ATTITUDE TOWARDS PATIENT SAFETY AMONG UNDERGRADUATE MEDICAL STUDENTS IN THE UNIVERSITY OF MALAYA

JEEVITHA RAJASINGAM

FACULTY OF MEDICINE
UNIVERSITY OF MALAYA
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JEEVITHA RAJASINGAM

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Field of Study: Medical Education

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ABSTRACT

In the last two decades, patient safety awareness has become one of the emerging themes. To prevent from doing harm to patients, safe medical practices should be implemented and followed strictly. Therefore, a basic understanding of human factor principles need to be instilled into all health care workers. Medical universities play a vital role in fostering patient safety attitudes of their students towards the importance of patient safety during their practise. However, the medical curricula still face challenges regarding the correct timing and appropriate methods of instruction in their understanding of their principles. Experiments have shown that patient safety classes in health care facilities are being developed, incorporated, and tested. In this study, the attitude towards patient safety among medical students in University of Malaya was studied. The end results of this study would help medical schools in introducing patient safety components to their curriculum.

This study was performed among undergraduate medical students in the University of Malaya. Attitudes toward Patient Safety Questionnaire III (APSQ-III) - a 30- items, 5-point Likert scale questionnaire, was used as the study instrument. Year 1 to Year 5 medical students were approached via an online questionnaire using Google form and administered to their email addresses.

It resulted in a positive attitude culture towards patient safety among the undergraduate medical students. By measurements, the attitude towards implementing team functioning was scored the highest (mean=4.37) and the male medical students had better attitude towards Error Reporting (mean=3.66) compared to the females. For Working hours, the scores (mean=4.03) among the Year 1 medical students was the lowest compared to all the other years.

Students had positive views of patient safety importance, some still felt that patient safety must be highlighted further in the medical curriculum. The World Health

Organisation (WHO) has since established the Patient Safety Curriculum Guide to support health care organizations who incorporate values of patient protection by concentrating on operating a safety culture for all health care professionals and undergraduate medical students in an integrated manner. Hence more studies are needed to be focused in curriculum to enhance the attitude of students towards patient safety.

ABSTRAK

Dalam dua dekad kebelakangan ini, kesedaran berkenaan keselamatan pesakit telah menjadi salah satu aspek yang penting dalam bidang perubatan. Untuk mengelakkan daripada membahayakan pesakit, amalan perubatan yang selamat harus dilaksanakan dan diikuti dengan tegas. Oleh itu, pemahaman asas mengenai prinsip faktor manusia perlu ditanamkan ke dalam semua pekerja penjagaan kesihatan. Universiti perubatan memainkan peranan penting dalam memupuk sikap kesedaran mengenai keselamatan pesakit di dalam pelajarnya dan kepentingan mengamalkan sikap ini semasa mereka menjalani latihan. Walau bagaimanapun, kurikulum perubatan masih menghadapi cabaran seperti mengenalpasti masa yang tepat dan kaedah pengajaran yang sesuai dalam memahami prinsip mereka. Eksperimen telah menunjukkan bahawa kelas keselamatan pesakit di kemudahan penjagaan kesihatan sedang diperkembangkan, digabungkan, dan diuji. Dalam kajian ini, ~~dikaji~~ sikap terhadap keselamatan pesakit telah dikaji di kalangan pelajar perubatan di Universiti Malaya. Hasil akhir kajian ini akan membantu sekolah-sekolah perubatan dalam memperkenalkan komponen keselamatan pesakit dalam kurikulum mereka.

Kajian ini dilakukan di kalangan pelajar perubatan sarjana di Universiti Malaya. Sikap Terhadap Soal Selidik Keselamatan Pesakit III (APSQ-III), suatu soal selidik yang mempunyai 30 ~~item~~ perkara, ~~soal selidik~~ dengan skala Likert 5 mata, telah digunakan sebagai instrumen kajian. Pelajar perubatan Tahun 1 hingga Tahun 5 telah dihubungi melalui borang soal selidik dalam talian menggunakan borang Google (Google Form) yang dihantar ke alamat e-mel mereka.

Ini menghasilkan budaya sikap positif terhadap keselamatan pesakit di kalangan pelajar perubatan sarjana. Melalui pengukuran, sikap untuk melaksanakan fungsi pasukan didapati mendapat markah tertinggi (min = 4.37) dan pelajar perubatan lelaki mempunyai

sikap yang lebih baik terhadap Pelaporan Ralat (min = 3.66) berbanding wanita. ~~Untuk~~ Semasa waktu bekerja, skor (min = 4.03) di kalangan pelajar perubatan Tahun 1 adalah yang terendah berbanding dengan tahun-tahun yang lain.

Pelajar-pelajar didapati mempunyai pandangan positif terhadap kepentingan keselamatan pesakit. Sebahagian pelajar, berpendapat keselamatan pesakit harus dititikberatkan dengan lebih lanjut dalam kurikulum perubatan. Organisasi Kesihatan Sedunia (WHO) juga telah menetapkan Panduan Kurikulum Keselamatan Pesakit, untuk menyokong organisasi penjagaan kesihatan yang menggabungkan sikap perlindungan pesakit dengan menumpukan perhatian pada pengoperasian budaya keselamatan untuk semua profesional penjagaan kesihatan dan pelajar perubatan sarjana, secara bersepadu. Oleh itu, lebih banyak kajian yang perlu ditumpukan dalam kurikulum untuk meningkatkan kesedaran pelajar terhadap keselamatan pesakit.

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LIST OF SYMBOLS AND ABBREVIATIONS

APSQ	Attitude towards Patient Safety Questionnaire
APSEF	Australian Patient Safety Education Framework
DG	Director- General
FOM	Faculty of Medicine
HO	House Officers
IOM	Institute of Medicine
IMU	International Medical University
MOE	Ministry of Education
MOH	Ministry of Health
MaHTAS	Ministry of Health Medical Development Division
MCO	Movement Control Order
NPCB	National Pharmaceutical Control Bureau
PSAQ	Patient Safety Attitude Questionnaire
SOP	Standard Operating Procedures
UK	United Kingdom
UN	United Nation
USA	United Stated of America
UM	University of Malaya
WHO	World Health Organization
ZPD	Zone Of Proximal Development

LIST OF APPENDICES

CHAPTER 1: INTRODUCTION

According to the World Health Organization (WHO), patient safety (World Health Organization, 2004; Walton et al., 2010) is "the absence of preventable harm to a patient during the process of health care and reduction of risk of unnecessary harm associated with health care to an acceptable minimum". In this case, an acceptable minimum is the "collective notions of given current knowledge, resources available and the context in which care was delivered weighed against the risk of non-treatment or other treatment" (Vilcahuamán & Rivas, 2017).

It is understood that in a high-risk environment like health care, there is a certain degree of the lack of safety present (Flanagan et al., 2004). Thus, there are clear-cut policies and guidelines established to ensure that the health care professionals are adequately skilled to provide their patients with effective care while ensuring their safety (Leung et al., 2010). Health care providers need to be properly educated in the matters of patient safety to achieve the best results when caring for their patients (Flanagan et al., 2004; Goldsmith, 2011). There needs to be a strong knowledge, correct attitude, and clear awareness regarding patient safety to not compromise the health and safety of the patients (Berretoni et al., 2011; Hall; Kanerva et al., 2013).

Several reports that have been conducted have increased the importance of quality and safety when providing health care (Kohn et al., 2000). Consequently, there have been many efforts on many parts, especially by the World Health Organization (WHO), to start emphasising on the importance of the education on health care safety for health care professionals, especially at the learning stage (Safety & Organization, 2011; Walton et al., 2010).

From the early 1990s, all around the world patient safety and quality care studies have regularly identified patient safety and quality problems (Flanagan et al., 2004; Hayes et al., 2014; Wu & Busch, 2019). The awareness of the problem has increased significantly, with great efforts to improve the security of medical care in the past two decades (Kamran et al., 2018; Myung et al., 2012). WHO in a study found that the world's 21st most common cause of global death and morbidity is seven adverse events that cause 43 million injuries a year (Wu & Busch, 2019). A chilling statistic from the WHO indicated that, on average, one out of 10 in high-income countries has a serious adverse event. In high-income countries, this can be avoided (Pittet et al., 2005; Sittig & Singh, 2012).

