwhile, the private sector consists of 6,978 clinics which are clustered in urban and semi-urban areas which provide about 40% of outpatient care and accounts for about 65% of total expenditure on primary care (Milton Lum, 2019; Rifat Atun et al., 2016).

Most of the private primary care centre are solo practices with a single doctor manning the practice and assisted with 3-5 assistants. In contrast, the public primary care centre houses a larger group of healthcare professionals. According to the National Medical Care Survey (NMCS), public clinics were staffed with 26.4 health professionals on average, with a median of three doctors (Sivasampu et al., 2016). The NCMS also showed that only 15.7 % of the doctors in primary care have a primary care related postgraduate qualification, and they are mostly in the public sector. The spectrum of conditions seen by these two sectors also differs. Public centres see more patients for chronic diseases and the private sector sees mainly for acute complaints.

Primary care has been long considered as the major thrust for Malaysia's health care (Anis Safura Ramli et al., 2019). Even though Malaysia has achieved reasonable health outcomes by spending a modest amount of the gross domestic product on healthcare, the country is now experiencing a new health care landscape. The incidence of infectious diseases and chronic lifestyle conditions is on the rise, which is further complicated with an ageing population (Jiwa et al., 2012). Besides that, the current global health policies and initiatives are focusing on providing universal health coverage. The way forward for a better healthcare system and outcome is to strengthen primary care (van Weel & Kidd, 2018). Based on these, the Malaysian healthcare reforms are geared towards

strengthening and enhancing the primary care services (WHO Representative office for Malaysia, 2019).

1.2 Primary Care Training in Malaysia.

Medical education in Malaysia roots back to 1963 when the Faculty of Medicine was established in University of Malaya. Now, medical education is being delivered by 32 medical schools in Malaysia (Malaysian Medical Council, 2018). Twenty-one of these institutions is private institutions. These institutions produce around 2000-3000 doctors per year for the Malaysian healthcare system (Wong & Abdul Kadir, 2017). Some of these medical schools have international collaboration and conduct twinning or credit-transfer programmes. Besides the Malaysian teaching staff, these universities have experienced expatriates educators from India, Bangladesh, Pakistan, Myanmar and Indonesia (Roy, Goh, & Malik, 2017).

Currently, the duration of medical programmes in Malaysia is five years. These programmes are usually divided into two stages, which are "preclinical years" and "clinical years". The usual arrangement would be the initial two years for pre-clinical or basic science and the remainder three years will be for clinical teaching. The duration of clinical years (36 months) is fixed for all schools because it is the requirements of the relevant accreditation bodies in Malaysia. However, the distinction between clinical and pre-clinical has becoming blurred with more medical schools introducing early clinical exposure during the first two years of the medical programme. Three of the major medical school (UM, UKM and USM) have their teaching hospital. The rest of the medical schools utilises the Ministry of Health hospitals and other clinical facilities.

Nearly all medical schools adopt discipline-based modules which are usually delivered in the form of rotations or postings for the clinical years. Students will undergo rotation or postings of various disciplines like Internal medicine, obstetrics and gynaecology,

surgery paediatrics, orthopaedics and surgery during their clinical years. As an accreditation standard, primary care is considered as a core discipline, and students should be adequately exposed to it as part of their clinical education. The duration of the primary care posting or rotation can range from 4 weeks to 12 weeks. Some schools combine primary care discipline with other disciplines like rural health, community or public health. During the primary care rotation or postings, students are exposed to either or both government health clinics and private health clinics too. Some schools require students to be attached to clinics which are in the rural area. Besides clinical teaching, the primary care rotation or postings are usually delivered using various teaching-learning methods, including student-oriented learning activities and small group teaching. Students are usually required to maintain logbooks and portfolios of their clinical learning activities during this rotation (Lim, 2008). Assessment for primary care rotation is usually formative and summative. Assessment for primary care medicine is conducted during high stakes exams. In addition to theory examination, clinical assessment method like Objective Structured Clinical Examination (OSCE), short cases or long cases are usually used for assessments. Some schools also assess the student's portfolio or logbooks.

In Malaysia, following completion of the medical programme, graduates are eligible for provisional registration by the Malaysian Medical Council. These provisionally registered graduate doctors (house officers) will undergo compulsory housemanship (internship or residency) for two years. During this housemanship period, house officers will undergo 4-month rotations in surgery, paediatrics, internal medicine, obstetrics and gynaecology and orthopaedics. The final rotation will be in either emergency medicine, anaesthesiology, psychiatry or primary care for four months. After completing six rotations, these doctors are eligible for full registration. Malaysians are required by the Ministry of Health (MOH) to undergo further two years of compulsory service. Some

doctors will join as medical officers in the public primary care clinics upon full registration.

After completing the compulsory services, doctors have an option to join the private sector as a general practitioner or remain in government service. The fully registered doctors in the government service have the option to pursue postgraduate training to become a primary care medicine specialist. Currently, postgraduate specialist training in Primary Care is being offered by six of the public universities. The postgraduate student undergoing training with these institutions will be conferred a masters degree, and the usual length for this training is four years. There are also parallel pathways where both private and government doctors can take to become a primary care medicine specialist. One of the recognised pathways is the Membership of the Academy of Family Physician Malaysia (MAFPM) and Fellowship of Royal Australian College of General Practitioners (FRACGP). The Membership of the Irish College of General Practitioners (MICGP) is another alternative pathway which is still at an explorative stage.

1.3 Outcome-Based Education, Competency-Based Medical Education and Entrustable Professional Activities.

Since the 1950s, Malaysia has been practising outcome-based education (OBE), and it has been implemented at all level of education, including tertiary education (Mohayidin et al., 2009). OBE emphases on the finished product or output and defines what the learner is answerable for any teaching and learning program (Haque, 2017). In the last few decades, there has been increasing literature on how OBE has influenced medical education (Ronald M. Harden, 2007). A curriculum that is based on the principles of OBE will be designed to focus on the end product (the type of doctor produced) rather than the educational process (R. Harden, 1999). This approach provides a "clear and public statement of the learning outcomes" of the programme (R. Harden, 1999). The outcome-based curriculum not only creates awareness for all the stakeholders but decides on educational strategy and resources (R. Harden, 1999). R. Harden (1999) lists several advantages of an outcomes-based approach. These include accountability, clarity, flexibility in terms of educational strategies, and that outcomes can be used to guide assessment.

In the recent years, there has been increasing literature on competency-based medical education (CBME), entrustable professional activities (EPAs) and milestones (Carraccio et al., 2017; Iglar, Whitehead, & Takahashi, 2013; O. Ten Cate, 2005). CBME is a type of OBE (Frank et al., 2010). CBME has been defined as " An outcomes-based approach to the design, implementation, assessment, and evaluation of medical education programs, using an organizing framework of competencies" (Frank et al., 2010). However, CBME is not perfect, and it is not short of criticism. There are three categories of issues related to CBME, which are conceptual, assessment and practical issues (Touchie & ten Cate, 2016). Touchie and ten Cate (2016) states that the conceptual issue with CBME is that it is a reductionist approach which is rooted in behaviourism. Using

behavioural objectives of competency will never be able to explain complex human behaviour. Assessment wise, CMBE's assessment findings might not represent the actual performance in the real work environment (Touchie & ten Cate, 2016). One of the practical issues of CBME, it not only affects logistics and resources but also influences the breadth of knowledge and skills of graduates because it promotes educators to teach only on what is being assessed (Touchie & ten Cate, 2016).

Noting issues with CBME, Entrustable Professional Activities (EPAs) were developed. EPAs are the units of professional practice that constitute what clinicians do as daily work (Cate, 2018). Trust is the basis of EPAs. EPAs is a core set of tasks or responsibilities that all junior doctor could be trusted to do independently by upon graduation from a medical school (Krupat, 2018). The advantage of EPAs are that they are observable (assessable), related to clinical practice (relevant), integrates across a spectrum of competency domain and awarded once the learner can be trusted to perform the activity effectively, safely and independently (Dhaliwal, Gupta, & Singh, 2015). EPAs are also considered being able to improve the continuity between undergraduate and postgraduate medical training (Carraccio et al., 2017). EPAs are used in postgraduate education (El-Haddad, Damodaran, McNeil, & Hu, 2016) and there is emerging evidence on the application of EPAs for undergraduate medical education (Call et al., 2017; Chen, van den Broek, & ten Cate, 2015; Elnicki et al., 2017; Englander et al., 2016; O. Ten Cate et al., 2015). All of these supports that EPA is the way to move forward.

1.4 Problem Statement.

Over the last few decades, primary care has been recognized as a cornerstone for an efficient and effective healthcare system. This has led to an increasing focus on developing a strong primary care sector. However, in some developed countries, shortages of primary care doctors have become a major issue, and this is worsened by the trends demonstrating that the numbers of doctors entering or choosing primary care have been reducing. In the United Kingdom, recent literature confirms that there is a shortage of primary care doctors, and it is estimated that an additional 5000 primary care doctor will be needed by 2020 (Majeed, 2017). Similarly, in the United States, it is predicted that there will be a shortfall of between 21,100 to 55,200 primary care doctors by 2032 (Association of American Medical Colleges, 2019). The situation in Malaysia is also almost similar. There are a shortage and maldistribution of primary care medicine specialist in the country (Bernama, 2019).

There are many factors why doctors are not considering primary care as their career. From the medical education perspective, various literature has shown that the hidden curriculum and hostility to this discipline has caused doctors shying away from a speciality (Ajaz, David, Brown, Smuk, & Korszun, 2016; Brooks, 2016; Christopher Chung, Maisonneuve, Pfarrwaller, Audétat, et al., 2016; Phillips, Weismantel, Gold, & Schwenk, 2012; Pimlott, 2018). It is noted that the hidden curriculum of an undergraduate curriculum has been influencing future doctors by giving an image that primary care is an inferior speciality compared to other specialities and doctors who join primary care are intellectually inferior (Mahood, 2011). Woloschuk, Wright, and McLaughlin (2011) have shown that some of this image implied by the hidden curriculum is not true, especially that primary care is the field for underperforming graduates. In addition , it has been shown that there is a lot of difference on the way primary care is being taught at the undergraduate level and students could also be minimally exposed to the field (Brekke et

al., 2013; Tandjung et al., 2014). Studies have shown that the timing of exposure and the context (who, what, when, where) of a speciality during undergraduate can influence the student's future careers (Pianosi, Bethune, & Hurley, 2016).

In Malaysia, medical education is currently delivered by 34 medical schools (Malaysian Medical Council, 2018). Currently, there is limited evidence to show that a shared national undergraduate curriculum for primary care exist in Malaysia, and every medical school has its unique curriculum which exposes their students differently to primary care. In 2014, a study involving Asia Pacific medical schools was conducted to determine the status of primary care teaching in these schools (Jenn Ng et al., 2016). It involved seven schools from our country, Malaysia. It was found that the duration of postings, assessment and the curriculum delivery used in these schools had wide variation. It showed that every school had a different primary care curriculum. Other works of literature on this subject were very descriptive. A review article stated that medical schools need to expose primary care to undergraduate students as a requirement for accreditation (Lim, 2008). It did not describe the current curriculum for primary care. Similarly, another review article describing the trends of curricula among Malaysian medical schools states that primary care was taught at the undergraduate level, but it failed to describe the curriculum adequately, and it suggested that every school was approaching it differently (Azila, Rogayah, & Zabidi-Hussin, 2006). The study included a very small number of public medical school.

A specialty shared curriculum has been considered as a way to overcome the hidden curriculum against primary care and encourage more doctors to consider primary care as their career (Blythe & Hancock, 2011; David A. Keegan et al., 2017a; McDonald, Jackson, Alberti, & Rosenthal, 2016). It has also shown that the having a primary care undergraduate curriculum can influence future career choice in primary care (C. Chung,

Maisonneuve, Pfarrwaller, Audetat, et al., 2016). Based on these reasons, developed countries like North America (H. Chumley, 2009b; O Brien-Gonzales, Chessman, & Sheets, 2007), Canada (David A. Keegan et al., 2017a), and Europe (Fazio et al., 2016; Tandeter et al., 2011) have created a shared or a national primary care curriculum.

The Malaysian healthcare policies and reforms have been in the direction of strengthening primary care (Bahagian Perancangan Kementerian Kesihatan Malaysia, 2016). In order to achieve this, a national or shared undergraduate primary care curriculum which will not only address the issues with the hidden curriculum but encourage more doctors to consider primary care as their career choice is needed. Besides that, having a national or shared undergraduate curriculum has other benefits. Le and Prober (2018) state that a shared curriculum which is developed by consensus will create a shared medical curriculum ecosystem. This ecosystem would help medical schools reduce cost, save time on curriculum development and focus on developing more valuable teaching activities. It will also provide students with a more consistent educational experience which are better aligned to the main stakeholder's need. i.e. the national medical council.

It is high time to conduct a study to develop a curriculum for primary care at the undergraduate level in Malaysia. This study will be useful overcoming the problems mentioned earlier, and eventually strengthen the primary care sector.

1.5 Rational of the Study

It is undeniable that primary care is an important pillar of a healthcare system. From the World Health Organisation's Alma Ata Declaration (World Health Organization, 1978) until the current reforms in healthcare, primary care has been in the limelight in achieving these goals. In Malaysia, the majority of doctors are produced by local medical schools and a large number of these doctors enters the primary care workforce (Wong & Abdul Kadir, 2017). Therefore, any new and significant knowledge that can improve the education and training of theses graduates and promote them to enter the primary care workforce will be an added advantage.

From my own experience as Primary Care Medicine Specialist working as a lecturer at the Department of Primary Care Medicine, MAHSA University and trainer for postgraduate training, I know that primary care doctors provide a wide range of care like diagnosis and management of acute and chronic illnesses, health promotion, disease prevention, health maintenance, counselling and patient education. In order to provide these services, doctors need to have a different set of knowledge, skills and attitude compared to those doctors who are based in the hospitals. This motivated me to understand further what can be done to train under undergraduates to prepare them and encourage in the field of primary care.