Though health care still damages patients, some progress has been made (World Health Organization, 2017; Vaismoradi et al., 2011). Since 2000, this is the system that creates dangers and harms and which also creates patients safety and not individual providers (Carayon, 2010; Wu & Busch, 2019). However, people, public and health managers have a deeply seated, pernicious habit of accusing individual health professionals of specific health errors only (Berretoni et al., 2011). It is certainly true that people are involved in the health care system and they act as team members and interact with other parts of the system (Hughes, 2008; Wu & Busch, 2019). They must feel individually responsible as well. The key process of changing individual conduct will be lost when the balance of responsibility shifts too far and we depend on system solutions (Rogers et al., 2004; Wu & Busch, 2019).

Being one the leading health care providers, physicians participate not only in the production, prevention and monitoring of errors, inaccuracies, and preventable adverse effects (Carrier et al., 2010; Hall et al., 2016). They are the first to communicate that an error has transpired and to inform the family and friends of the patient by dealing with the consequences (Ghahramanian et al., 2017; Sultana et al., 2018). The doctor itself,

however, could be affected as well as traumatized and mistaken as a second victims. But little attention has been paid to teaching and training doctors on this subject (Leung et al., 2010; Wu & Busch, 2019). The integration of education on patient safety and medical error as early as possible in undergraduate medical education has long been recommended by different international committees (King & Hoppe, 2013; Sultana et al., 2018). In 2008 the Guidance for the development of a curriculum was explicitly established as a guideline for health faculties as part of the WHO World Patient Safety Alliance (Lives, 2008; World Health Organization, 2004; World Health Organization, 2012). A subject such as security for patients is not just about knowledge instruction, but also about attitudes to the subject. It is crucial to involve students and their viewpoints in the curriculum planning phase in handling the task of designing material and teaching methods that help to nurture student attitudes (Britnell, 2015; World Health Organization, 2004; Sultana et al., 2018).

A person or system view point of the cause of a medical error is considered, clinicians need to be educated on how to provide more safe medical attention (Gallagher et al., 2006; Myung et al., 2012; Wu & Busch, 2019). Safety of patients should be a new fundamental science in vocational training. Major reforms in health education are needed to achieve this (Gilkey et al., 2008; Sandars et al., 2007). We also understand that the incorporation of patient health into curriculum and training poses difficulties (Bates & Gawande, 2003; Britnell, 2015; Oates et al., 2018).

There have been many efforts also on the part of the Malaysian Ministry of Health

(MOH) as well as the Ministry of Education (MOE) to integrate and emphasize the importance of patient safety in the medical environment (Leotsakos et al., 2014; Motola et al., 2013). The patient Safety Council of Malaysia, for instance, has established an online portal where medical caregivers and patients can access for resources regarding

patient safety (Noh, 2011). They also have a Patient Safety Awareness course for House Officers (HO) (Thompson et al., 2008), in which the stringent passing mark of 80% assures that the health care providers who pass this course are well-versed in-patient safety (Graban, 2016; Shah et al., 2015).

Since the Institute of Medicine's (IOM) report, To Err is Human: Building a Safer Health System (Kohn et al., 2000), was released in November 1999, there has been a surge in the number of medical literature on patient safety, which is echoed by medical students worldwide, stating that patient safety is an important part of their education (McFadden et al., 2009). With the WHO guideline of patient safety education (Fleming & Wentzell, 2008), it can be successfully implemented in the medical education at the undergraduate level, as it is quite a basic requirement for health care providers to put their patient's safety first and foremost (Jarrar et al., 2019).

The study aims to address the gap in the patient safety education by directly interacting with medical students and address what they feel is lacking in terms of patient safety education. This is done on view of the possible concern that not many medical students voice out their lack of knowledge in the patient safety aspect due to the existence of seniority, lack of confidence, and fear of being liable for errors.

1.1 Problem Statement

Medical errors (Khoo et al., 2012) usually occur due to defects in the design and conditions of medical work that lead to competent, careful or caring doctors (Safety & Organization, 2011) to make mistakes that are often no different from the simple errors individuals make every day but which has devastating consequences for patients (World Health Organization, 2012; Sen et al., 2020; Walton et al., 2010). Medical errors results from faulty system and not faulty people (Boyle et al., 2006; Sirriyeh et al., 2010). Hence, it is the system that needs to be fixed and the emphasis on quality enhancement efforts

should not be associated with a fault-finding operation. Looking for defects in health care is the key to target on overcoming them thus the basic 'quality of doing the right thing right at the first time and doing it better the next time' must be supported and upheld (Gallagher et al., 2003; Leung et al., 2010; Safety & Organization, 2011). Hence the Malaysian Health Care System should take lead to ensure all measures are taken care off in prioritizing the patient safety element and to identify the lack of its importance in the system (Alkhenizan & Shaw, 2011; Vilcahuamán & Rivas, 2017).

Major harm occurs to patients mainly due to attitude of health care professionals towards patient safety (Kiesewetter et al., 2014). Practitioners working are commonly used to the safety practices and culture in a hospital and majority of the hospital management consists of medical practitioners (Ross & Loke, 2009). Never forgetting, these medical doctors were once upon a time undergraduate medical student as well. Therefore, where and what happened that the attitude towards patient safety decreased? Is it because the 5 years program in the undergraduate medical school did not nurture them enough to see a positive attitude towards patient safety? Some researchers stated that medical students were not exposed to patient safety in their curriculum during their undergraduate days (Sandars et al., 2007).

In Malaysia, currently the number of housemans have increased drastically and this would reduce the learning opportunities for freshies during their housemanship. Therefore it is appropriate to carry out a study to determine the attitude of patient safety among the medical students of the University of Malaya (UM), recognize where precisely they are missing in their knowledge as well as address the gaps in their education in terms of patient safety, and to identify ways to integrate the WHO's guideline on patient safety education in the medical education curricula in Malaysian medical learning institutions.

1.2 Research Objectives

1. To assess attitude towards patient safety among undergraduate medical students in the University of Malaya.
2. To compare the attitude towards patient safety between male and female undergraduate medical students.
3. To compare the attitude towards patient safety among undergraduate medical students from different academic years.

1.3 Research Questions

1. What is the attitude towards patient safety among undergraduate medical students in the University of Malaya?
2. Is there any significant difference in the attitude towards patient safety between male and female medical students in the University of Malaya?
3. Is there any significance difference in the attitude towards patient safety among medical students from different academic years in the University of Malaya?

1.4 Significance of study

The significance of the study works for undergraduate medical students. The findings will include details about how the awareness of patient safety impacts the academic success of the student. This study is crucial in identifying how the undergraduate medical students understand about the importance of patient safety and their attitude towards patient safety. Similar studies have been conducted in different places as well. Data collected will help the administration initiate collaboration between faculty and stakeholders to help plan the advancement of medical education in the new curriculum For future, the results from this study can be a comparison study to other countries as a form of benchmarking to understand further in depth on the topic.

1.5 Operational Definitions

For this study, several terms were defined as below:

Patient safety is "the absence of preventable harm to a patient during the process of health care and reduction of risk of unnecessary harm associated with health care to an acceptable minimum" (Walton et al., 2010).

Medical error is "the failure of a planned action to be completed as intended and it represent a serious public health problem and pose a threat to patient safety" (Grober & Bohnen, 2005).

Patient safety culture is "compromised by a lack of leadership, lack of responsibility among leadership, lack of routines, failure to update procedures, and a lack of knowledge and education among health care workers" (Berland et al., 2012).

Patient safety attitude is "the shared attitudes, beliefs, values, and assumptions that underlie how people perceive and act upon safety issues within their organization" (Sen et al., 2020)

1.6 Summary

Chapter 1 indicates the level of attitude towards patient safety in an overall and the significance of it was discussed. The next chapter discusses the literature review derived on patient safety worldwide and in Malaysia.

CHAPTER 2: LITERATURE REVIEW

2.1 Development of the patient safety concept

Important concepts of health care on patient welfare has been re-written (Flanagan et al., 2004). The first paradigm shift, focusing on why people make mistakes leading to negative events defined the beginning of patient safety concerns into health care (Liao et al., 2014). The conventional method focused on professional, knowledgeable practitioners made no errors and traditional thinking was equivalent to incapacity, and penalty was implementing appropriate measures in encouraging people to take more precautions (Sittig & Singh, 2012). Practitioners never reported mistakes and sometimes silence was witnessed by the patients and the superiors (Flanagan et al., 2004). Therefore, in 1990s, several information began to change and it seems pointless to blame persons for these mistakes, because accidents will occur before root causes are even rectified (Berretoni et al., 2011). Redesigning procedures and processes mistakes might be minimized if the concept of human nature such as uniformity, streamlining constrains are given the priority (Kanerva et al., 2013).

In the earlier periods of medical culture, various types of belief processes were common and these types centered not on the relationship with people or treatment but on the biological processes of each patient (Carayon, 2010). With the advent of the scientific age as the medical profession started to effectively implement the research theory (Leung et al., 2010), the structures of physiology continued to think. Perhaps it was effective because physicians now were conscious of the provision of health services (Longo et al., 2005).

Health care needed to be considered to be an transparent program, not locked, and regulations have already begun to be viewed as a framework function (Leung et al., 2010). The necessity of medical mistakes being exchanged for successful patient health results

and the more it is communicated across, there will be more examples to be learned in the health care industry (Despins, 2009). The formation of high efficiency organisations was gradually promoted by physicians, boards of directors, senior members, and middle management of health care organizations (Goldsmith, 2011). As treatment methods became more and more effective in an essential dynamic system, the health sector began to develop responsibilities and the integrity of the particular importance in patient safety in society increased (Farley et al., 2015). The three-phased approach to the safety and effectiveness of new treatments includes Phase 1, safety assessed clinical studies; Phase 2, effectiveness clinical studies; and Phase 3, comparable trials to another usual protocol (Leape et al., 2009). The goal was to insure that medicine existed and was accepted as a credible scientific method centered on science (Kutaimy et al., 2018). The initiative was productive; society acknowledged that medicine retained its prestige as a specialty with professional experience through the effective application with powerful techniques (Bates & Gawande, 2003). Thus, these methods and related mindsets have been consolidated by science and medical studies (Miller & Zhan, 2004).

The emerging realization that it was also harder for medical services, including that of the physician and other elements, to understand the error. Adjustments of litigation law and administrative responsibility for health procedures have been made. A model of physician's integrity which also included continued learning obligation set the foundation for the complete comprehension as to what transparency was needed and the effective design of healthy medical systems (Carrier et al., 2010; Studdert et al., 2005)

Patient safety requires system design to ensure reliability of risky treatments (Emanuel et al., 2009). Two principles of the theory of complexity apply: Firstly, the more complex the process, the more likely it is to be chaotic. Secondly, unforeseen events will occur in open interrelated components (Gilkey et al., 2008). To order to prevent or save future

accidents, the easier a treatment method, the most robust it will be, both reliable and unpredictable. The protection mechanisms require the configuration of equipment, procedures, climate, and the atmosphere of the individuals working to the program. Barriers are recognized to proceed from level to level. Furthermore, the level of catastrophic accidents in medicine is considered by members of reputable organisations in many sectors to be so large that others find the medical system as being in a chaotic state (Casey et al., 1999). The discipline in patient safety expects structures that can increase and increase the level of security in health care (Flanagan et al., 2004).

The medical profession has codes of professional ethics that guide the best way to provide health care without dishonoring the person suffering to protect patient integrity. Such essential restrictions include anonymity, physical protection, and others must be governed by patient health principles. Such criteria are at times in direct contrast with the openness and diligence required, including health, for optimum patient care (Naidu, 2009). A specialist who offers full health care must be careful or vigilant about patients' safety. The abundant understanding of adverse effects as well as how to reduce or prevent damage to them is almost always notified of that quality. This sort of functional understanding or awareness of protection constantly grows with familiarity and a willingness to realize that it is incorrect (Schwartz & Claxton, 2010).

2.2 Patient Safety Importance

The Institute of Medicine (IOM) of the National Academy of Sciences, reported 98,000 Americans died as a consequence of preventable medical errors in the US hospitals (Kohn et al., 2000; Samsuri et al., 2015). They also indicated that patient safety is the prevention of harm to patients. Importance is focused on the system of care delivery that:

(1) prevents errors

(2) learns from the errors that do occur and

(3) is built on a culture of safety that involves health care professionals, organizations, and patients.

The United Kingdom (UK) National Health Service database indicates that there has been a drastic increase indicating towards patient safety resulting in death between the Year 2010 to 2012 (Donaldson et al., 2014). Some statistics obtained to prove the above would be due to multiple reasons that falls under patient safety such as; failure of prevention (26%), mismanagement of deterioration (35%), dysfunctional patient flow (10%), equipment-related errors (6%), deficiency in checking and oversight (11%) and others (12%). Combine the effect of human failure and error results in 98% from the total mentioned above. This situation is extremely worrying (Makary & Daniel, 2016) and mainly occurring due to poor attitude of the health care workers.

Mangers also play an important role in patient safety element (El-Jardali et al., 2011). Managers should be able to cultivate encouraging patient safety culture, formulate appropriate strategies and goals, and practice data-centered plans and provide timely feedbacks for their staffs to observe (Neuhauser et al., 2011).

2.3 Background on Malaysia's health care system

The avoidance of adverse effects for patients is defined as patient safety (Mu'taman Jarrar & Don, 2016; Vincent, 2011). Error prevention, error learning and the creation of a safety culture involving health professionals and patients are key factors in the improved safety of patients. Safe patient practice was early described as a type of process or structure that reduces the probability of adverse events caused by the exposure of a range of diseases and methods to the health care system" (Battles & Safety, 2006).

The wellbeing of patients can be assessed by experiences in the health care system (Chow et al., 2009). Device health assessment may be conducted using reactive and positive metrics. Reactive indicators of safety are conclusions from previous events such as infection rates, surgical injuries, falls, stress ulcers and malnourished patients (Carayon, 2010). Proactive safety indicators include a regular screening and identification of entities that are known to have implications for the safety status of an organization including communication, cooperation, routines, guidelines, timing, supporting documents and conflict between production and safety (Reiman & Pietikäinen, 2010).

The Malaysian MOH has a highly efficient health care system in place which caters to a wide range of citizens and foreigners via a universal health care system that is provided by the government, while also overseeing various private health care systems (Organization, 2012; Thomas et al., 2011). The reason that there is a two-tiered health care system in Malaysia is due to the waiting time to see a specialist in the Malaysian government hospital, and the private health care system helps by supplementing the need for urgent health care by cutting down on the waiting time for those who are able to afford it (Abd Hamid et al., 2018; Horvath et al., 2009; Wong et al., 2009). Colonialism introduced modern medicine into the Malaysian health care system, which has been so far relying on traditional cures to take care of the health of the local population, and it does not address emerging diseases that was prevalent at that point of time in Malaysia, such as leprosy and tuberculosis (Neill, 2012).

In rural areas of Malaysia (Ariff & Teng, 2002), the public health care system is quite basic, prompting the government to come up with plans such as 1Care for 1Malaysia (Noh, 2011), which is in line with the importance that is placed upon health care for all Malaysians. The public health care sector has been allotted 5% from the government's social sector development, which translates to around RM 2 billion invested into health

care (Rad et al., 2010). Even a third of the beds in the private health care system have been subsidized by government funding to increase the ease to health care for the citizens of Malaysia (Britnell, 2015). The government also made this decision as the shortage of staff in the public health care sector impacts the waiting time for patients, (Dansky & Miles, 1997) as a mitigating measure. Government investment in the private health care system is also deemed wise as they are equipped with the latest diagnosing technologies and high-tech medical equipment (Leng, 2010; Musa et al., 2012).