As a result of these inquisitions of mine, I started to develop an interest in curriculum development, specifically looking at what should be taught and what are the expected of a primary care doctor. It was during exploration of these ideas; I realised that there were very limited research and literature on Malaysian undergraduate curriculum, especially concerning primary care. This was another motivating factor that gave rise to this project.

1.6 Research Objectives

The objectives of this study are:

1. To determine core clinical topics that a medical student should learn as part of an undergraduate primary care curriculum
2. To determine the expected entrustable professional activities that a medical houseofficer should be able to perform on day 1 of housemanship without direct supervision, during primary care posting.
3. To develop a consensus-based undergraduate primary care curriculum based core clinical conditions and entrustable professional activities.

1.7 Research Questions

The overarching research questions that need to be to answer are :

"What should medical students in Malaysia learn about primary care medicine and what kind of capabilities or responsibilities are expected out of them when they join the primary care workforce for the first time? "

Answering this question is fundamental for developing an undergraduate curriculum for primary care medicine.

1.8 Significance of the Study

Primary care has been considered as an important aspect of a healthcare system. Despite all the various policies and supports to strengthen and improve this sector, recently, it has been facing challenges like a shortage of primary care doctors. The reason for this could be multifactorial, but there are a few factors that stem out from undergraduate education. The results of this study will contribute towards reducing the challenges faced the primary healthcare system by creating an undergraduate primary care curriculum which hopefully will help to overcome the hidden curriculum against primary care and encourage more doctors to join the primary care workforce.

Furthermore, this study will serve as the initial stepping stone in developing a shared curriculum ecosystem which could help medical schools to reduce cost, save time on curriculum development and focus on developing more valuable teaching activities. The ecosystem provides an opportunity for collaboration and resource sharing. Also, the ecosystem will be able to provide students with a more consistent educational experience which are better aligned to the main stakeholder's need. i.e. the national medical council.

This study will also be useful for policymakers, and those involve in curriculum development like deans, medical education units and other stakeholders. The results of this study could lessen their burden with curriculum development and would allow them to incorporate the findings of this study or modify their existing curriculum.

Literature shows that one the goal of undergraduate medical education is to produce well- prepare doctors for postgraduate training (O. Ten Cate, 2014). Therefore, this study will also serve as a useful reference in the future for the stakeholders involved in the developing postgraduate primary care curriculum.

Medical education research can be considered as a young field which begun to develop around the 1950s (Kuper, Albert, & Hodges, 2010). In Malaysia, it has been growing rapidly in the last few decades. Researches on primary care, together with medical education, are very limited in Malaysia. This study will contribute more to this gap of knowledge in this understudied field in Malaysia (education in primary care).

1.9 Scope of Study

This research project will focus on developing an undergraduate curriculum in primary care medicine in Malaysia. Therefore, the scope will be limited to Malaysia only. The participants of this study will be Malaysian experts. The definition these experts are explained in detail in the methodology chapter.

The concept of curriculum is very complex, and there are other aspects of the curriculum like delivery of curriculum, assessment and evaluations. The scope of this research project has been narrowed to the content (clinical topics) and the expected entrustable professional activities only. Other aspects of the curriculum are considered beyond the scope of this research project. The core clinical topics that are being studied will cover clinical topics that are relevant to Malaysia. Similarly, the expected entrustable professional activities will be related to Malaysian medical graduates entering to work in the Malaysian healthcare system.

In view that the project is part of the Masters of Medical Education Programme, University Malaya. The duration of this study will be from 18th February (Semester II) till 19th August 2019 (Special semester).

1.10 Summary of Chapter 1

This chapter provides an introduction to this research project. It briefly introduces the primary care medicine field and the research problem. Subsequently, the problem statement, rationale of the study, research objectives, the significance of the study and scope were then introduced. The purpose of this chapter is to provide the readers with a brief picture and the outlook of this research project.

CHAPTER 2: LITERATURE REVIEW

2.1 Introduction

A literature review is defined as a written summary of available literature and information that describes the past and current state of information on the topic being research (John W. Creswell, 2019)**.** The purpose of reviewing the literature to determine how the research will add to the existing literature and prevents from duplication of existing work.

This chapter will begin to establish what is currently known about definitions of curriculum, including the definitions of shared curriculum and core curriculum. It will then subsequently provide a literature review of studies done in the past, both locally and globally, that are relevant to the aspect of a specialty curriculum development. The focus will be on primary care curriculum development. Then, the literature review findings regarding medical problems or conditions that are relevant to undergraduate primary care and entrustable professional activities will be discussed. Finally, the chapter will be concluded with a summary.

2.2 The Definitions of Curriculum

The word curriculum is originated from Latin, which means “track or racecourse” (Prideaux, 2003b) The definition of curriculum was first used in Scotland around 1920s (Wiles & Bondi, 2007). However, to define curriculum has been a very challenging task, and various definitions exist. It estimated that there about 120 definitions of the curriculum in the literature (Portelli, 1987). In the medical education field, experts have also proposed several definitions. Kern, Thomas, and Hughes (2009) define curriculum as a planned educational experience in their book curriculum development in medical education (Kern et al., 2009). In contrast, Prideaux defines curriculum is all the planned learning experiences of a school or educational institution (Prideaux, 2003a). These definitions are concise but are not comprehensive on all the aspects of the concept of the curriculum. Harden, for instance, describe curriculum as a sophisticated blend of educational strategies, course content, learning outcomes, educational experiences, assessment, the educational environment, and the individual students’ learning style (R. M. Harden, Sowden, & Dunn, 1984; Simiao Li-Sauerwine & Andrew King, 2018). The definition can be considered broad but not comprehensive enough. Recently, Janet Grant (2018) proposed a more broader working definition of the curriculum whereby curriculum being defined as a managerial, ideological, and planning document that should:

• Tell the learner exactly what to expect – including entry requirements, length and organisation of the course or programme and its flexibilities, the assessment system, and methods of student support.

• Advise the teacher what to do to deliver the content and support the learners in their task of personal and professional development.

• Help the institution to set appropriate assessments of student learning and implement relevant evaluations of the educational provision.

• Tell society how the school is executing its responsibility to produce the next generation of doctors appropriately.

The definition of curriculum proposed by Grant (2018) is complete and ideal for the undergraduate curriculum, including speciality curriculum. However, to develop a curriculum based on this definition would require a great amount of time and resources.

Meanwhile, there is limited literature in the medical education field on the definition of a shared curriculum. The term shared curriculum was used in the shared Canadian curriculum in family medicine, and it was described as an open-access, free of charge educational resources which are based on research and peer-reviewed educational resources (United Nations, 2018). In comparison, Le and Prober (2018) describe share curriculum as a common set of shareable curricular components leading to standardised learning outcomes in core competencies. The difference between the two definitions is that the earlier definition defines the characteristics of the developed curriculum, and the later definition defines the characteristics and purpose of the curriculum.

The idea of a core curriculum was first introduced more than 25 years ago (R. Harden & Davis, 1995). The core curriculum was introduced mainly to address the issue of content overload. The core curriculum was defined as mastery of the core, which may cover knowledge, skills and attitudes and ensures the maintenance of standards (R. Harden & Davis, 1995). They also illustrated that core could mean differently to different people. Out of the four definitions of the core, there were two that relevant to a speciality curriculum. Core means the essential aspects or key aspect of the discipline (R. Harden

& Davis, 1995). Another definition is that core means key competences required of the doctor for the practice of medicine (R. Harden & Davis, 1995)

The above definition proposed by R. Harden and Davis (1995) is more contextual and allows decisions on the essential aspects, contents and competencies to be made based for a speciality curriculum. Complying to this definition would also fit with the concept of a shared curriculum describe by Le and Prober (2018), which also aims to achieve a standard. As mentioned above, various definitions for curriculum exist in medical education, but there is no one perfect definition. For the reasons mentioned earlier, the definition of core curriculum proposed by R. Harden and Davis (1995) will be appropriate for this study. Core curriculum is the mastery of the core, which may cover knowledge, skills and attitudes and ensures the maintenance of standards.

2.3 Developing of Undergraduate Primary Care Curriculums.

Various specialities have developed a speciality based undergraduate curriculum in (Feigenbaum, Boscardin, Frieden, & Mathes, 2014; Denise Rohan, Ahern, & Walsh, 2009a) the recent years (Lloyd, Tan, Taube, & Doshi, 2014). A shared curriculum for primary care has been developed in various countries by speciality societies, government medical councils and researchers.

In the United Kingdom (UK), the Royal College of General Practitioners (RCGP) and the Society for Academic Primary Care (SAPC) published a guidance titled Teaching General Practice: Guiding Principles for Undergraduate General Practice Curricula in UK Medical Schools in October 2018 (Harding, Hawthorne, & Rosenthal, 2018). This guidance is the closest thing to a shared curriculum in the UK. It was developed using methods like extensive literature review, group discussions and multiple consensus development conferences. It was developed by involving primary care educators and students. The results were a guiding document which describes the expected content to be taught and the delivery process. The content did not describe the expected core clinical topics and skills but more on guiding principles which were based on person-centred care, population-centred care and providing highly efficient care in the community settings.

In Canada, a shared national curriculum in family medicine (primary care medicine) was developed beginning 2006 with the purpose to assist education leaders to fulfil the responsibilities entrusted to them and to support undergraduate training in primary care clerkship (David A. Keegan et al., 2017a). It was also developed for countering the hidden curriculum against primary care medicine and providing a route to scholarship. It was a national collaborative project involving the undergraduate primary care education directors and supported by the College of Family Physicians of Canada. Through a modified Delphi process, 23 core clinical topics with demonstrable objectives were

identified for the curriculum. This curriculum has been adopted by medical schools across Canada. The developed curriculum contained 23 clinical scenarios which were based on clinical condition or the presenting problem. The developed curriculum also contained seven competency objectives.

Given the increasing demand for primary care services and the changing of healthcare scope, a blueprint for an undergraduate primary care curriculum was developed by Harvard Medical School (Fazio et al., 2016). The blueprint was developed by a working group of 15 Harvard Medical School educational experts from the various primary care-related fields. Besides family medicine doctors the group consisted of 5 medical students, paediatric, medicine–paediatrics and primary care internal medicine doctors. The blueprint was developed by initially reviewing the literature and followed by a series of iterative discussions among the working group members. The blueprint contains three competency domains which were care management, specific areas of content expertise, and understanding the role of primary care in the health care system. Within each domain, it was further divided into a more specific curriculum content and competencies that all medical students should attain by graduation (Fazio et al., 2016). The blueprint lists 19 clinical topics under the approach to acute care and 23 clinical topics chronic care, respectively.

In the United States, it was also noted that the medical schools had wide variations undergraduate primary care curriculum. This resulted the Society of Teachers of Family Medicine to develop a task force to address this issue. The task force consists of major stakeholders in the family of family medicine. The taskforce developed The Family Medicine Clerkship Core Content Curriculum (Heidi Chumley, 2009a). The curriculum was developed via formal consensus development conferences. The curriculum contains a set of learning objectives and common conditions tied to one of three types of office visits

– patients presenting for acute, chronic, or preventive care (The Society of Teachers of Family Medicine, 2018). This list contained common presentations and not the extensive list of conditions that are seen in primary care. One lesson learnt from this study is that the list of conditions should not be long.

Noting that that primary care is not developed similarly worldwide, and wide variations exist on how primary care is being taught at undergraduate level across Europe, the Basic Medical Education Committee of the European Academy of Teachers in General Practice and Family Medicine (EURACT) developed a 'minimal core curriculum' for Family Medicine in undergraduate medical education (Tandeter et al., 2011). Delphi method was used to develop this curriculum. The participants comprised of 40 family physicians and medical educators. These participants were national representatives from all European countries, including Israel. The core curriculum developed had 15 themes. Some of these themes included clinical topics like diabetes, hypertension, chronic ischaemic heart disease, and obesity. The description of the methodology and discussion was brief in this study.

Compared to some of the developed country, the South East region is still tardy in developing a shared undergraduate primary care curriculum. There was limited literature on undergraduate primary care curriculum from other South-East countries except one from Indonesia.

Indonesia has adopted a national undergraduate curriculum which not specific for primary care but it is orientated towards primary care. (Claramita, Sutomo, Graber, & Scherpbier, 2011). This curriculum was developed by focus group discussion, nominal group technique and formal consensus development conference. It involved the various medical councils, schools, organisations, specialists and many discussions during conferences (Indonesian Medical Council, 2012). The curriculum delineates that medical

students should achieve seven competencies, which are effective communication, clinical skills, medical knowledge, patient-management, information-management, life-long learning and ethics-professionalism. It also lists down various medical conditions and reason per encounters in a system wise manner (Cardiovascular, Respiratory etc). Each of this reason per encounter or medical condition, the entrustable professional activities and milestones were given.

2.4 Medical problems and conditions that are core to undergraduate Primary Care

There are thousands of problems and conditions that a patient can present to a primary care doctor. ICD-10 (10th revision of the International Statistical Classification of Diseases and Related Health Problems) is one of the most used medical classification (World Health Organization, 2015). It was developed by the World Health Organization (WHO). It contains codes for diseases, disorders, injuries and other related health conditions. There are more than 10,000 codes in this classification. Logically, it is almost impossible to learn or teach all of them. It is not only the number of conditions, but the knowledge about these conditions have also been ever-expanding. Since the 1960s, this has been posing as a difficulty to students and medical schools and has been labelled as information overload (Anderson & Graham, 1980). One of the methods that can be used to prevent information overload is to develop core curriculums focusing on pertinent or common conditions (R. Harden & Davis, 1995).