2.4 Quality of Malaysia's health care

In hospitals that are keen to keep up their reputation as health care providers with high standards, it is important to maintain the quality performance provided (Habidin et al., 2015). There are several ways to measure quality performance which have been adopted by the Malaysian government in order to assess the quality of the services provided by the health care agencies (Lee et al., 2012) they are responsible for, which all hospitals in Malaysia conduct in order to improve the quality of the services provided. It is essential to measure the quality of the service provided in order to keep the rate of performance continually high, as good performance is a good indicator of good quality rendered (Manaf, 2005), and serves as a standard of practice for all staff to follow when performing their services. The outcomes from the patient care provided are used as a judging factor (Myung et al., 2012) to measure the quality of the services provided. Some of the outcomes measured include patient satisfaction and loyalty (Amin & Nasharuddin, 2013).

Admittedly, it is difficult to measure quality performance in exact terms at the health care system is really quite complex in nature, and one cannot really set a standard in stone when it comes to delivering health care due to its dynamic nature (Hazilah et al., 2009). When it comes to human life, even the smallest mistake can make a difference between life and death, which makes it really complex to apply a static measurement system

towards health care practices (Asch, 1998). Hence, there needs to be a lot of problem-solving skills involved, with the application of strong reasoning skills with an experienced judgement when measuring the quality of health care (Mu'taman Jarrar & Don, 2016).

Malaysian hospitals are measured in their quality to continually increase and improve their services and the benchmarks set are quite high, which places the Malaysian health care system among some of the best in the world (Mu'taman Jarrar & Don, 2016). There are five factors used to determine these benchmarks; establishing an understanding and addressing the problems of the health care industry, encouraging a culture of continual progress and emphasizing patient welfare, continually monitoring performance and evaluating the best practices, changing strategies to improve performance, and involving the key stakeholders in the organization (Sexton et al., 2006; Youssef & Zairi, 1995). The Ministry of Health Medical Development Division (MaHTAS) (TE, 2018), the National Pharmaceutical Control Bureau (NPCB) (Sivanandy et al., 2016) and the Ministry of Health Medical Device Unit are all involved in maintaining the control of quality within the health care organizations in Malaysia (Organization, 2012).

2.5 Delivery of health care in Malaysia

In Malaysia, patients can access both public and private clinics for their medical needs (Neuhauser et al., 2011; Shazali et al., 2013). Some also go to traditional homeopathic practitioners for alternative healing (Hasan et al., 2011). Urban areas have a larger concentration of private general and specialist practitioners while in rural areas (Ariff & Teng, 2002) the MOH has established clinics, where patients are checked and treated and referred to hospitals if more comprehensive treatment is required (Manaf, 2005). The primary care in the private sector imposes fees per service, and private clinics in Malaysia outnumber the government health centres (Goldsmith, 2011; Yu et al., 2008). Both provide curative services, and the government clinics go a step further by also offering

preventive, promotive, and rehabilitative services, which enable the people in areas with less access to hospitals to get a better quality of health care (Parameshvara Deva, 2004; Suleiman, 2001).

The services delivered in the MOH clinics are as follows: (Thomas et al., 2011)

1. Curative
    a. Basic medical care
    b. Minor surgery
    c. Circumcision
    d. Care of chronic conditions
    e. Detection of malaria and tuberculosis
    f. Detection and early intervention of diabetes
    g. Cancer
    h. Sexually transmitted diseases and HIV
    i. Rest beds in the centre for observation before referral to the next level of care
    j. Referral to specialists
2. Preventive
    a. Screening for child development
    b. Screening for women's health concerns (pap smears, breast screening)
    c. Screening for cardiovascular risk factors
    d. Thalassemia screening
    e. Tobacco cessation programmes
    f. Blindness prevention
    g. Mental health services
    h. Elderly and adolescent health programmes
    i. Premarital screening for HIV
    j. School health services

k. Communicable and vector-borne disease control

l. Environmental sanitation.

3. Promotive

a. Health Education and Nutrition

4. Rehabilitative

a. Community based rehabilitation for children with special needs

b. Maternal and child health services

c. Clinic and home delivery

d. Family planning

The MOH provides 5 different levels of health care in its hospitals (World Health Organization, 2012) which are aggregated by the services they offer. Firstly, there are small district hospitals, where the specialists are there on certain times on visit (Bakar, 2009; Rani, 2012). Then there are larger district hospitals where there are resident specialists for up to 6 specialties (general medicine, general surgery, paediatrics, orthopaedics, obstetrics & gynaecology and anaesthesiology), the state-level general hospitals which also retain resident specialists and provide up to 15 specialty services (general medicine, general surgery, paediatrics, orthopaedics, obstetric care & gynaecology, anaesthesiology, radiology, pathology, ophthalmology, ENT, emergency medicine, psychiatry, dental, dermatology and nephrology), regional and national hospitals that have multiple specialties and serve several states, and specialist hospitals or institutions that focus on a certain ailment (Ghahramanian et al., 2017).

The MOH clinics have basic emergency services rendered by paramedics, and most of these clinics have their own ambulance services (Khoo et al., 2012). They have the capacity to respond to accidents and emergencies, and all have a standardized clinical

treatment, referral protocols, and tools to provide quality health care (Mu'taman Jarrar & Don, 2016).

2.6 Concerns of malpractice and its effects on patient safety

Patient safety is a prerequisite in any healthcare facility, and the health care provider is required to always put the welfare and the best interests of the patients first (Classen et al., 2011; Kohn et al., 2000; Mu'taman Jarrar & Don, 2016; Studdert et al., 2005). There are certain misdemeanors that constitute medical malpractice, which include practicing defensive medicine, failing to report incidents, and hesitating to disclose incidents to patients (Carrier et al., 2010; Gallagher et al., 2003; Yousuf et al., 2007). Defensive medicine is defined as performing medical procedures and tests that are not needed, deviating from the standard operational practices, and refusing to treat patients that have a high risk (Studdert et al., 2005).

Practitioners may practice unsafe behaviour (Flanagan et al., 2004) due to blame culture, risk of litigation, lack of communication skills, and the lack of experience in dealing with patients' and their relatives' understanding and emotions regarding the patient's condition (Iedema et al., 2011). Previous studies link the practices of defensive medicine positively with the risk of malpractice litigation as the practitioners want to avoid the liability costs, and it also prevents the full disclosure of information to the patients when an error occurs (Mastroianni et al., 2010). When there is less risk of litigation, the practitioners are more likely to be transparent in the disclosure process (Gallagher et al., 2006).

2.7 Patient safety from a global perspective

The WHO has determined that among the top 10 causes of death and disability in the world includes harm due to adverse events due to unsafe hospital practices, with an estimate of 2.6 million deaths annually, mostly from low to middle income countries

(Boyle et al., 2006; Classen et al., 2011). Medical errors are a main cause of injuries and irreversible harm in the medical practice, as well as improperly treated infections leading to sepsis, unsafe surgical, injection, and transfusion practices, and diagnostic errors (Durand et al., 2015; Lamont et al., 2009).

Improper medical practices (Hambali & Khodapanahandeh, 2014; Hayes et al., 2014) can have tragic consequences for the patients and their loved ones, and shows a deeper problem, where the concerning lack of focus on the safety of patients is impacting the quality of life and contributes to the loss of trust in the health care systems, making people resort to other sources of medicine which may not be suitable for their ailments (Stein, 2011).

As the advancements in medical practice offer new treatments, technologies, and care models to continually offer better health care, it also poses new threats to patient care, especially now that the health care sector has become increasingly more complex and dynamic (Carayon et al., 2006; Myung et al., 2012; Vincent, 2011). Thus, global patient safety is now a challenge to be met to reduce harm to patients on a global level (Pittet et al., 2005). Current safety measures have limited impacts and many low to middle income countries have shown that the safety measures have not been successfully implemented (Lives, 2008; Organization, 2017). The member states of the WHO are striving to implement universal health coverage in alignment with the United Nation's (UN) Sustainable Development Goals (Kieny et al., 2017). This is implemented with the aim of enabling universal health care coverage to be delivered worldwide while also ensuring communities that their health care systems are able to deliver the best care for them and their families (Emanuel et al., 2009; Organization, 2004, 2017; Sanchez, 2010).