In primary care, the International Classification of Primary Care classification, 2nd Edition (ICPC-2) is widely adopted and used primary care-related research. (The University of Sydney, 2018; World Organization of National Colleges, Academies, & Academic Associations of General Practitioners/Family Physicians, 1998) . It is more suitable for primary care because it classifies according to patient's reason for encounter (RPE), the problems/diagnosis managed, interventions, and the ordering of these data in an episode of care structure (World Health Organization, 2019). The reason for this type of classification being used in primary care is because, in primary care, the patient can present with an undifferianted, undiagnosed sign or symptom. Diagnosis may or may not be made after a few rounds of a clinic visit. Patients can also present with a health concern which may not be a diagnosable condition. i.e annual medical examination.

The original printed version of ICPC-2 had many errors and inconsistencies, and the newer corrected digital version (ICPC-2E) was introduced in 2000 (Miller & Britt, 2000; Okkes, Jamoulle, Lamberts, & Bentzen, 2000). Therefore, determining medical problems or conditions that are relevant to undergraduate primary care should be based on the latest ICPC-2E classification.

Determining the medical problems or conditions that are relevant to the undergraduate curriculum has been under-researched and most researchers have used consensus methods to determine it (Rolfe et al., 2002). There is ambiguity to the definition of the core, but defining it loosely as " common and important" conditions has been accepted and used (Haddad et al., 1997).

With regards to the common conditions seen in primary care, a recent systemic review involving several large-scale studies from 12 countries shows that there are twelve common conditions or RPE presenting to the primary care setting (Finley et al., 2018). The list of conditions and RPEs is shown in Table 2.1. The ten most commonly seen conditions or reason per encounter in the Malaysian primary care setting is published in The National Medical Care Survey (NMCS) 2014 (Sivasampu et al., 2016) . The list published in the NMCS was also developed based on the ICPC-2E classification. In comparison to the list from Finley et al. (2018), the Malaysian list is 75% similar. The list of conditions and RPE from both studies are shown in Table 2.1.

Therefore, the common conditions seen in the primary care sector should be used as a guide in developing the curriculum. Selecting these conditions should be based on evidence and relevant to the local context. Therefore, the listed conditions from the NMCS report are relevant to this study. The conditions used in this study and that will be developed should be follow the ICPC-2E classification.

Table 2.1 Common clinical conditions or RPE seen at primary care.

Study/ Report	**The National Medical Care Survey (NMCS) 2014**		**What are the most common conditions in primary care? Systematic review***
Type of Facility	Government	Private	
Common clinical conditions or RPE	1. Hypertension 2. Diabetes 3. Lipid Disorder 4. Cough 5. Fever 6. Runny Nose/ Rhinorrhoea 7. Medical examination- (Pregnancy) 8. Musculoskeletal Symptoms/ Complaints 9. Medical Examination 10. Blood test - Endo/Metabolic	1. Fever 2. Cough 3. Runny Nose/ Rhinorrhoea 4. Musculoskeletal Symptoms/ Complaints 5. Abdominal Pain 6. Hypertension-Cardiovascular 7. Pain/ Sore Throat 8. Diarrhoea 9. Headache 10. Back problem	1. Hypertension 2. Upper respiratory tract infection, unspecified 3. Depression or anxiety 4. Back Pain 5. Routine health maintenance 6. Arthritis (not back) 7. Dermatitis 8. Acute otitis media 9. Diabetes 10. Cough 11. Medication 12. Urinary Tract Infection

(Source : Finley et al. (2018))

As discussed earlier, medical problems or conditions that are relevant to undergraduate primary care should be based on the latest ICPC-2E classification because of the characteristics of presentation to primary care. Therefore, clinical topics should include both clinical conditions and RPEs to be relevant to primary care.

2.5 Entrustable Professional Activities

Even though EPAs is a new concept, developing EPAs specific for primary care has been attempted. Shaughnessy et al. (2013) developed entrustable professional activities in family medicine using the Delphi process. The study utilised a group of 22 experts who were academic doctors who were considered an expert in the field of competency-based teaching and assessment in primary care. The initial list of EPAs was developed based on literature and followed by multiple steps of iteration using formal and informal discussion, and pilot testing for its suitability. The initial list developed that was brought to first Delphi round had 91 EPAs, and upon completion of the study, the list contained 76 EPAs. The EPAs produced were a hybrid of clinical presentation and competency. The limitation of this study was that the study was conducted based on by a single setting, clinical practice, faculty, and program philosophy. The generalisability of its findings to other regions and centres is doubtful. The list produced was also too long.

In 2015, the Family Medicine for America's Health: the Council of Academic Family Medicine developed 20 Entrustable Professional Activities (EPAs) for primary care medicine. (Garvin & Mazzone, 2017). There was limited information on the methods used to develop these EPAs. However, this literature listed 20 EPAs which expected of doctor completing residency.

EPAs for primary care has also been developed in Canada (Schultz, Griffiths, & Lacasse, 2015). 35 EPAs were developed as part of a larger study of developing EPA-based assessment system. The EPA was developed using a group consensus method. An important point was learnt from this study, logistic and time of constrains should always be considered properly when considering the methodology for developing EPAs. Logistics and time constrain had to influenced the researcher's choice of the methodology of EPA development in this study.

In the Asia region, the literature on undergraduate EPA is limited (O'Dowd, Lydon, O'Connor, Madden, & Byrne, 2019). The National University of Singapore's Yong Loo Lin School of Medicine has developed and implemented EPA for medical graduates (Goh, Samarasekera, & Jacobs, 2015). EPAs were developed as part of curriculum revamp in 2006 (Samarasekera, Ooi, Yeo, & Hooi, 2015). However, the methodologies used were not described. The EPA developed were not speciality specific. The EPAs developed based on a modified definition of the Dreyfus model of skill acquisition. The EPAs were not truly EPA because it was paired with clinical conditions reflected entrustability rather than entrustment (Goh et al., 2015).

A recent systemic review on EPAs related researches for the last seven years (2011–2018) shows that only three studies have developed EPAs for primary care (O'Dowd et al., 2019). The systemic review involves 49 studies from all over the world. The literature shows that various specialities have developed and implemented EPAs. In this systemic review, the most common method used to develop the initial draft EPAs was using working group method (69%) followed by literature review (26%) and other methods like interviews and focus groups. In the same review, it was noted that Delphi method (26%) was the second most common method used for EPAs development. The other methods used for EPA development were stakeholder deliberation (51%) and surveys (21%).

With regards to the development of EPA, The Association of American Medical Colleges (AAMC) published a guide on developing EPAs on May 2014 (Call et al., 2017). The set of 13 EPAs provided was generic and not speciality specific. The EPAs were meant for doctors entering residency, and medical schools were encouraged to consider them in determining outcomes for graduating students. The benefits of developing EPAs using this guideline is because it was developed based literature and vetted by experts in the field of medical education. (Englander et al., 2016). This guide has been used by 10

medical schools in the Unites States as part of a pilot study (Lomis et al., 2017). The aim of this pilot study was to use the EPA framework to improve their graduates' professional duties at the beginning of residency with the ultimate goal of improving patient care (Lomis et al., 2017). From the pilot study, they concluded that the Core EPAs offers a valuable framework to clarify the core clinical expectations of medical school graduates. One of the recommendations of this pilot study is that they encourage collaborations with other educators on developing common national standards for entrustment.

Another template that guides the development of EPA is the one proposed by Olle Ten Cate and Young (2012) in their article. The guidance is very brief compared to the guide provided by the Association of American Medical Colleges (AAMC). Utilisation of this guide has also been very limited (O'Dowd et al., 2019).

2.6 Summary of Chapter 2

From the literature, it is obvious that there is limited information and studies when it comes to undergraduate primary care curriculum in Malaysia. Various definitions of the curriculum were reviewed, and the one proposed by R. Harden and Davis (1995) was found to be appropriate for this study. It was also noted that medical problems or conditions that are relevant to undergraduate primary care should be based on the latest ICPC-2E classification and NMCS report. Clinical topics should also include both clinical conditions and RPEs so that it will be relevant to primary care.

The information for this chapter, which is taken mainly from recent journals and articles provided us with a better understanding on the concepts of curriculum, clinical conditions or reason per encounter and the development of entrustable professional activities. The discussion and information from this chapter will serve as a guide for the subsequent chapters. The following chapter will inform us on the theoretical and conceptual framework underpinning this research.

CHAPTER 3: THEORETICAL & CONCEPTUAL FRAMEWORK

3.1 The Theoretical Framework

In general, a theory is a set of ideas used to explain a phenomenon and explicitly informing how theories were used for the research is a way of ensuring the quality of medical education research (Bolander Laksov, Dornan, & Teunissen, 2017).

In this study, the aim is to develop a core curriculum which will consist of core clinical topics and EPAs. EPAs has been considered to consist of multiple competencies (Cate, 2018). Therefore, it is fundamental to review the theoretical principles or educational philosophies of competencies first . Norris (1991) describes the following three different theories or construct for competency:

i. The Behaviourist Construct.

   This is the most common construct. It is founded on a description of the behaviour or also known as performance and the situation in which it takes place. Also, it should be able to be demonstrated and observed. It based on the notion of something a person is or should be able to do. To sum up, competency in this theory is a description of action, behaviour or outcome in a form that is capable of demonstration, observation and assessment.

ii. The Generic Construct of Competence.

   This approach "favours empirical investigation to establish the competencies which discriminate between average and expert performers as opposed to the theoretical or logical requirements of a particular occupational function" (Norris, 1991). Information about general abilities associated with expert performers is obtained by studying behavioural events or critical incident interviews. However, there is a lack of understanding of whether it poses as

strength or weakness when the generic construct of competence which has been determined by this theory is being universally applied. Critics also highlight the various serious problems associated with the assessment of competence using this theory (Norris, 1991).

ii. The Cognitive construct.

It is closely related to a general theory of intelligence in terms of cognitive potential. This theoretical construct differentiates competence and performance. It describes competence as a potential and performance is behavior in an actual situation. Competency is a potential that is rooted in the cognitive and there could be a mismatch between the action and cognitive structure at times. In this theory, competency is not a measurement of what is being done in a particular situation but it goes beyond it. It considers what a person thinks and can do under ideal circumstances. Describing cognitive in these contexts is something ambitious (Norris, 1991).

In relation to the present study, the behaviourist theoretical construct will be the foundation of this study. The Malaysian education system subscribes to the concept of outcome-based education (OBE). Therefore, the penultimate aim of a curriculum developed based on OBE would be able to observe and measure the intended outcomes that have been expressed. Based on this reasoning and the research objectives of this project, the behaviourist construct will be used. The generic construct was not considered because the description of this theory or construct goes beyond the usual components of a competency, which are knowledge, skills and attitude. It also lacks provision for assessment, which makes it difficult for application in OBE. The cognitive construct is also not suitable for this study because the theory describes the competency as a potential

which is deeply rooted into the cognitive and there might be a discrepancy on what a person thinks and what he or she performs. As described earlier, medical education in Malaysia is more focused towards outcome and not on something that ongoing and could be perpetual.

Another theoretical perspective underpinning this research is positivism. In recent years, philosophical paradigms and assumptions have been considered when conducting medical education research (Bunniss & Kelly, 2010). Research paradigms and philosophy will influence the research methodology. The four major paradigms which are usually used in medical education research are positivism, post-positivism, interpretivism and critical theory.

Since the Enlightenment period during the French revolution, positivism has been the main perspective for physical and social science. The main tenet of positivism is that evidence from research conducted objectively will help humankind to fully understand the world around us and this has been considered as one of the grand theory in health professions education research (Johnston, Bennett, & Kajamaa, 2018).

Auguste Comte (1798- 1857) is a French philosopher and he is known as the founder of sociology and positivism (Barnes & Fletcher, 2019). He was the one who first coined the term positivism. Comte's most important works are the Course on Positive Philosophy (1830–1842) which was translated and condensed later by Harriet Martineau as The Positive Philosophy of Auguste Comte, the System of Positive Polity, or Treatise on Sociology, Instituting the Religion of Humanity, (1851–1854) and the Early Writings (1820–1829) (Bourdeau, 2018). The current and common conception of positivism corresponds to his writings in the Course on Positive Philosophy. Comte's positivism challenges us to search for regular characteristics and constant relationships to facts and

to laws that can be scientifically established using the scientific method of observation, experimentation, and comparison (Illing & Carter, 2019).

Another central tenet of positivism is verificationism. Verificationism or "Principle of Verification" is the philosophical doctrine that only statements that are empirically verifiable are cognitively meaningful, or else they are truths of logic (Berlin, 1938). This principle can be attributed to the works of Ludwig Wittgenstein (1889—1951), an Austrian philosopher (Biletzki & Matar, 2019). The important focus of this principle is to verify statements using scientific methods and the resulting outcomes.

The ontology of positivism is that realism. Reality is fixed and static. The epistemology of positivism is objectivism. It maintains a stand that an objective and generalizable theory can be developed to accurately describe the world (Bunniss & Kelly, 2010). This knowledge or "facts" collected, can be neutral or value-free. It is independent of the interpretation of individuals and deemed to be the truth. Therefore, researchers should be objective in the collection and interpretation of data. The researcher will be an independent observer who discards their personal bias and attempts to standardise methods. Another assumption is that the object of study cannot influence or be influenced by the researcher.

Positivist methodology is usually aimed to deduct what exists by prediction and control of phenomenon (Swinton & Mowat, 2016). Research procedures are usually adhered strictly to prevent values and biases influencing the data. The methodology is usually reported in detail so that the findings and the study is replicable. Methods that can produce quantitative data is usually used.

With this underlying philosophical paradigm as a guide, the methodology of the study was chosen —The Delphi Survey. The Delphi survey's philosophical orientation is

aligned with the research paradigm of this study. Delphi survey is closely aligned to positivism, because of the intention and objectives of the study which is primarily to build consensus and require the use of quantifiable methods (Hanafin, 2004; Shariff, 2015). The Delphi survey does generate narrative type of qualitative data through its open-ended questions. However, these data will further be analysed for major and recurring themes which align back to a positivist approach. In addition, the method is aligned to the positivist paradigm because the researcher's position in the study is of an objective and uninvolved observer (Hanafin, 2004). The inclusion of 'experts' assumes an ontological position of a single reality (on which 'experts' agree) and the reductionist approach to the identification of the phenomenon under study could also be understood as adhering to positivistic principles (Blackburn, 1999; Monti & Tingen, 1999). Therefore, the Delphi survey used in this study is anchored with the principles of positivism because of the use of questionnaires (quantitative methods); numerical data will be produced and analysed using statistical methods.

In summary, the underpinning research paradigm of this research is positivism, and the basis of the theoretical foundation is of behaviourist constructs/ theories.

3.2 The Conceptual Framework

With the advent of outcome-based education and competency-based education, curriculum design focus have shifted towards the curricular content and outcome that can be measured. The "backward design model" was first proposed by Wiggins, Wiggins, and McTighe (2005). Backward Design for the curriculum is an instructional design model that proposes curriculum development, to begin with the outcome. This process consists of three steps:

1) Identify the desired result (i.e. defining your learning outcome)

2) Determine the acceptable evidence (i.e. designing your assessments)

3) Plan the learning experiences and instructional materials that will be used.

Applying backward design in curriculum design is not something new. The backward design has influenced the designs of various higher education courses and has been extensively described in the scientific literature (Armbruster, Patel, Johnson, & Weiss, 2009; Cooper, Soneral, & Brownell, 2017; Davidovitch, 2013; Linder, Cooper, McKenzie, Raesch, & Reeve, 2014). With end-goal in mind, the backward model is well suited for this study and fits into the conceptual framework for this study. The conceptual framework used in this study is shown in Figure 3.1 and the following paragraph explains it.

The backward design model is used partially in the conceptual framework of this research. As described earlier, the backward model is linear, whereby the first step is to identify the desired results. The first step will be adopted in this framework. The identified results will answer the research question of this research. The behaviourist construct will serve as the theoretical foundation that will define and guide on the characteristics of the desired results (bold dotted line box). The intended outcome or the identified desired

results comprises of a list of knowledge and entrustable professional activities (a combination of knowledge, skill, attitude and professionalism). The knowledge here is the clinical topics which are knowledge about reason per encounters or clinical conditions.

The positivist paradigm (dashed line box) will influence the methodology used in this study to answer the research question. The Delphi survey method used in this study is aligned to a positivist paradigm. The Delphi method (text box shaded with dots) will be informed by information from prior research and literature review. This will be used to develop the Delphi questionnaire. The Delphi process would consist of three-iteration questionnaire surveys. The results will be analysed and reported. All of these will be done under a positivist approach using quantitative data and statistical analysis. The result will for the identified desired results which will answer the research question.

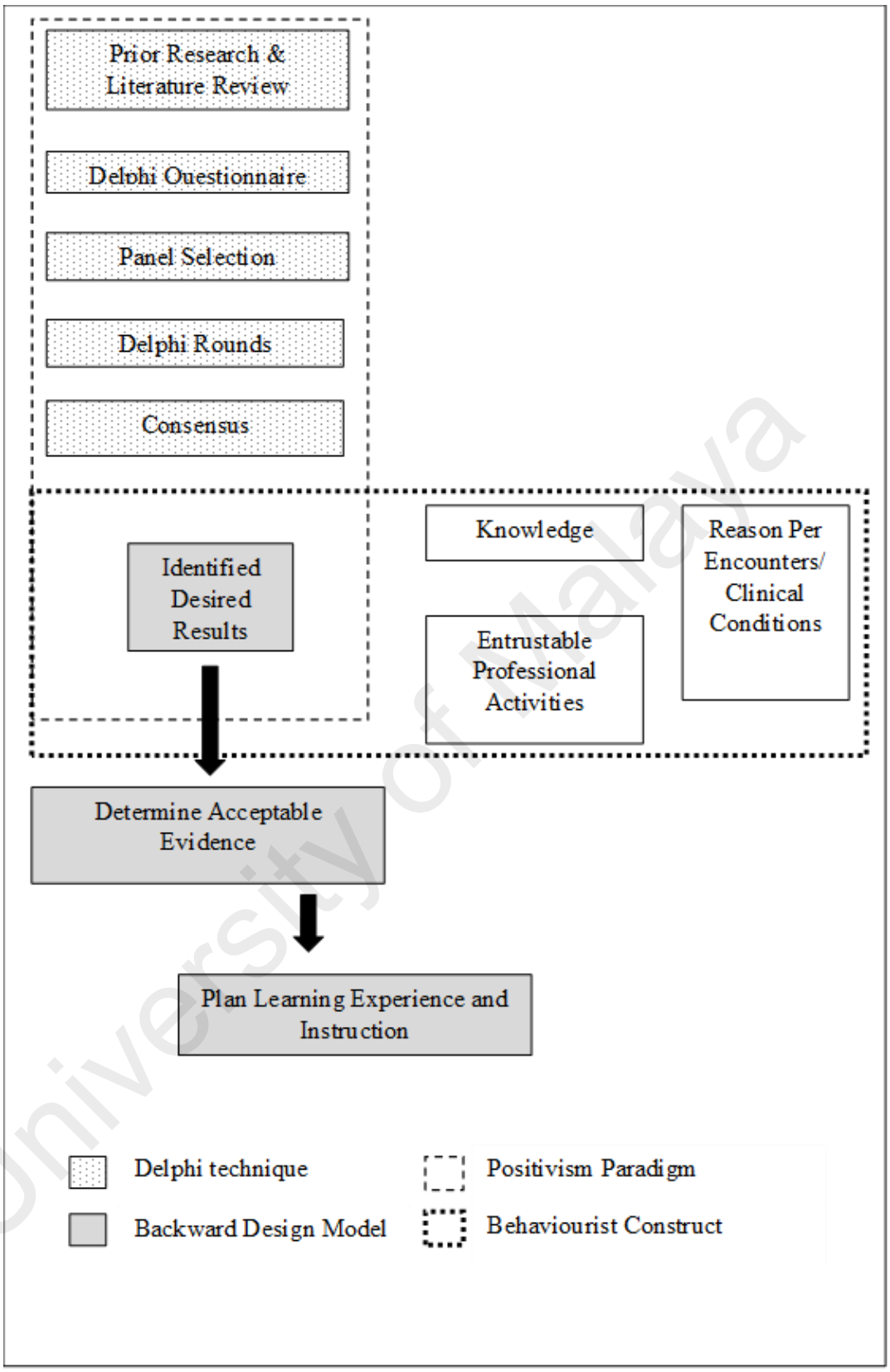

Figure 3.1 Conceptual Framework

CHAPTER 4: METHODOLOGY

4.1 Introduction

This chapter will begin with discussions on the research design and the considerations for selecting the research design. Next in the chapter will be an overview of the Delphi technique. Subsequently, the data collection process used for the research project will be discussed. Finally, all the ethical considerations which have been considered and adhered in this research will be discussed.

4.2 Research Design

According to Susan Humphrey-Murto, Varpio, Gonsalves, and Wood (2017), consensus methods are systematic methods of measuring and building consensus with the objectives of determining how well the specialists agree on a specific problem. It is based on the thinking that an accurate answer or reliable assessment of a specific problem can be best obtained by consulting a panel of experts and accepting their consensus. There are various formal consensus methods, and the Delphi technique is one of them. From the literature review chapter, it is noted that various formal consensus methods have been used for curriculum development, and the Delphi technique is one of the acceptable methods that has been used before.

The Delphi technique uses interactions between group members (called panel) via questionnaires rather than face-to-face communication (McMillan, King, & Tully, 2016). The advantage of this is that it preserves the anonymity of the participants. Anonymity stimulates an individual to be focused, allows reflection, and imagination and removes the biases introduced by the effects of status, personalities, and group pressure (Chalmers & Armour, 2019). Another advantage of this method is its ability to obtain opinions or decisions from a group of experts who has certain niche knowledge or have expertise in the topic of study.

The technique is also capable of including participants from a wide geographical area in a short period and this can be cost-effective (Susan Humphrey-Murto, Varpio, Gonsalves, et al., 2017). (Vázquez-Ramos, Leahy, & Estrada Hernández, 2007). The advantage of coverage, time and cost saving is an advantage that differentiates it from other consensus methods that usually needs face to face interaction. All this was considered when making choices for the research design.

In chapter 3, it was shown that a relationship between the Delphi methodology and the research paradigm of this research exist. It was also demonstrated in the conceptual framework on how this research design will assist with answering the research question.

Before considering the Delphi technique, a few of its limitations has to be considered first. One of the limitations is there is lack of standard guidelines for this technique (Keeney, Hasson, & McKenna, 2010). The nature of this technique which is a mixed quantitative-qualitative method makes it difficult to be standardised. There are numerous variations on this technique in the literature. Thus, it is important to note that there might not be enough assistance if any issues arise from the Delphi technique because there is lack of standards and guidance. Another limitation of this method is the issue of non-responders (Hsu & Sandford, 2007). Due to the unavailability of a standard guideline for Delphi technique, the sample size can vary greatly. The sample size is usually determined pragmatically (Thangaratinam & Redman, 2005) and non-respondents can affect the sample size, which could eventually affect the findings (Chalmers & Armour, 2019).

Taking into all these considerations, the Delphi method was found to be the most appropriate method for this research.

4.3 Overview of the Delphi technique.

Named after a famous ancient Greek oracle who could predict the future, the Delphi technique was developed by Dickey and Helmer for the United States Airforce Project RAND in 1963 (Dalkey & Helmer, 1963). It was initially designed for the military to forecast priorities. However, now it has been extensively used in various fields including business, economics, computer science, civic planning, education and healthcare. It is commonly used in situations where qualitative data cannot support decision making (Chalmers & Armour, 2019). The technique uses the knowledge and experiences of a panel of experts from the relevant field to make groups decision. It is based on the old adage that " two heads are better than one " (Nayahangan, Stefanidis, Kern, & Konge, 2018). It is now being used in various situations, including predicting future events, policy development, goal setting and problem-solving. The Delphi technique is the most common method used for curriculum development in medical education research (S. Humphrey-Murto, Varpio, Wood, et al., 2017).

The Delphi techniques is commonly referred to as a consensus method (Jones & Hunter, 1995). It is a method of gaining consensus on a particular topic or subject. It utilises a group or a panel which comprises of experts in the field. The consensus is reached by having the experts undergoing multiple rounds of questioning. There are three characteristics that differentiate the Delphi techniques from other group interaction methods. The characteristics are (Chalmers & Armour, 2019):

1. The experts are anonymous to each other, including their interactions and responses.
2. The technique utilises multiple rounds of questioning.
3. In between each round, feedback is given to the group

The key characteristics will encourage the convergence of idea and at the same time, remove the influences of societal and peer pressure on the panellist. Altogether, it reduces the biases in gaining consensus.

Since its development, the techniques has undergone various modifications to allow for a broader use. Keeney et al. (2010) describes the Delphi techniques can be categorized into nine different variations of Delphi technique and these variations are shown in Table 4.1

Table 4.1 An overview of the various Delphi techniques and its features.

No	Type of Delphi	Key Features
1.	Classical	Utilizes an open-ended question in the first round to facilitate idea generation. This is to elicit opinion and gain consensus. Three or more rounds by email or postal.
2.	Modified	The first round is replaced or modified with face-to-face interviews or focus group. May require lesser than three email or postal rounds
3.	e-Delphi	Classical Delphi administered by email or online web survey
4.	Decision	Similar as the classical Delphi The focus is on making decisions rather than coming to consensus.
5.	Real Time	Same process to classical Delphi. The difference is the experts may be in the same location. Consensus reached in real time rather than by post Also known as a consensus conference.
6.	Online	Similar as classical Delphi but questionnaires are completed and submitted online
7.	Technological	Real time Delphi using technology. Hand held technology devices can be used to conduct the process in real time
8.	Policy	Used for policy making.
9.	Argument	The purpose is to produce of relevant factual arguments Off-shoot of the Policy Delphi It is considered as a Non-consensus Delphi.
10.	Disaggregative	Goal of consensus not adopted Conducts various scenarios of the future for discussion Uses cluster analysis.

Adopted from Keeney et al. (2010)

The Delphi technique for this study will be similar to the e-Delphi technique. The e-Delphi is almost similar to a classical Delphi but the difference is the questionnaires in e-Delphi are administered by email or online web survey. A classical Delphi's first round is also similar to the first round of a e-Delphi. The purpose of first round is for idea generation and it is usually done by an open-ended questionnaire. For this study, there will be a mixture of both closed-ended questions and open-ended questions during the first round. This modification cannot be considered to be a modified Delphi method because, in the modified method, the first round begins with an interview or focus group. In view the methodology employed in this study has some variations from the classical Delphi, doesn't really fit into modified Delphi definition and looks like a e-Delphi, the general term Delphi method will be used. A more detailed explanation of the data collection process will be described in the subsequent sections. This will give a better understanding in the Delphi method untilised.

4.4 Data collection process

The data collection is the process where the researcher obtains or gathers data which will build evidence to answer the research questions (John W. Creswell, 2019, p. 9). The process involves identifying and selecting the participants, gathering their consent and obtaining information by questioning or observing. Therefore, the instrument used is paramount in achieving the objectives of this process. Technicalities like the procedures and conditions such as the timing or resource available have to be taken into consideration for the selection of the instrument (Minas & Jorm, 2010; R. Fraenkel, E. Wallen, & Hyun, 2012). Therefore, for this research project, data collection was done using Delphi questionnaires. Three rounds of Delphi questionnaire were used. The following subsection will discuss in more detail on the data collection process employed for this research project.