2.8 Attitude and knowledge of patient safety as applied in Malaysia

The Patient Safety Council of Malaysia was established to fulfil a Malaysian Cabinet directive that exhorted the Malaysian health care providers to ensure that the citizens of Malaysia receive safe health care (Mu'taman Jarrar & Don, 2016). The function of the Council is established as one where the Director- General (DG) of Health Malaysia plays the role of the adviser to the MOH regarding the best practices in medicine and the prevention of adverse events as well as the measures to overcome them (Manser, 2009; Organization, 2012; Yoelao et al., 2014).

Quality improvement efforts are put forward in order to identify and address any problems in the current health care system, as systems by nature are prone to error, and continual improvement efforts are necessary in order to keep these errors as minimal as possible, if not eradicating them entirely (Rahman & Mu'taman Jarrar, 2015). Thus, the National Patient Safety Council is a point of reference for all health care providers (Leape et al., 2009). There are many guidelines available for perusal on their website, as well as videos and presentations where health care providers can access them to increase their knowledge on patient safety, and also the patients themselves can educate themselves on the proper practices that are due to them during their period of medical care or treatment (Jarrar et al., 2019; Mu'taman Jarrar & Don, 2016; Vincent, 2011).

2.9 Attitude and knowledge of patient safety among medical students

Medical students are often dismissed as an important part in ensuring patient safety (Demirtaş et al., 2014; Liao et al., 2014). In many cases where errors occur, medical students remain silent observers, in deference to their supervisors (Halbach & Sullivan, 2005; Myung et al., 2012). Their lack of experience and knowledge, and the consequential lack of confidence contribute to their unwillingness to speak up when they see medical errors happening(Gallagher et al., 2006; Leung et al., 2010). The apparent hierarchy in

medical institutions infantilizes the medical students to the point of discouraging identification of errors, or if one is identified, not being communicated to the relevant parties (Asch, 1998; Stein, 2019).

The Patient Safety Attitude Questionnaire (PSAQ) (Samsuri et al., 2015; Sexton et al., 2006), is designed for health care specialists who are being employed but for this study the emphasis is focused on attitudes towards patient safety among undergraduate medical students. Hence the Attitude towards Patient Safety Questionnaire (APSQ) was designed to study medical tutors and students' attitudes towards patient safety (Carruthers et al., 2009b) and initially it had 45-item measuring attitudes towards five patient safety themes. For this study, the questionnaire was called APSQ-III as it was validated to 30 items with nine components and items 12, 16, 17, 18, 19, and 28 were reverse scored, hence the responses were required to reverse code it (Refer Appendix A). According to the authors, it could be used to evaluate the effectiveness as a curriculum involving patient safety as well. Each item is scaled ranging from 1 to 5; 1 suggesting strong disagreement while 5 strongly suggesting agreement.

Among four medicine universities in Heilongjiang province, China a cross-sectional study to assess the medical students' attitudes towards patient safety was conducted (Liu et al., 2018). The study was conducted among the undergraduate medical students and a Likert scale of 1 to 5 was used. The lowest score was to component 'medical errors are a sign of incompetence' and highest score was to component 'I have a good understanding of patient safety issues because of my medical training'(Sultana et al., 2018).

Another study at Pakistani Medical School was conducted on patient safety awareness among undergraduate medical students and there were 122 students participated (Kamran et al., 2018).There were high mean scores for 'team functioning' and 'long working hours as a cause of medical error; and moving on 'Error disclose responsivity' was low.

Comparison between male and female students, there were no significant differences in all components. As conclusion, the misconceptions on medical errors and error disclosure in patient safety should be included in their medical curriculum, says the authors.

2.10 Consolidating principles and methods of patient safety within educational curriculum

While patient safety is a universally acknowledged need, there is not much being done in terms of emphasizing it in medical education curricula (Kutaimy et al., 2018; Thompson et al., 2008). Medical education has yet to fully integrate patient safety concepts and principles into the existing curriculum, despite medical students themselves stating that they see it as an important part of their education (Ganasegeran & Al-Dubai, 2014; Vaismoradi et al., 2011). There is a need to include a comprehensive knowledge, skill, and behaviour training within the medical education curriculum (Halbach & Sullivan, 2005; Kutaimy et al., 2018; Myung et al., 2012; Sandars et al., 2007).

The Australian Patient Safety Education Framework (APSEF) is an evidence-based description of the knowledge, skills, and behaviours that health care providers need to have to provide quality health care while ensuring patient safety (Walton et al., 2010). The World Alliance for Patient Safety by WHO also developed a universal patient safety curriculum guide for medical schools worldwide (World Health Organization, 2012; World Health Organization, 2017). While many curricula for medical schools are already filled to their capacities, it is important to integrate patient safety into the curriculum (Kutaimy et al., 2018). In view of this, the WHO designed the topics to be either integrated into existing teaching or introduced as stand-alone modules (Halbach & Sullivan, 2005; Safety & Organization, 2011). It is hoped that the availability of WHO's universal patient safety curriculum guide will enable institutions of higher learning with the proper aid to

develop their own patient safety curriculum (Fleming & Wentzell, 2008; Walton et al., 2010).

2.11 Summary

Chapter 2 indicates results from literature search conducted throughout the world and focusing on Malaysia. Majority of the contents are obtained from online search engine via Google Scholar and mainly the key terms used were : patient safety, attitude towards patient safety, medical errors, practitioners, patient safety culture, medical curriculum, undergraduate medical students, malpractise, quality of medical care. The next chapter discussed the frameworks related to patient safety and medical teachings.

CHAPTER 3: FRAMEWORKS

3.1 Theoretical Framework

The objective of this current study is to understand the attitude of undergraduate medical students towards patient safety. Because educational goals are to improve the individual's perspective on the importance of patient safety (Chow et al., 2009), it is very necessary to establish the program, its review, and its transformation in higher education institutions (Britnell, 2015). During the course, designers will pay attention to the goals, methodologies, materials, experiments, and a framework to achieve all the above (Walton et al., 2010). It is important to understand the education setting, both internally and externally, which denotes the entire education market (Lee et al., 2013). To prepare students for challenges related to the workplace, they must be equipped with critical thoughts, adaptive mechanisms, creative abilities, silks problem-solving and applied ethics (Valentine & Larson, 1974). There are many approaches to patient safety curriculum development and implementation (Myung et al., 2012).

In the past decade, multiple approaches were implemented to resolve medical problems and increase patient welfare, but one of the main challenges remained the prevalent corporate climate in the health care community (Sittig & Singh, 2012). Physicians' attitude to medical errors is one of safety culture's most important components. Good awareness is recommended as the strongest method for enhancing patient health attitudes (Carayon et al., 2006; Carayon, 2010). Various studies have implemented and highly recommended to enable patient safety education for health care workers in the hospital itself and some others focused on formal education by including the including patient safety as a requirement in undergraduate studies (Kanerva et al., 2013; Nabilou et al., 2015). In some fields, like medical education, this is a necessity (Quek, 2011). Without appropriate educational climate and health and safety preparation, reacting to reasonable public demands would be unsuccessful and temporary (Kanerva et

al., 2013). Recently, the WHO established a robust patient care curriculum (World Health Organization, 2012; Walton et al., 2010). Considering these adjustments in undergraduate curriculum at all levels; it is a challenge and needs reliable policies together with sincere commitment from educators and managements (Mattox, 2012; Nabilou et al., 2015).

Patient safety is a fundamental part of quality care (Manaf, 2005). The target of moving towards patient safety is to deliver consistent care and continuously learn from the care being offered. Hence, the basic milestone is achieved by development of high reliability processes in the clinical microsystem mainly to look forward to what may happen and resilience when things do occur, which forms the basis of situation awareness (Abdallah, 2019; Jeffs et al., 2016).