4.4.1 Definition of the expert panel.

It has been suggested that panels should be made primarily of experts in the field (Waggoner, Carline, & Durning, 2016). The definition of an expert has never been defined properly and there has been a lot of controversies surrounding it (Nayahangan, Stefanidis, Kern, & Konge, 2018). A recent guide suggested that experts are usually individuals who are knowledgeable, representative of the area of inquiry and have practical experience (Humphrey-Murto, Varpio, Gonsalves, & Wood, 2017).

In Malaysia, experts are generally specialist in their field of practice, and they need to be registered with the National Specialist Register (NSR) of The Malaysian Medical Council (MMC). A definition of an expert was initially developed based on the NSR requirements for primary care specialist registration. Two senior primary care medicine specialist and educationist were approached for their expert opinion and validations of the definition. Both the expert consulted were senior academicians of primary care medicine who are helming the post of Professor and Associate Professor. The final and validated definition of expert that was developed and used for this study was:

iii. A medical practitioner fully registered with the Malaysian Medical Council (MMC)

iv. A Primary Care Physician (either Family Medicine/Primary Care Medicine Specialist or a primary care doctor) with 10-year experience in primary care medicine.

v. Currently in a full-time position at a primary care/general practice/primary care teaching centre.

vi. Currently involved in primary care teaching for undergraduates.

The above definition was used as a criterion for selecting the expert panel for the study.

4.4.2 Selection of panel and panel size.

The panel size used for Delphi techniques can vary greatly. The range can be as low as 4 to as many as 3000, but the minimum accepted number is 7 (Chalmers & Armour, 2019; Thangaratinam & Redman, 2005). The size of the panel is determined by various factor like the number of questions, the questionnaire delivery method, researcher's access to the experts, the research timeframe, cost and the dropout rate (around 20-30% between each round) (Chalmers & Armour, 2019). The panel size is around 15-30 if the participants are from the same field (de Villiers, de Villiers, & Kent, 2005). For this study, the target was to recruit 25-30 participants because it is the usual panel size for the Delphi technique.

Purposeful sampling is one of the non-probability methods of sample selection and recruitment. It is commonly used for the identification and selection of individuals or group of individuals who are knowledgeable or experienced on the topic that is being researched (Palinkas et al., 2015). The method also allows the researcher to obtains sample who not only available but willing to participate. There are various designs of purposeful sampling. In general, the designs are based on the strategy on emphasising variation, similarity or non-specific. One of the strategies that emphasise similarity is the snowballing strategy. This strategy uses research participants who have been identified to recruit or identify other potential participants with the initial research participants. This strategy allows to achieve the target sample size and locate difficult to find participants (John W. Creswell, 2019, p. 143). Therefore, the participants of the panel were recruited using purposive sampling with snowballing strategy and based on the selection criteria discussed in the earlier section and achieve homogeneity.

The researcher is a member of the Association of Family Medicine Specialist of Malaysia (FMSA) and The Academy of Family Physicians Of Malaysia (AFPM). The

initial participants recruited will be acquaintances from this organizations. An email and a message via the messaging application WhatsApp (Whatsapp Inc., 2019) was sent to these acquaintances. These correspondences explained the purpose of the study and more information about the research (Appendix A) The participants for the study provided consent via a digital consent form (SurveyMonkey Inc) (Appendix B) prior to the first round of Delphi.

4.4.3 Definition of Consensus

Reaching a consensus is one of the goals of the Delphi technique, and this makes it an essential aspect of the technique. There are variations in the definition of consensus (Hasson, Keeney, & McKenna, 2000). Researchers have used the percentage of agreement, mean or a median score above a defined threshold to define and measure consensus (Humphrey-Murto, Varpio, Gonsalves, & Wood, 2017).

Based on a similar study on curriculum development for a specialty (Tam, Ingledew, Berry, Verma, & Giuliani, 2016), questionnaire items with a mean score of 7.0 or greater was considered as strong consensus and will be included in the final curriculum draft, items with a mean score of 1.0–3.9 will considered as weak consensus and be excluded from the final list, and items with a mean score of 4.0–6.9 good consensus but it will be discussed be further in the subsequent Delphi rounds.

For the final round of Delphi which will propose the final draft of the curriculum, a consensus of 75% or more was used. The final round was to seek the consensus of the expert panel based on the final list of clinical topics and the list EPAs to be included in the final curriculum. The modification of the final round was to address the possibility of non-responders, which could be the length of the questionnaire (too many items). This is one of the limitations that was noted during literature review (Shaughnessy et al., 2013). It is noted that the range of percentage agreement for consensus can be from 51% to 100%

(Loughlin & Moore, 1979; Williams & Webb, 1994). For this research, a of 75% was chosen because it was the usual and accepted percentage used (Diamond et al., 2014; Humphrey-Murto et al., 2017). It is important to note the is no standard guideline for Delphi methodology. This modification was made based on the article by Hsu and Sandford (2007). In their article, they also stated that implementing changes to achieve and maintain the desirable response rates is considered a part of the Delphi process.

The definition of consensus was informed to the participants during the beginning of the study and each round.

4.4.4 Three rounds of the Delphi questionnaire.

Generally, the Delphi process is repeated until the best possible level of consensus is reached, or until a predetermined number of rounds have been completed, which is usually around 3-4 rounds. (Chalmers & Armour, 2019; Susan Humphrey-Murto, Varpio, Gonsalves, et al., 2017). Too many rounds may influence the findings. These because there is the possibility of group composition change due to the participant dropout from each round and the possibility of participant fatigue (Thangaratinam & Redman, 2005). Therefore, this study used three rounds.

4.4.5 The Round One Delphi Questionnaire

The questionnaire was designed to have three sections. The initial section of the questionnaire collects the demographic data of the participants. This data was collected in the first round to obtain a profile of the panel group. Only basic demographic data of the participants were collected (age, gender, location of practice, years of primary care experience). The second section of the questionnaire for Round 1 contained a list of clinical topics that were developed based on the common conditions and reason per encounter is based from the National Medical Care Survey (NMCS) 2014 (Sivasampu et al., 2016). This report was used because of it a Malaysian report, and it is more relevant

for this study and falls within the scope of the study. The conditions from both private and government sector were combined to create a list of 15 conditions. The subsequent section of this questionnaire, contained a list of 13 EPAs based on the EPA guide by the Association of American Medical Colleges (Association of American Medical Colleges, 2017). This guide was adopted because the EPAs listed were for doctor entering residency, which was equivalent to the entry point of our doctor entering housemanship.

There is permission to use for this guide, and it is detailed in the ethical consideration section of this report.

For each clinical condition or RPE, the participants had to express their degree of agreement or disagreement using the 9-point Likert scale. For each clinical condtion or RPE, the participants had to decide their level of agreement on whether the clinical topic should be taught as part of the undergraduate primary care curriculum in Malaysia. Similarly, for each EPA the participants had to select on a 9-point Likert scale, the degree to which the participants believed that the EPA activities are activities that all entering house officers should be expected to perform on day one of working as houseman in primary care department during their housemanship without direct supervision, during primary care rotation. At the end of each section (clinical topics and EPA), there is a free text box to allow the participants to add any comments or suggestions concerning the items provided.

The questionnaire was developed in English.

An initial questionnaire containing the EPAs and clinical topics were developed before the first round of Delphi. The developed questionnaire was discussed with two researchers for content validation. The researchers were primary care researchers who are also experienced in instrument development.

The final modified version of the questionnaire is shown in Appendix C and was utilized for Round 1.

4.4.6 Round One of Delphi

The first round of the Delphi started with the round one questionnaire. The questionnaire was made available using a digital online survey tool (SurveyMonkey Inc). The link to access the questionnaire was sent via email and the messaging application WhatsApp (Whatsapp Inc., 2019). Only participants with the link could access the questionnaire, and the participant was anonymous for the other participant through this process. Careful consideration was taken to maintain anonymity during inviting and the whole Delphi round. However, the participants are anonymous to each other but not to the principal investigator. Unique identifiers known only to the principal investigator were used in this study. The reason for this is to provide reminders to the non-responders. Participants who answered the questionnaire from either link (email or WhatsApp) will not be able to repeat the questionnaire using the link from another device due to the setting of the online survey tool. This setting and the unique identifiers prevented from duplication.

The questionnaire was accessible for two weeks (20.5.2019 till 02.06.2019), and participants were sent weekly reminders to complete it.

4.4.7 Analysis of Round 1 results.

Basic descriptive statistics were used to analyses the data obtained of the Round 1 questionnaire (closed ended questions). The data was analyzed using the in-built feature of the online survey tool (SurveyMonkey Inc) The mean, mode, median and standard deviations were analyzed. This was done during the first week after the closing date of round 1 survey. The qualitative data obtained like the suggestions and recommendations we thematically analyzed. The Round 2 questionnaire was developed based on this

analysis of these two types of data. Round 1 items with good consensus were included into round 2. Items listed into Round 2 were developed by a variety of ways. The items that receive only good consensus were included into the list first. Other new items were added after thematically analyzing the recommendations by participants and coding it properly to the ICPC-2 classification. Existing EPAs that needed modification or clarification were also included for round 2. Items which received strong consensus were excluded from Round 2. This process of dropping the items which have received consensus and including items that had failed to reach strong consensus in the second questionnaire has been considered as an acceptable variation of the Delphi technique (McMillan et al., 2016).

4.4.8 Round Two of Delphi

An invitation to the second Delphi round was sent to all participants of round one in a similar manner as round one. Those who wished to continue participating were given online access to the Round 2 Delphi questionnaire (Appendix D) that has been developed after round 1. For each item, panel members were again asked to rate each item in a similar fashion as round 1. Additional free-text responses were invited at the end of each section.

The questionnaire was accessible for almost three weeks. The additional duration was because the Delphi study coincided with the festive seasons, and there were numerous national holidays during that time. This was to provide some flexibility and to prevent non-responders. Participants were sent weekly reminders to complete the questionnaire. The same procedure for analysis was used first Delphi round 1 was used for the second round. Round 3 questionnaire contain the a draft curriculum which was developed based on Round 1 results.

The questionnaire for round 2 was accessible for three weeks (11.06.2019 till 30.06.2019).

4.4.9 Round Three of Delphi

Participants were invited similarly as the first and second Delphi round. Those who agreed to continue were informed that the curriculum presented for consensus was the final draft and this was the final round.

The participant was asked if they agreed or disagreed with the draft curriculum. The draft curriculum (Appendix E) was divided into two components (clinical topics and EPAs). Participants could agree to both or either one.

The questionnaire was accessible for two weeks (11.07.2019 till 25.07.2019), and participants were sent weekly reminders to complete it.

4.5 Ethical considerations.

During the entire study, ethical principles has been adhered at all times. The following sub-section describes all the ethical considerations in more detail.

4.6 Ethical approval.

This study was approved by the University of Malaya Research Ethics Committee (UMREC) (Appendix F). Reference No : UM.TNC2/UMREC – 551

4.7 Informed Consent

All participants were briefed by the researcher regarding the intent of this study and it was clearly stated that it would be a voluntary process; therefore, only those who were interested and consented were allowed to participated. Both verbal and written informed consent (Appendix B) were obtained from the participants. All participants were give a participant information sheet which provided more details about the study and to assist them in making a well informed decision (Appendix A).

4.8 Privacy and Confidentiality

Each participant was assigned a unique code which will was disclosed to anyone at any time. During the Delphi process, each participant's reply was ensured to be anonymous to each other. Delphi reports from previous rounds were carefully prepared to maintain the anonymity of the participants. Diligent effort will be taken to preserve the anonymity of participants and their agencies during publishing the information from this study in journals, or presentation of the findings in academic and research settings. No identifiers linking back the data to the participants will be published or presented.

4.9 Data record

The research data were recorded using an online survey form. The online survey form and the results will be saved and stored on a secure online storage account. All the data collected will be stored on a secure, HIPAA-compliant online storage account. The data will be kept for at least 5 years from the date of publication. After that period, the data will be completely deleted. Only the researcher and the supervisors have access to the research data. The data and research results will belong to University of Malaya.

4.10 Conflict of Interest

No potential conflict of interest.

4.11 Funding

The study did not receive any form of funding.

4.12 Permissions and copyrights.

The EPAs used for this study was developed based on the Core Entrustable Professional Activities for Entering Residency: Toolkits for the 13 Core EPAs – Abridged published by the Association of American Medical Colleges (AAMC) which is available at https://www.aamc.org/initiatives/coreepas/publicationsandpresentations/

The AAMC Website's Terms and Conditions section (last accessed 13.08.2019) states that : 'Unless otherwise indicated on the specific webpage and/or document, the AAMC grants permission to reproduce and distribute documents and related images available the AAMC website, provided that use of documents and related images available from this site is for educational and non-commercial purposes only, including professional conferences'

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Therefore, there is no infringement of permissions or copyrights as long as the research project and its finding are being used for educational and non-commercial purposes only.

4.13 Summary of Chapter 4

The chapter begin with discussion on the research design considerations. It was then followed by an overview of the Delphi method. After discussing about the Delphi technique, the data collection process and the conduct of this research was discussed. The chapter was concluded with the various ethical consideration that has considered and adhered. In summary,

CHAPTER 5: RESULTS AND DISCUSSION

5.1 Results

Thirty-six primary care educators were invited to participate in the study. Twenty-seven agreed to participate (75 %) for the first round of the Delphi. Their demographic characteristics are shown in Table 5.1. Majority of the participants are female and located in Selangor. More than half of the participants are from private general practice. The average age of the participants of this study is 50.4 years. The participant has an average of 18.3 years of primary care experience.

Table 5.1 The demographic characteristics of the participants

Participants Characteristics	**No. (%) of participants (n = 27)**
Gender	
Male	8 (29.6)
Female	19 (70.4)
Age Group	
30-39	3 (11.1)
40-49	10 (37.0)
50-59	10 (37.0)
>60	4 (14.8)
Type of Primary Care Practice	
Private General Practitioner	15 (55.6)
Government Primary Care Centre	4 (14.8)
Academic Institution	8 (29.6)
Location	
Selangor	14 (51.85)
Johor	3 (11.11)
Kuala Lumpur	3 (11.11)
Kedah	2 (7.41)
Perak	2 (7.41)
Penang	1 (3.70)
Sarawak	1 (3.70)
Malacca	1 (3.70)

5.1.1 Round 1 of the Delphi

The first round Delphi questionnaire contained a list of core clinical topics (clinical conditions or reason per encounter) and entrustable professional activities. The questionnaire contained 28 items (15 clinical topics and 13 EPAs). Twenty-seven participants participated in first Round. In this Delphi round, all the 15 core clinical topics received a mean score greater than 7.0 (strong consensus) and they were included in the final round's list. 8 out the 13 EPAs received a strong consensus and were included into the final round's list. 5 EPAs received a mean score of 4.0-6.9. These EPAs were included in Round 2 for further iteration. No EPAs items received a mean score which was considered weak consensus. The score for the items of Delphi Round 1 is shown in Table 5.2. The participants of the first round Delphi have suggested 20 new items for the clinical topics. Some of the topic were developed by thematically analyzing the participants comments from the open ended questions. For the EPAs, the participants have suggested 2 new entrustable professional activities to be added and suggestions were provided to modify one of the EPA (Perform general procedures of a primary care doctor).

Table 5.2 Mean scores for the items in the first round Delphi.

Delphi Questionnaire Item	Mean Score ± SD (n=27)	
Core Clinical Topics		
1. Hypertension	8.85	(0.59)
2. Diabetes Mellitus	8.85	(0.59)
3. Lipid Disorder	8.59	(0.78)
4. Cough	8.63	(0.62)
5. Fever	8.81	(0.39)
6. Rhinorrhoea	8.37	(0.73)
7. Antenatal Care	8.56	(0.92)
8. Musculoskeletal Symptoms/ Complaints	8.56	(0.79)
9. Medical Examination	8.30	(1.15)
10. Investigations related to endocrine/metabolic disorder	8.11	(1.31)
11. Abdominal Pain	8.70	(0.60)
12. Sore Throat	8.63	(0.82)
13. Diarrhoea	8.48	(0.83)
14. Headache	8.56	(0.79)
15. Backpain	8.67	(0.61)
Core Entrustable professional activities		
1. Gather a history and perform a physical examination	8.33	(1.44)
2. Prioritize a differential diagnosis following a clinical encounter	8.04	(1.17)
3. Recommend and interpret common diagnostic and screening tests	7.41	(1.55)
4. Enter and discuss orders and prescriptions	6.19	(2.42)
5. Document a clinical encounter in the patient record	7.93	(1.25)
6. Provide an oral presentation of a clinical encounter	8.11	(1.29)
7. Form clinical questions and retrieve evidence to advance patient care	6.74	(2.01)
8. Give or receive a patient handover to transition care responsibility	6.85	(2.01)
9. Collaborate as a member of an interprofessional team	7.15	(2.03)
10. Recognize a patient requiring urgent or emergent care and initiate evaluation and management	7.52	(2.30)
11. Obtain informed consent for tests and/or procedures	7.11	(1.99)
12. Perform general procedures of a primary care doctor	6.19	(1.76)
13. Identify system failures and contribute to a culture of safety and improvement	6.59	(2.28)

5.1.2 Round 2 of the Delphi

Twenty-five participants (92%) from the first round of the Delphi participated in the second round of the Delphi process. The participants that dropped out did not provide any reasons. The list for the second round of the Delphi process included the 20 core clinical topics and two new entrustable professional activities which were suggested in Round 1. The reasons for their suggestion were included in the new items. The list also included the 5 EPAs which received a mean score of 4.0-6.9 in Round 1. Additional information containing the basic descriptive statistics (Mean, Mod) from Round 1 and panellist comments was included for the EPAs.

For the clinical topics, 20 items received good consensus, and they were included in the final round list. However, only one item which was Musculoskeletal Symptoms/ Complaints (non-backpain) did not receive an average score of 7.0 or greater. So, the original item was included the final list because it had already received strong consensus. Concerning EPAs, all EPAs received a mean score of 7.0 or greater and were included into the final round list. The score for the items of Delphi Round 2 is shown in Table 5.3.

Table 5.3 Mean scores for the items in the second round Delphi.

Delphi Questionnaire Item	Mean Score ± SD (n=25)	
Core Clinical Topics		
1. Mental Health	7.96	(1.61)
2. Women's Health (non-Antenatal care related)	8.24	(0.86)
3. Common skin conditions	8.44	(0.70)
4. Bronchial Asthma	8.84	(0.46)
5. Chronic Obstructive Pulmonary Disease (COPD)	8.44	(0.90)
6. Child Health	8.64	(0.56)
7. Dengue	8.64	(0.69)
8. Musculoskeletal Symptoms/ Complaints (non-backpain)	6.68	(2.77)
9. Adolescent Health	7.88	(1.31)
10. Elderly Care	8.12	(1.21)
11. Men's Health	7.60	(1.96)
12. Palliative care	7.04	(2.04)
13. Urinary Tract Infection	8.48	(0.75)
14. Anaemia	8.24	(0.95)
15. Chest pain	8.68	(0.55)
16. Stroke	8.12	(1.18)
17. Human immunodeficiency virus (HIV)	7.64	(1.26)
18. Tuberculosis	8.32	(0.84)
19. Preventive care including immunization	8.68	(0.61)
20. Dizziness	8.04	(0.87)
Core Entrustable professional activities		
1. Enter and discuss orders and prescriptions	7.08	(1.72)
2. Form clinical questions and retrieve evidence to advance patient care	7.16	(1.62)
3. Give or receive a patient handover to transition care responsibility	8.00	(1.06)
4. Perform general procedures of a primary care doctor Perform general procedures of a primary care doctor. These procedures include: 5. • Basic cardiopulmonary resuscitation (CPR) 6. • Bag and mask ventilation 7. • Venepuncture 8. • Inserting an intravenous line	7.40	(1.13)
9. Identify system failures and contribute to a culture of safety and improvement	7.04	(1.48)
10. Able to seek help/advice from appropriate senior and/or referral to the appropriate health service provider	8.04	(1.87)
11. Demonstrate good communication skills	8.40	(1.41)

5.1.3 Round 3 of the Delphi

Twenty-three participants (85%) from whom had participated in the first round and second of the Delphi participated in the third round of the Delphi process. The participants that dropped out for this round did not provide any reasons. The list that has been iterated from Round 1 and Round 2 had 34 core clinical topics or reason per encounter and 15 entrustable professional activities. For the core clinical topics, a consensus was achieved with 95.6% (n=23) agreeing with the final list. The EPAs in the final list achieved 100% (n=23) consensus. Table 5.4 shows the final agree results of the third Delphi round.

Table 5.4 Results of the third Delphi Round 3.

Delphi Questionnaire Item	Number of agreements (%) (n=23)
Core Clinical Topics	
Abdominal Pain	22 (95.6%)
Adolescent Health	
Anaemia	
Antenatal Care	
Backpain	
Bronchial Asthma	
Chest Pain	
Child Health	
Common Skin Conditions	
COPD	
Cough	
Dengue	
Diabetes Mellitus	
Diarrhoea	
Dizziness	
Elderly Care	
Fever	
Headache	
HIV	
Hypertension	
Investigations related to endocrine/metabolic disorder	
Lipid Disorder	
Medical Examination	
Men's Health	
Mental Health	
Musculoskeletal Symptoms/ Complaints	
Palliative Care	
Preventive Care Including Immunization	
Rhinorrhoea	
Sore throat	
Stroke	
Tuberculosis	
Urinary Tract Infection	
Women's Health	

Table 5.4 Results of the third Delphi Round 3 continued

Delphi Questionnaire Item	**Number of agreements (%) (n=23)**
Core Entrustable professional activities	
Gather a history and perform a physical examination	23(100%)
Prioritize a differential diagnosis following a clinical encounter	
Recommend and interpret common diagnostic and screening tests	
Enter and discuss orders and prescriptions	
Document a clinical encounter in the patient record	
Provide an oral presentation of a clinical encounter	
Collaborate as a member of an interprofessional team	
Recognize a patient requiring urgent or emergent care and initiate evaluation and management	
Obtain informed consent for tests and/or procedures	
Identify system failures and contribute to a culture of safety and improvement	
Form clinical questions and retrieve evidence to advance patient care	
Give or receive a patient handover to transition care responsibility	
Able to seek help/advice from appropriate senior and/or referral to the appropriate health service provider.	
Demonstrate good communication skills	
Perform general procedures of a primary care doctor. These procedures include: • Basic cardiopulmonary resuscitation (CPR) • Bag and mask ventilation • Venipuncture • Inserting an intravenous line	

A summary of the three Delphi round and the whole process of developing the curriculum is shown in Figure 5.1. Meanwhile, Table 5.5 shows the final Malaysian undergraduate primary care curriculum that has been agreed by the participants of this study.

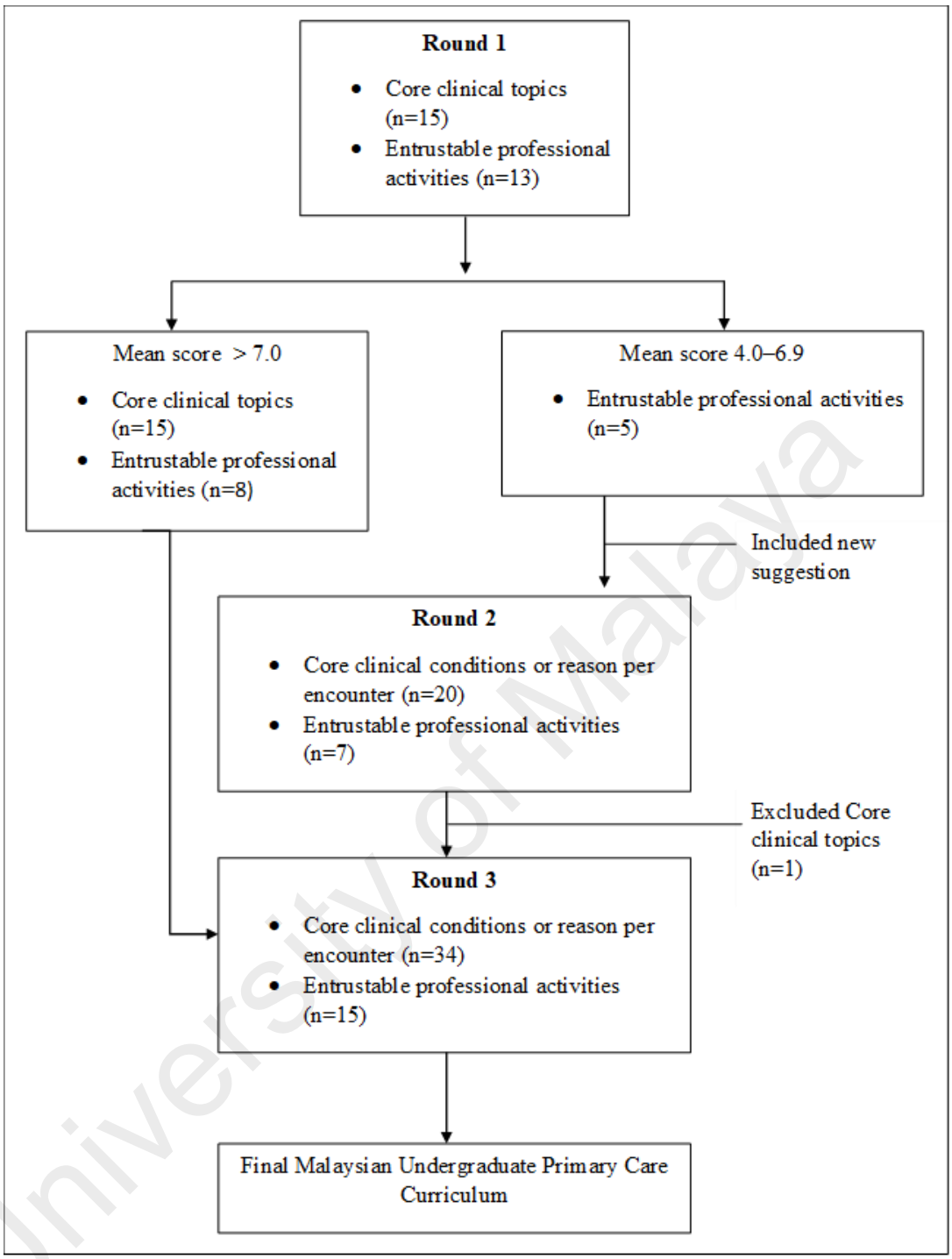

Figure 5.1 The development process for the undergraduate primary care curriculum utilizing the Delphi technique

Table 5.5 The final Malaysian Undergraduate Primary Care Curriculum

The following are core clinical condition or reason per encounter that should be taught as part of the undergraduate primary care curriculum in Malaysia.

1. Abdominal Pain
2. Adolescent Health
3. Anaemia
4. Antenatal Care
5. Backpain
6. Bronchial Asthma
7. Chest Pain
8. Child Health
9. Common Skin Conditions
10. COPD
11. Cough
12. Dengue
13. Diabetes Mellitus
14. Diarrhoea
15. Dizziness
16. Elderly Care
17. Fever
18. Headache
19. HIV
20. Hypertension
21. Investigations related to endocrine/metabolic disorder
22. Lipid Disorder
23. Medical Examination
24. Men's Health
25. Mental Health
26. Musculoskeletal Symptoms/ Complaints
27. Palliative Care
28. Preventive Care Including Immunization
29. Rhinorrhoea
30. Sore throat
31. Stroke
32. Tuberculosis
33. Urinary Tract Infection
34. Women's Health

These EPA activities are activities that all entering house officers should be expected to perform on day 1 of housemanship without direct supervision, during primary care rotation.