The approach was built for patient safety on four key steps:

- Risk management is to identify risks and adverse events and to develop a response to mitigate that risk.
- Human factors are by addressing the factors that can cause harm due to the nature of humans. This includes addressing the design of processes to take these risks into account, looking at tasks, equipment, environment, patients, and staff factors and how they impact on safety.
- Reliability theory aims to develop standardised approaches and have the patient receive the right care the first time every time.
- Resilience engineering mainly looks at what works and tries to build on this as well as learning from what does not work.

This research targeted at students' expectations, skills, and attitudes towards patient health care. Perceptions of students include causes and management of errors, and attitudes of students include their interest in patient safety education and skills, and the

integration of WHO's guidelines on patient safety awareness to enhance their patient safety skills (Demirtaş et al., 2014; Hasan et al., 2011; Liu et al., 2018; Shah et al., 2015). It is essential to note that integrating practical applications along with good mentorship in the patient safety training curriculum is important to enhance the awareness and knowledge of patient safety among students. Experiential learning in this case is highly essential for students to develop knowledge , skills and values derived from direct academic experiences.

3.2 Application of the learning theories

3.2.1 Vygotsky's Theory

Vygotsky 's central subject is the essential role of social engagement in the growth of cognition. Every role in cultural development of the child has two different characteristics: first, social, and then individual; second, interpsychological; and second, child interpsychological; second, intrapsychological (Rowland, 2011). It often refers to volunteer treatment, rational memory, and idea creation. All the higher functions are the product of real partnerships ". The idea that cognitive development potential is dependent on the "zone of proximal development" (ZPD) is a second aspect of Vygotski 's theory. This is a development level achieved when children engage in social conduct (Chaiklin, 2003). The ZPD depends on complete social interactions in its development. The level of talent which can be established through training for adults or peers goes beyond what can be done by itself (Wang, 2015).

Russian psychologist Lev Vygotsky (1986) highlighted the importance of language , social interaction and adult guidance in the learning process , researchers exploring, interacting, and discovering the world in a relatively solitary manner (Davydov & Radzikhovskii, 1999; Matusov & Hayes, 2000). When applied to adult learning capabilities, some adults benefit from a more balanced approach between theoretical as

well as a hands-on approach to learning (Wang, 2015). Vygotsky's theory adapted into the patient safety curricula will then emphasize upon the aspect of guided discovery in the learning environment, where a mentor is on hand to oversee the learning activities, adjusting and correcting the mistakes and errors as the medical students experience the learning process, thereby allowing a more holistic learning approach to patient safety, which is an aspect of health care education that cannot afford any errors during implementation in real patient care settings (DeVries, 2000; Kelly, 2013).

3.2.2 John Dewey Reflective Theory

In practical professional educational activities, reflective practice is also an effective component where learners realise from their own experience instead of formal learning and transferring knowledge (Jarvis, 1992). It can be the most important source of development and improvement for individuals. Through reflection, someone is able to see and label ways of thinking, and forms of theory in a context of their work (Valkenburg & Dorst, 1998). Throughout their practice, the person reflects not only on past actions and events, but also takes a conscious look at emotions, experiences, actions and responses using that information system and carries an important way to bring them together (Miettinen et al., 2012). From the 1970s, the focus has been on the development and application of reflective practices and on experiential learning (Willower, 1994).

Reflective practice is seen as an important strategy for lifelong learning health care professionals (Tobin et al., 2009). Due to the constantly changing context of health care and the continuously growing medical knowledge, demand for expertise is high. Because of this complex and constantly changing environment, medical practitioners may benefit from a reflective practice program (Mamede et al., 2008; Mamede & Schmidt, 2004). There are many explanations that a health care provider should participate in reflective practices: to learn more about motives, beliefs, behaviours, principles and emotions

involved with patient service; to give a fresh insight in the experience of circumstances and in adjustments to current ideas , experiences and actions; the reflection act is seen as a way to encourage the development of practitioners and to build more successful health teams (Mamede & Schmidt, 2004; Redmond, 2004). Participating in reflection practice is linked to the enhancement of health care efficiency, promoting personal and professional growth and narrowing the differences between philosophy and action (Abela, 2009; Doll et al., 2013).

3.2.3 Meaningful learning

Meaningful learning is also comparing to rote memorization, which often memorizes details without elements or connections to certain items or places (Mayer, 2002). An instance of successful learning is a real-life demonstration of a principle where the learner has mastered. The usage of practical learning can contribute to increased learning, as the student should be motivated to apply an idea to a real-life scenario. It will enable the student to consider the knowledge posed and allow them to recognize constructive teaching approaches (Novak, 2002). Even though it requires awhile to memorize rather than repeat, memory is usually stored for a prolonged duration (Huang & Chiu, 2015).When meaningful learning occurs, the learner becomes completely involved and then the brain can organize the information based on its relation, creating associations that help us to learn more and better by establishing connections. This also means that, instead of being individual, these facts are remembered together (Jonassen & Strobel, 2006).

Teachers who can utilize this form of learning are, more than rote, likely to answer challenges better because of their desire to adapt their expertise. Technology encouraged student learning and rendered studying simpler (Jonassen et al., 2003). With free and convenient access to such learning resources, students will grow their interests and

thereby learn the content meaningfully. The creation of interest is one of the purposes of successful study, because students who are usually interested perform better (Adema-Hannes & Parzen, 2005; Bretz, 2001). Applied to patient safety education, this theory would apply the idea of using the students' cognitive processes to immerse themselves into their learning experience by establishing connections between the concepts they learn and thus they are able to process and adapt the information situationally (Adema-Hannes & Parzen, 2005; Bretz, 2001; Pintoi & Zeitz, 1997; Rendas et al., 2006).

3.2.4 Experiential Learning

Experiential learning, also known as "learning through focusing on doing," is the method of learning by practice (Kolb et al., 2001). Experience is unique from rote or instruction, wherein the learner assumes a fairly inactive function (Kolb et al., 2005). This is linked to, but not similar with, other kinds of active learning, such as reflective practice, travel learning and free choice learning. Experiential learning is sometimes confused with the word 'active learning,' because although experiential learning is a wider concept of schooling, it considers the human method of learning (Kolb et al., 2005; Kolb et al., 2009).

This concept may be learned learning without any instructor and it applies exclusively to the significance cycle of the actual knowledge of the person (Yardley et al., 2012). However, while knowledge acquisition is inherent in a natural process, a real perception of learning requires several elements. According to Kolb, both individual and situational understanding is perpetually obtained (Kolb & Kolb, 2009; Kolb et al., 2001)

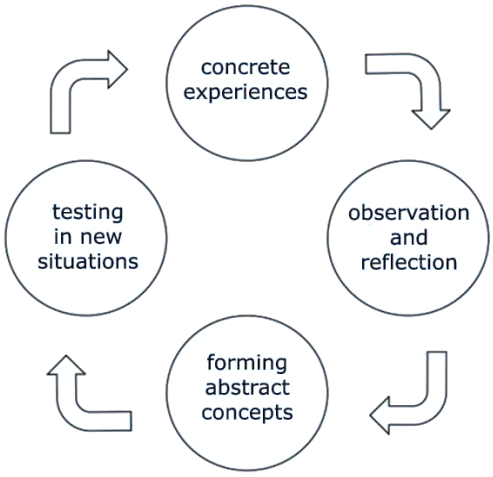

Figure 3.1: David Kolb's Experiential Learning Model (ELM)

Experiential learning is the most effective if it includes reflective learning, the learning of experiential learning and the further learning phase (Smith, 2016). This learning method is able to contribute to "changes in opinion, responsiveness or abilities" and to "make the decision a reference for selecting and acting" (Baker et al., 2012). Instead, the experiential learning mechanism reflects the learner 's experience with analytical skills (Beaudin et al., 1995). However, it helps in developing a framework for adapting different teaching / learning techniques in the classroom by considering experiential learning in the development of courses or program contents (Chavan, 2011).