1. Gather a history and perform a physical examination
2. Prioritize a differential diagnosis following a clinical encounter
3. Recommend and interpret common diagnostic and screening tests
4. Enter and discuss orders and prescriptions
5. Document a clinical encounter in the patient record
6. Provide an oral presentation of a clinical encounter
7. Collaborate as a member of an interprofessional team
8. Recognize a patient requiring urgent or emergent care and initiate evaluation and management
9. Obtain informed consent for tests and/or procedures
10. Enter and discuss orders and prescriptions
11. Form clinical questions and retrieve evidence to advance patient care
12. Give or receive a patient handover to transition care responsibility
13. Able to seek help/advice from appropriate senior and/or referral to the appropriate health service provider.
14. Demonstrate good communication skills
15. Perform general procedures of a primary care doctor. These procedures include:
    - Basic cardiopulmonary resuscitation (CPR)
    - Bag and mask ventilation
    - Venipuncture
    - Inserting an intravenous line

5.2 Discussion

5.2.1 Expert panel demography and profile.

As outlined earlier in the methodology section, there is no ideal number, and a wide range of panel size exist. The panel size for this study falls within the acceptable range of 25-30 participants (de Villiers et al., 2005). The size of the panel for this study is acceptable because a larger number of experts will affect the results (McMillan et al., 2016). The age of the majority of participants was between 40-59 (74%) and had an average of 18.3 years of primary care experience. This age range is an acceptable age group because the majority of them are not very senior doctors. It is found that older doctors or those in practice longer are less updated, had reduced compliance to standard and quality of care (Choudhry, Fletcher, & Soumerai, 2005; Tsugawa, Newhouse, Zaslavsky, Blumenthal, & Jena, 2017). However, there are very limited data on defining the cut off age for a very senior doctor. For discussion purpose, the Malaysia retirement age of 60 will be used as a cut off age for a very senior doctor. Therefore, the participants' age group in this study is still acceptable. From the participant's demographic data, it is shown that there is a wide discrepancy between the number of participants from the private sector compared to the government and academic institution (Private 55.6% vs Non-Private 44.4 %). This discrepancy could be related to the current distribution of the private and government primary care clinics in Malaysia. There are 7571 private clinics compared to 1085 government health clinics (Ministry of Health Malaysia, 2018). The majority of primary care doctors are also from the private sector (Sivasampu et al., 2016).

Another characteristic of the participant is that most of them are female doctors. There are very limited data on the gender distribution of primary care medicine specialist in Malaysia. However, it has been shown that primary care medicine has been the speciality of choice for females and the number of female primary care medicine specialist has been increasing (Zulkifli & Rogayah, 1998). Recent studies involving primary care physicians

in Malaysia had also shown a similar female predominance (Sharifah Nurul Aida Syed Ghazaili & Daud, 2016).

The majority of the participants are from Selangor followed by Johor and Kuala Lumpur. This distribution is expected because the Klang Valley which includes Selangor is the most populated region in Malaysia and most of the primary care services are concentrated in urban areas (Sivasampu et al., 2016). On the other hand, it is important to consider that the participants are from 8 of the 13 states and 3 federal territories of the country. This is due to the advantages of Delphi method which allows study to cover a large geographical area in a short time (de Meyrick, 2003).

Based on the selection criterion and the demographic data, the overall profile shows that the panel consists of a homogenous group. This study's expert profile is similar to other similar studies. In most literature regarding speciality undergraduate curriculum development, a homogenous group was used (Copeland, Fisher, & Teodorczuk, 2018; Masud et al., 2014; D. Rohan, Ahern, & Walsh, 2009b; Tam et al., 2016). Similarly, a homogenous group was also used in developing shared national primary care curriculum in Canada (D. A. Keegan et al., 2017b). The homogenous group has been considered as "true" experts of the area of inquiry (Baker, Lovell, & Harris, 2006; Chalmers & Armour, 2019). Therefore, the results of this study can be considered as narrowed but a true consensus of the experts of the topic of study.

5.2.2 Round 1 of Delphi

As outlined in the methodology section, the participants of the study were required to choose their level of agreement based the list of core clinical conditions or reason per encounter that should be taught as part of an undergraduate primary care curriculum. It also required the participants to choose their level of agreement on the expected entrustable professional activities of a medical graduate entering a primary care rotation during housemanship. The list of clinical topics was developed based on the common clinical conditions seen in a primary care setting in Malaysia (Sivasampu et al., 2016). Meanwhile, the EPAs were developed based on EPA development guide by Association of American Medical Colleges (Call et al., 2017).

From the results of the first round, all the conditions or reason per encounter in the list received a mean score greater than 7.0. All except one clinical topic was included in the final list. Musculoskeletal Symptoms/ Complaints was recommended to exclude back pain since back pain has been considered separately in Round 1. This recommendation was reasonable because this condition listed is a combination of multiple ICPC-2E codes. This is the feature of the ICPC-2E coding system.

For all the other conditions, the logical reason for the high mean score is because these are common conditions seen in practice. Doctors are generally trained in the lines of " common things are common" as part of their clinical reasoning (Peile, 2004). Therefore, it makes sense that these conditions were easily accepted because it is common, should not be missed and relevant to primary care. Among the clinical conditions, diabetes and hypertension received the highest mean score. This could be explained by the high prevalence of diabetes in Malaysia, which is increasing at alarming levels (Tee & Yap, 2017). Hypertension also has been shown to have similar trends (Naing et al., 2016). These two conditions have been a major public health issues Malaysia and combating

them has been a priority by the Malaysian government (Ab Majid et al., 2018; Hussein, Taher, Gilcharan Singh, & Chee Siew Swee, 2015). All of these would have contributed to the high mean score among the participants of the study. Close to diabetes and hypertension, fever is the third in ranking for the mean score. One explanation for this finding is that fever is a common presentation for dengue. Dengue is endemic in Malaysia and can be a life-threatening condition (Lum, Ng, & Khoo, 2014). Therefore, fever is an important condition which could be a presentation of dengue, and doctors have to be vigilant about it. Hence, fever is being favoured to be taught at the undergraduate level for primary care.

Eight EPAs received a mean score of 7.0 or greater and were included in the final round list. The EPA to gather a history and perform a physical examination received the highest score. History taking is one of the most common and important tasks of a doctor. History taking alone can lead to the diagnosis in 76% of the cases (Peterson, Holbrook, Von Hales, Smith, & Staker, 1992). It also improves patients satisfaction, adherence to therapy, compliance with follow-ups and their health outcome (Seitz, Raschauer, Längle, & Löffler-Stastka, 2019). Physical examinations can prevent errors, reduce unnecessary and potentially harmful investigations, improve communication with patients and prevent diagnostic delays by improving the diagnostic capability of history alone (Block & Easton, 2017). Based on these factors, it is understandable why performing history taking, and physical examination received the highest score.

To provide an oral presentation of a clinical encounter in another EPA that received a high level of agreement. Being able to communicate verbally has been a very important clinical skill for doctors and this has been listed as an important outcome in the Tomorrow's Doctor, a standard for good medical practice and an important undergraduate medical education guide in the United Kingdom (General Medical Council, 2009). Proper

verbal communication, especially during the transition of care, can prevent adverse event in the care of the patient (Bergman, Flanagan, Ebright, O'Brien, & Frankel, 2016; Monks & Maclennan, 2016). This EPA improves patient safety, and that is the reason for it to be easily agreed upon. For the same reasons, the EPA to collaborate as a member of an interprofessional team was also agreed by the participants. To further support the agreement on this EPA, it is noted that enhancing interprofessional team care has been an important foundation of primary health care (Bodenheimer, Ghorob, Willard-Grace, & Grumbach, 2014; K. Grumbach & Bodenheimer, 2004). These EPAs are related to patient safety.

To prioritise a differential diagnosis following a clinical encounter also received a considerable high agreement mean score because this EPA is also related to patient safety. Maude (2014), in his work, states that having differential diagnosis will reduce diagnostic error and the cost of healthcare. Singh et al. (2013) conducted a study on the types and origins of diagnostic errors in primary care and found that as high 81% of cases presenting to primary care had no differential diagnosis. This was considered as one the cause for diagnostic error. In their work, it is also shown that improper documentation was also one of the causes of diagnostic error. It is also shown in Malaysia; documentation issues have been the cause of medical errors in primary care clinics (Khoo et al., 2012). These could be the reasons for the EPA to document a clinical encounter in the patient record to receive a considerable amount of agreement.

Handling emergencies in part and parcel of primary care. Doctors are expected to be responsible and able to handle emergencies that present to primary care (Ramanayake, Ranasingha, & Lakmini, 2014). Studies have shown that primary care doctors deal with life-threatening emergencies like ischaemic chest pain frequently, and they are usually unprepared (Liddy, Dreise, & Gaboury, 2009). There are limited studies on how the

preparedness of house officers in handling emergencies in Malaysia. However, recently, it has been highlighted in the press that Malaysian medical graduates are unprepared for handling emergencies (Kiran J, 2019). These factors may have influenced the participants supportive decision on this EPA.

Obtaining consent is a part of a legal requirement, ethical and administrative compliance (Hall, Prochazka, & Fink, 2012). Obtaining consent is a part of the good medical practice guideline in Malaysia (Malaysian Medical Council, 2001). These important reasons explain the high mean agreement score for the EPA to obtain informed consent for tests and/or procedures. To recommend and interpret common diagnostic and screening tests is another EPA that has been agreed in Round 1. Investigations is an important aspect of primary care health and are used for diagnosis, monitoring and screening. A report on Malaysian primary care services shows that 22.6% of the patient encounters end up with an investigation (Sivasampu et al., 2016, p. 96). The report also states that the rates and number of investigations ordered can directly affect healthcare expenditure. Inappropriate investigations not only increase healthcare expenditure but also can lead to patient harm (Morgan & Coleman, 2014). Thus, it is was an appropriate decision for the participants to consider this as a core EPA for house officers.

Five out of the thirteen EPAs did not reach the threshold means score in the first round, and these EPAs were brought forward to the second round. One of the EPA required additional information and modification due to the terminology used for the EPA. Multiple recommendations and suggestions were made for the EPA to perform general procedures of a primary care doctor. The general theme was to specify specific procedures to be added to the terminology. The procedure recommended were almost similar to the procedure described for this EPA in the AAMc guide fro EPA. The procedures listed in the guide was added to the existing EPA. These recommendations were contradicting

with the key characteristics of primary care, which is known to be comprehensive (Kevin Grumbach, 2015). Primary care doctors are known to be a jack-of-all-trades (Draper & Smits, 1975). However, from the literature, there have been studies showing that intended scope of primary care might not be the same with the one being practised (Coutinho, Cochrane, Stelter, Phillips, & Peterson, 2015). This explains the recommendation for narrowing down the scope. Another comment for the EPAs from the first round is that one of the EPA (identify system failures and contribute to a culture of safety and improvement) was not suitable because there has been already a system in place and there is no need for house officer to perform it. This comment could be related to the fact that EPAs that has been adopted for this Delphi study is from America, and it may not be suitable to the local healthcare system.

5.2.3 Round 2 of Delphi

The second round's questionnaire was also divided into two sections. The first section contained a new list clinical conditions or reason per encounter that were recommended from Round 1 and one existing clinical condition from round 1 which the terminology was recommended for modification. Meanwhile, for the EPA section, the EPAs which were not agreed in Round 1 and two new EPAs were included into the list.

All the 20 new clinical conditions or reason per encounter in round 2 received a mean score above the agreed level and were included in the final round list. Chest pain received the highest mean score in this round. It is not surprising because of ischemic heart disease, which normally presents with chest pain is the number one cause of death in Malaysia (Department Of Statistics Malaysia, 2018). Mental health is also one of the conditions that are becoming a serious public health problem, and the trend has been increasing (Institute for Public Health, 2015). Mental health conditions like depression have become the leading cause of disability worldwide (Friedrich, 2017). It is shown that primary care

has been playing various roles in managing mental health and it is recommended that the management of mental health at primary care level should be stepped up to match the efforts shown for non-communicable disease (Malaysian Healthcare Performance Unit, 2016). Novel topics like men's health (Tong, Low, Ismail, Trevena, & Willcock, 2011) were also agreed in this round. This is relevant because studies have shown that Malaysian undergraduates have poor knowledge about men's health (Thein, Than, Soe, Lwin, & Moe, 2017). Malaysia has an underdeveloped elderly care and palliative care services (Gendeh et al., 2016; Tan, Kamaruzzaman, & Poi, 2018). Currently, these two conditions are also being handled at the primary care level. From this, we could see that the participants of the study have not only agreed on conditions that are common to primary care but also have based it on current and future trends.

With regards to the EPAs in the second round, all the EPAs scored a mean score more than the agreed level for consensus by the participants. As discussed in the previous round discussion, communication skill is an important aspect of patient care. Demonstration of good communication skill was the new EPA that was introduced in this round and received a high level of agreement from the participants. Communications skill has been an important focus of medical education, and it is being recommended to be taught early in medical school (Krishnasamy, Ong, Loo, & Thistlethwaite, 2019; Mohd Abd Wahab & Shareela Binti Ismail, 2014; Yardley et al., 2010). However, there has been growing evidence that current doctor lacks good communication skills (Ganasegeran, Perianayagam, Manaf, Jadoo, & Al-Dubai, 2015; Kee, Khoo, Lim, & Koh, 2018). The very high mean score for this EPA could be an echo of this sentiment. Another new EPA that has been agreed by the participant is able to seek help/advice from appropriate senior and/or referral to the appropriate health service provider. Similar EPAs has also been

proposed for medical graduates in Singapore by Yong Loo Lin School of Medicine (Goh et al., 2015). The school sets that it is expected that the graduating student will able to achieve this outcome with little or no guidance (entrustment). An almost similar descriptor to this EPA has been used as one of the competency levels for doctors standards in Indonesia (Indonesian Medical Council, 2012). The descriptor was the second-highest level before being able to completely manage a clinical condition independently. Two out of the four-level of competency descriptor contained referral to the appropriate health service provider. Primary care is also known as the gatekeeper to specialists and other medical resources, and this has been shown to lower healthcare usage, expenditure and to provide a better quality of care (Sripa, Hayhoe, Garg, Majeed, & Greenfield, 2019). All of these justifies for this referral EPA.

The EPAs from the round one received a higher mean score compared to round one after participants were given the group median scores, mode and the free-text comments. Susan Humphrey-Murto, Varpio, Gonsalves, et al. (2017), in their article on consensus methods, describes that the type of feedback can influence the outcomes. In this study, the participants own ratings were not provided in the second round, and this may have influenced their choices. A recent randomised control trial has shown that participants who were not provided with their initial rating changed their ratings to a greater degree towards the group response compared to the group which received their initial rating. (Meijering & Tobi, 2018). There might be some element of conformity as a result of the feedback given (Skinner, Nelson, Chin, & Land, 2015, p. 34).

5.2.4 Round 3 of Delphi

In the third Delphi round, the participants were provided with a questionnaire which contained a draft of the proposed curriculum which was divided into two predefined headings (Core clinical topics and core EPAs). The participants had to select, *Agree* or

Disagree with the proposed curriculum. For both headings, a consensus was reached with the final list. The clinical topic received a consensus of 95.6%, and the EPAs received 100%. These results were expected because it has been noted that homogenous participants usually reach a consensus earlier (Chalmers & Armour, 2019). Another reason for such a high level of consensus could be reached earlier in this round is due to the commitments of the participants. It has been published that participant that is to be affected directly by the results are more likely to be involved in the Delphi process (Hasson, Keeney, & McKenna, 2000).

The dropout rate for this study was for the second and third round was 7.4% and 8% respectively. Attrition rates for the Delphi technique are usually around 20-30% (Chalmers & Armour, 2019). The attrition rates in other studies for medical curriculum development has been in the range of no dropout at all (0%) to as high as 51% (Copeland et al., 2018; Lloyd et al., 2014; Masud et al., 2014; Denise Rohan et al., 2009a; Tam et al., 2016). Attrition rates for the Delphi technique have been accepted around 20-30% (Chalmers & Armour, 2019). Hence, the dropout rate for this study is still acceptable. The low attrition rate could due to the frequent reminders sent. This was one of the strategies being recommended to reduce non-responder rates (Hsu & Sandford, 2007). The reason for attrition was not given by the participants. However, the period of study was during multiple major public holidays in Malaysia, and this may have attributed to the slight attrition.

5.2.5 The Final Curriculum.

The final curriculum developed and agreed contained 37 clinical conditions or RPE and 15 EPAs. The number of conditions and EPAs is more than the list of clinical topics listed published guidelines like the Canadian shared curriculum (David A. Keegan et al., 2017a) and the recommended EPA by EPA guide by the Association of American

Medical Colleges (AAMC) (Call et al., 2017). The lack of standardised or shared curriculum in primary care in Malaysian has been highlighted in previous chapters. Therefore, to compare the developed curriculum from this study with other international curriculum or standards should be considered carefully. The healthcare system and medical education system of every country are unique. The list developed in this study may be contextual and relevant to the Malaysian healthcare and medical education system. It also contained more conditions than the top 15 most common conditions seen or RPE in Malaysia primary care. If we carefully look at the NMCS report, the actual conditions seen in the Malaysian primary care is a lot more compared to the top conditions (Sivasampu et al., 2016, pp. 65-66). The participants may have decided that some conditions that are not so common but it is important to know and should be included in the list. Therefore, this could have led to the increment of the list of clinical topics. Some curriculum development models begin with need assessment as the first step, and various techniques like Delphi has been used to obtain this information (Kern et al., 2009). There is a possibility that the developed curriculum is a reflection of needs from the participants who are generally practising primary care experts. This reason is another alternative explanation for the list going beyond the common presentations or recommended EPAs based on the development guide.

The developed curriculum list also had conditions which were considered novel or topics of underdeveloped specialities in Malaysia. Primary care sees a wide range of conditions and these topics may have been considered to be under the primary care umbrella. Studies in UK medical schools have shown that topics like palliative, geriatric and men's health that are being taught as part of the primary care curriculum in UK medical schools (Boon, Ridd, & Blythe, 2017). We could postulate that the students are being taught about these topics, and they are considered part of primary care here in Malaysia. One of the advantages of the Delphi technique is its capability of forecasting,

and this was the main reason why this technique was developed in the first place (Dalkey & Helmer, 1963). The Delphi technique was developed to predict the probable effects of the massive atomic bombings during the cold war (Thangaratinam & Redman, 2005). Delphi technique has been used in forecasting in the healthcare sector (Lintonen, Konu, Ronka, & Kotovirta, 2014). Thus, the conditions and EPAs proposed could also be a forecast of the future needs.

There is a possibility that the developed curriculum may have been influenced by the roles of the participants. As mention by Lim (2008) in his overview of the Malaysian medical education system, there are numerous schools in the country and every school is unique. Even though the school are unique in their ways, they still need to abide by the requirements by the Malaysian medical council and accreditation council. These requirements inform the university on the expected outcome of the students and efforts would have been taken to meet these requirements. From the profile of the participants, there were academicians from the universities and also doctors from the government sector who will be assessing these junior doctors on various capacities. For example, the academicians will be involved in university exit exams and government doctors will be involved assessing house officers for promotion to medical officers. Hasson et al. (2000) mentioned that Delphi technique participants are committed to the study if the topic is relevant to them. With these reasons, we can say that the outcome of the curriculum could have been influenced by the expectations of the participants as examiner or assessor.

As mentioned earlier, that developed curriculum could be influenced by the expectations of the participants as examiner or assessor. The question arises whether the developed curriculum has a higher or lower expectation compared to the requirements by the various stakeholder. The participants of this study are considered senior doctors because they are specialist in their fields. In their study, Chong, Taylor, Haywood,

Adelstein, and Shulruf (2018) found that examiner's seniority and experience are associated with bias when assessing communication skills. It is important to take note that good communications skill was one of the core EPAs proposed by this study. Stroud, Herold, Tomlinson, and Cavalcanti (2011) found that examiners familiarity with residents can also affect assessment scores. The assessments outcomes depend on whether it was a negative or positive impact by the residents. The participants of this study are also educators involved in undergraduate teaching. Therefore, it can be hypothesised that their exposure to undergraduate's student may influence their expectations depending on the type of encounter with the students. It is also documented in the literature that primary care doctors can fail to accurately assess their knowledge (Tracey, Arroll, Richmond, & Barham, 1997). This failure to self-judge could also lead to a biased expectation. All of these shows that doctors can be biased, and the reasons can be multifactorial. The curriculum developed may be biased towards the participants' expectations, but whether it is higher or lower is difficult to be determined.

There were 15 EPAs in the developed curriculum. This was comparatively lower compared to the 91 EPAs proposed by Shaughnessy et al. (2013) and 20 EPAs by Garvin and Mazzone (2017). The recommended numbers of EPAs for a medical programme is around 20-30 (Cate, 2018; O. Ten Cate, 2013). A recent systemic review shows that the range of EPA developed in various studies are from 1-76, and the majority of the studies produced less than 4 EPAs (O'Dowd et al., 2019). Too many EPAs developed will introduce the issues of CBME like too much paperwork for educators. (Touchie & ten Cate, 2016). Since the curriculum developed is a speciality curriculum which is part of the larger medical graduate curriculum, less than 20 EPAs can be accepted, but a lower number of EPA would have been preferred.

Overall, the developed undergraduate curriculum with EPAs can be considered as contextual and almost consistent with the current literature. Besides being consistent with the literature, the results also suggest that the developed curriculum is relevant to primary care is informed by current practice and considerate of future trends.

5.3 Summary of Chapter 5.

This chapter had provided an in-depth discussion of the finding, including the developed undergraduate curriculum for primary care. The discussions provided different angles to the core clinical topics and EPAs. By observing the results and discussion, it can be highlighted that the study has managed to answer the research question. The next chapter shall discuss the implications, limitations and recommendations for future research.

CHAPTER 6: CONCLUSION AND IMPLICATIONS OF STUDY

6.1 Introduction

This is the last chapter for this research project. This chapter will discuss the implications of this research, its limitations and the recommendations. It will begin informing the implications of this study from the various perspectives. The limitations of this research will be then explained in the subsequent sections. The chapter will provide recommendations and end with a conclusion.

6.2 Implications

The implications of this study can be divided into two categories. The following sub-sections will discuss the implications separately.

6.2.1 Implication on policy, guidelines and primary care teaching

The outcome of this study is a core undergraduate primary care curriculum for Malaysia, which was developed by a panel of local experts using group consensus method. The common issue with Delphi study is defining expert. However, this study defined experts with the help of senior academicians in primary care, which is an advantage. The developed curriculum can be considered as a collaborative and consensus-based curriculum by primary care experts in Malaysia. All of these adds strength to this study's results and improves acceptability to the various stakeholders in Malaysia, which could be policymakers, speciality societies, medical councils and medical schools. If properly disseminated and accepted by these stakeholders, the curriculum may inform policies and guidelines. This will have great implication on the various aspects of teaching and learning of primary care at the undergraduate level. Medical schools might have to implement changes to align their curriculum to match policies and guidelines which was being informed by this research. Indirectly it may provide solutions to the issues with primary care like hidden curriculum and workforce shortage

EPAs has been considered as the way to move forward. This study will promote the utilisation of EPAs at undergraduate and higher levels. The utilisation of EPAs will change the various aspects of teaching and assessing primary care at undergraduate and postgraduate level.

6.2.2 Implication on education in primary care research.

From the literature review, it can be noted that there is a gap of knowledge with primary care medical education in Malaysia. This study will add more knowledge to this field. There are are numerous variations of the Delphi technique. Nevertheless, it is being used frequently in medical education and various primary care related topics. The knowledge and experience gained during this study, which utilised this technique will assist and be a point of reference to future researchers in the future.

6.3 Limitations

The research project has some potential limitations. In view that the research project was conducted with a constrained time frame and budget, there is a possibility that the number and type of participants recruited into the study are limited. In view that this study is related to primary care and involving EPAs of houseofficer entering the government service, we were only managed to recruit four government doctors. A more heterogeneous panel and more representation of government doctors would have increased the validity of the findings (Chalmers & Armour, 2019, p. 721)

There are some limitations that could be due to the Delphi technique itself. There is no agreement on the definition of consensus. The consensus and level of agreement chosen for this study is based on similar studies from the literature. The criteria chosen could have been arbitrary. The existence of consensus or agreement does not mean that the solution has been found. The findings could have been a display of collective ignorance instead of collective wisdom. The Delphi technique itself sometimes tends to force a

middle ground consensus and weed out extreme positions. Therefore, the finding might not be a true answer, but just a display of consensus.

Another limitation to be considered is that the research was conducted in Malaysia and context is related to Malaysia. All of these factors have to be taken into consideration when applying or generalising the results of this study.

6.4 Recommendations

1. **More collaborative works/research should be done to develop more complete EPAs to supplement the EPAs developed from this study.**

   There are a lot of studies and changes going on in the medical education field with regards to EPAs. The EPAs developed for this curriculum is only the EPA topics and is considered the as the first step of EPA creation (Cate, 2018). A complete EPA will include EPA descriptions, milestones and assessment methods. A collaborative approach should be adopted in developing these complete EPAs. The various stakeholders, including junior doctors, specialist, consultant and medical student, should be included in future studies.

2. **A regular review of the shared core primary care curriculum.**

   The curriculum needs to be updated regularly for various reasons like the discovery of new advances in the field of medicine, changes in public health needs, changes in the regulatory needs and individual medical schools' situation. As a result of these changes and developments, the curriculum needs to be reviewed to ensure it is relevant and updated. Feedback from the various stakeholders like students, junior doctors and primary care physicians should be taken into consideration when reviewing and updating this curriculum.

3. **Direction of future work should be on**

   a) **Teaching and learning methods, locations used for teaching, assessment method, and who should be involved in primary care teaching.**

      i. The developed curriculum contains the core content and core EPAs only. As mention in the literature review that the concept of curriculum is much more complex. Future research should focus on the teaching delivery methods, locations used for teaching and who should be involved in primary care teaching. Answering these questions will supplement this study's result and assist with implementation

   b) **Evaluate the implications on the resources if a speciality curriculum is being implemented.**

      Any implementation of a new curriculum can cause a positive or negative impact at various levels (the national till the medical school level). Therefore, an impact assessment should be conducted before recommending any new curriculum implementation.

6.5 Conclusion

This study, which utilised the Delphi technique enabled the development of a primary care curriculum for medical undergraduates in Malaysia. The developed curriculum represents an important step in the development of a speciality core curriculum, which is relevant to the challenges faced by the primary care discipline. Among the challenges faced is the hidden curriculum of medical programmes which discourages doctors from considering primary care as a career which worsens the situation of the primary care doctor shortage. The developed curriculum provides the various stakeholders with a list of core clinical topics that should be taught as part of undergraduate primary care curriculum and the expected EPAs for new graduates entering the primary department as a houseofficer. This work will inform policies and guidelines which may influence the current undergraduate primary care teaching at the various medical schools. Furthermore, it addresses the gap in knowledge about education in primary care in Malaysia. However, the various limitations related to the Delphi techniques and the evolving concepts of EPAs should be considered when applying or generalising the findings of this study. Future research might seek to address the gaps related to EPAs, explore more about the delivery of the curriculum and assessments; and evaluate the implications on the resource if the curriculum is being used. The developed curriculum should also be reviewed from time to time to see whether it is still relevant.

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