3.3 Application of theories to patient safety – the framework

In patient safety education, this would be appropriate to apply as it can be a guided method as well as self-learning, which is suited to every type of learning styles of different students, and the immersive experience allows the students to have a more hands-on experience with regards to learning about patient safety.

Table 3.1: Application of learning theories to patient safety practices

Theories	Appropriateness in patient safety	How the theory fills the gap
Vygotsky's Social Constructivism (1930)	Student learning occurs through social interaction allowing the learner to learn to solve real-life problems. The environment is essential in allowing the process to happen, and as such, communal learning is common. The learning methods are dependent on the context of the activity as well as the events that take place during learning. The teachers implement mixed learning in which the tasks are specifically designed to boost the learning capacity of the individual students.	Learners get to practice their own knowledge, skills and understanding in real life situations Learning is linked to social context and culture Contexts reduce any misunderstanding of the learning experience. Cognitive development occurs in learners in terms of thinking, reasoning, logic and problem-solving skills.
John Dewy's Learning Theory (1900)	Active learning method that presents a holistic view of learning through experience and reflection. Guidance and support are provided by the lecturer with the students motivated to find answers for themselves. Favors both individual and group learning. The lecturer may adopt a mixed mode of delivery with his role varying from facilitator, or a coach	This also involves reflectivity and makes the learner analyse why practices and activities occur the way they occur.

Table 3.2, continued

Theories	Appropriateness in patient safety	How the theory fills the gap
David Ausubel's Meaningful Learning (1967)	A student-centered approach where the individual interprets by gaining insight and processing of knowledge internally. The environment is essential to support learning and hence learning thrives in a facilitatory environment. Since learning is a process, the lecturer should adopt mixed methods of delivery that includes e-learning and group projects.	Theory of meaningful learning emphasizes assimilation of relevant content and basing new learning on the already existing knowledge as opposed to rote learning which is not possible in bioethics education. This also leads to the development of new conceptual frameworks. Learning is through interaction, dialogue, and collaboration of learnt knowledge with previous knowledge and experiences. Learning can be mediated by academicians, which leads to internalization and development of independence by the learners

Table 3.2, continued

Theories	Appropriateness in patient safety	How the theory fills the gap
David Kolb's Experiential Learning Theory	takes a more holistic approach and emphasizes how experiences, including cognition, environmental factors, and emotions, influence the learning process. Students then use these concepts to develop new theories about the world, which they then actively test. There is a correlation between students learning styles and their chosen majors. People who choose specific majors and professions that are well-aligned to their learning styles tend to be more committed to their field.	Experiential learning can be good for helping people explore their own strengths when learning new things Learners can play to their own strengths as well as developing areas in which they are weakest. This method is highly adaptable to individual learning styles, which is essential in-patient safety for the students to gain a comprehensive understanding of it.

3.4 Conceptual Framework

Patient safety is a crucial aspect of the clinical education program, especially in medical curricula to reduce the adverse effects among the patients. Clinical mistakes may cause notable morbidity and mortality cases in both developed and developing health care organizations. Therefore, many researchers have pinpointed the significance of merging patient safety training in undergraduate and postgraduate clinical curricula. The overall health care organization's involvement needed to improve patient safety through educations. Yet, the educational concept alone is not enough to improve patient safety; instead, it should accompany by an integrated approach containing attitudes or behavioral changes towards the patient safety interventions (Gaupp et al., 2016).

In this regard, a few questionnaires modules have been established and used to determine attitudes changes towards patient safety in health care disciplines. All these questionnaires developed to highlight the standard measures and data concerning patient safety, so it could notify the medical program inventors to design and execute the relevant educational curriculum. Among the developed modules, "Attitudes to Patient Safety Questionnaire (APSQ-III)" is the widely used questionnaire to addresses patient safety. The modules have used to test knowledge, beliefs, and attitudes about patient safety (García Elorrio et al., 2016).

In this current study, a group of medical students from the first year to final year in Malaysia tested for their attitude and knowledge on patient safety using APSQ-III questionnaire. The same questionnaire module has applied for similar studies in different health care settings worldwide. There were researches conducted in Pakistan medical school (Kamran et al., 2018), in CEMIC University Institute of Argentina (García Elorrio et al., 2016), in National University of Singapore (Kow et al., 2016), in medical universities in Heilongjiang province, China (Liu et al., 2018), etc. The module tested among different levels of health care workers like medical students, pre-clinical medical students, doctors, nurses, and university students.

For the current study, the nine APSQ-III key factors (dimensions), as shown in Figure 1 tested against medical students (respondents) to monitor their attitude and knowledge regarding patient safety. The demographic characteristics of the respondents in this study include gender, age group, and academic years. The nine APSQ-III key factors become the independent variable, and their responses reflecting the behavioral and knowledge become a dependent variable. The study conducted in Pakistan (2018) compared the awareness level of medical students on patient safety in terms of gender and experiences on medical mistakes (Kamran et al., 2018).

In this study, the gender and year of study factors chose to make a comparison against the questionnaire's responses.

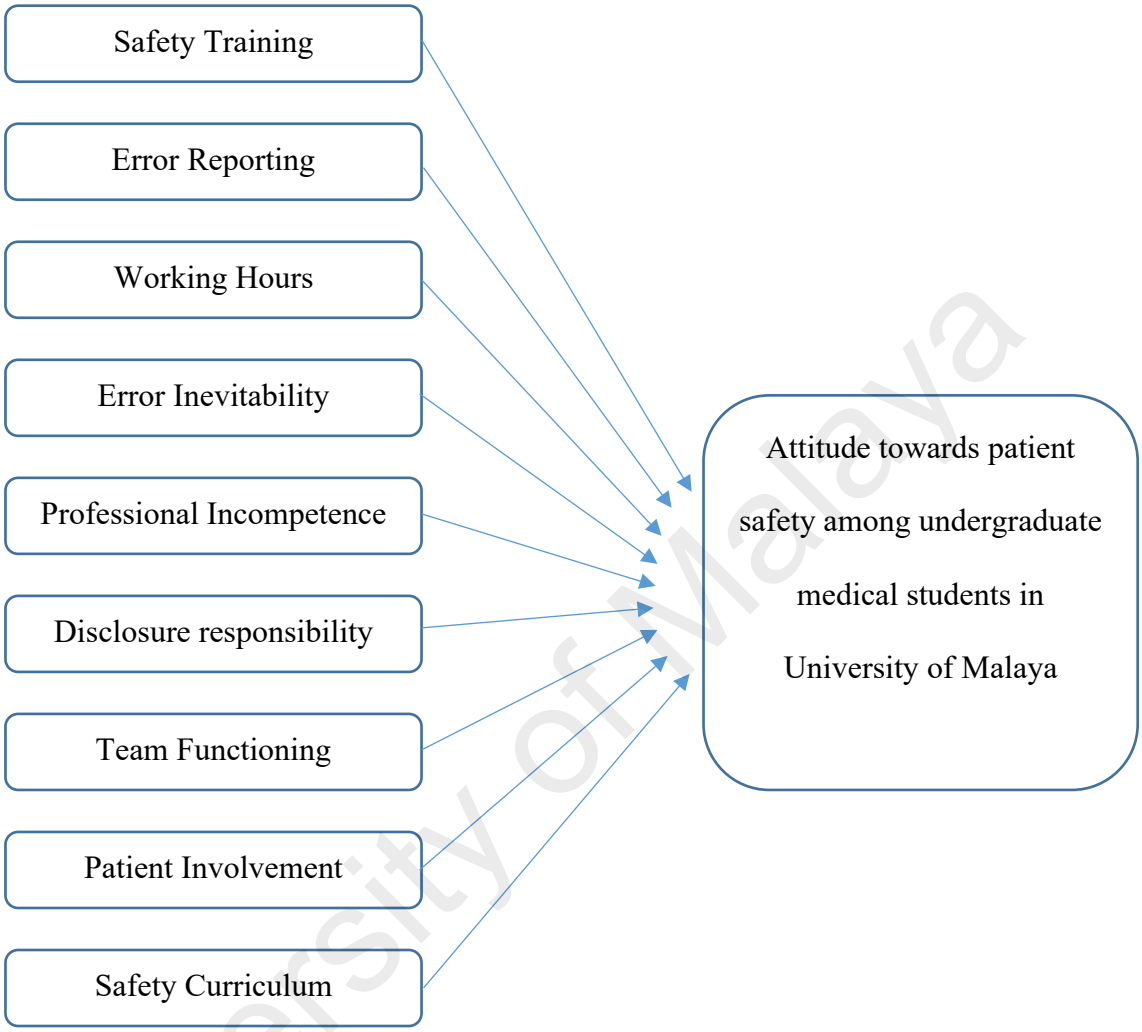

Figure 3.2: Schematic diagram of conceptual framework for the current study

The outcome from the current study compared the strengths and weaknesses of each dimension of the patient safety attitude among University of Malaya's medical students. The exact point also discussed in the past research conducted in Gaza for medical doctors (Alfaqawi et al., 2020). From the outcome, new approaches may plan to increase awareness of patient safety via education for all health care level workers.

3.5 Summary

Chapter 3 indicates all the theories linked to the study conducted on attitude towards patient safety among undergraduate medical students. Then it focuses on the concepts adopted to monitor and conduct this study mainly to achieve the objectives of this study successfully.

CHAPTER 4: METHODOLOGY

4.1 Introduction

This chapter focuses primarily on addressing the gathered data in a constructive manner to promote the dialogue described in Chapter 6. The aim of this study is to determine undergraduate medical students' attitudes towards patient safety. The survey based on APSQ-III questionnaire with nine dimensions on attitude towards patient safety were identified. The results from the data analysis were discussed later the next chapter. The scores in each dimension are then compared between themselves and discussed further.

4.2 Population and sampling procedures

Universal sampling refers to the selection of sample where not all the people in the population have the same probability of being included in the sample and each one of them, the probability of being selected is unknown . For this study, a universal sampling procedure was used. All the undergraduate medical students at University of Malaya, from Year 1 to Year 5 were included in this study.

4.3 Instrument

In this study, the Attitudes to Patient Safety Questionnaire (APSQ-III) was used (Samsuri et al., 2015) (Refer to Appendix A). Initially it aimed to measure attitudes on five dimensions with 47 items but in the validation process; it was made as nine meaningful dimensions, instead of five and the number of items were minimised to 30 (Oates et al., 2018). Since then majority of the research on medical students' attitude to patient safety have used APSQ-III as it became an open source, hence no permission needed to be obtained before using it in a research study. The dimensions are adopted and used directly without any alterations (Carruthers et al., 2009a; Liao et al., 2014; Nabilou et al., 2015; Sen et al., 2020). The nine dimensions in APSQ-III are as below:

1. Patient safety training received is defined as "measures the medical students' perception on the adequateness of the patient safety training they have received, using three items".
2. Error reporting confidence is defined as "evaluates the students' openness in reporting medical errors, immaterial of the seriousness. There are 3 items in this construct. Questions like, 'I would feel comfortable reporting any errors I had made, no matter how serious the outcome had been for the patient' were used to measure the medical students' perceptions on this".
3. Working hours as an error cause is used "to assess the medical students' perception of how the working conditions could lead to committing medical errors. There are 3 items in this construct. Questions like, 'Shorter shifts for doctors will reduce medical errors' were used to measure the medical students' perceptions on this".
4. Error inevitability is "the measures the medical students' opinion on whether errors are bound to happen, no matter how competent one is. One of the three questions in this construct is, 'Even the most experienced and competent doctors make errors".
5. Professional incompetence as an error cause is defined as "evaluates the medical students' perception on whether the health care providers must take the blame for the medical errors".
6. Disclosure responsibility is "the assessed the medical students' perception on the medical error disclosure responsibility".
7. Team functioning is defined as "the medical students are asked to state their perceptions on whether working in a team would help to reduce the medical errors".

8. Patient involvement in reducing error is "the evaluated the medical students' perception on whether the patients have a role to play for their own safety".
9. Importance of patient safety in the curriculum is defined as "the medical students' perception on the teaching and learning aspects of patient safety procedure is asked". Also, when asked 'Teaching students about patient safety should be an important priority in medical students training', and this means the medical students would want to learn more on patient safety.

4.4 Research Design

This is a descriptive study on the attitude towards patient safety among undergraduate medical students in University of Malaya. Due to the nature of this study, the quantitative method is used by the researcher as the empirical assessment which consists of numerical measurement and analysis. From the dimension of the period, the cross-sectional study type of this research where data were gathered within 2 months from March to April 2020. The delay in collection of data was because of government's restrictions to follow strict Standard Operating Procedures (SOP) on Movement Control Order (MCO) due of Covid-19 pandemic. On 27th of February 2020, UM.TNC 2/UMREC letter was received stating the clearance. (Refer to Appendix B) The deductive approach is being used in the study to conduct the research based on existing theories and research proposed by (Saunders et al., 2007) to identify the relationship between the independent variables and the dependent variable identified.

4.5 Data Analysis

Data analysis refers to the process of analysing and evaluating data to draw a result or conclusion (Bryman & Cramer, 2002). The purpose of data analysis was to collect information related to the subject being considered. In data analysis, SPSS version 25 software is used. The questionnaire, which is conducted online, respondents needs to

answer all items before proceeding next without skipping. Variables such as qualitative are list down as frequencies and percentages meanwhile quantitative variables are list down as mean and standard deviation. Reliability analysis was performed on each construct to test the internal consistency of the items. Each construct the mean of the items was computed and saved as the dimension score. A clearer visual comparison was administrated by obtaining a spider plot of all mean values of the nine dimensions. To test the difference in attitude towards patient safety between male and female, independent samples t-test were used. In comparing the scores among year of study, the one-way ANOVA procedure was used.

4.6 Ethical Procedures

The ethical approval for this study was obtained from University of Malaya ethical committee. The application for ethical clearance consists of:

1. Application form
2. Participant information sheet
3. Consent form
4. Questionnaire
5. Google form link

To participate in the study, the students are invited to participant voluntarily. All participants are given an informed consent form before proceeding further and they are given an option to quit the survey at any time, without having to state any reasons. All information collected will be stored as confidential details and only used for research purposes for this study.

4.7 Summary

Chapter 4 mainly focused on the methodology for this study. This chapter have discussed the research design, sampling and population, data collection methods, research instruments, data analysis and lastly ethical procedures for clearance. The findings and analysis through SPSS Version 25 will be discussed in the following chapter.

CHAPTER 5: RESULTS AND DISCUSSION

5.1 Introduction

The development of modern health care raises the risk of error (Teigland et al., 2013), and the knowledge of patient safety has been demonstrated by accidental harm and the lack of medical trainees knowledge (Flanagan et al., 2004; Myung et al., 2012). These issues should be addressed through formal training in relation to patient safety theories and techniques (Kutaimy et al., 2018). While medical schools have started incorporating in their curricula content on patient safety and clinical defects (Kow et al., 2016; Leung et al., 2010), very little was authored on these efforts so far. Only a few studies satisfy the criteria for inclusion (Hayes et al., 2014). The majority of these are cases, and none of Malaysia's studies have been identified especially in the undergraduate medical studies (Bakar, 2009; Rahman & Mu'taman Jarrar, 2015; Sivanandy et al., 2016).

This study reveals that patient health instruction is more often integrated into the curriculum of medical schools in industrialized countries such as the United Stated of America (USA) and the UK (Colla et al., 2005; Mu'taman Jarrar & Don, 2016). Most of these courses are optional or integrated into clinical or professional internships (Oxentenko et al., 2010; Ross & Loke, 2009), which have not formally been included in the medical education system (Motola et al., 2013; Quek, 2011). The design and curriculum duration of courses vary from 4 to 30 hours, and no research addresses all recognized core areas of patient safety awareness systematically (Motola et al., 2013; Thompson et al., 2008; Walton et al., 2010).

The varied methods of teaching for curricula implementation such as, including collaborative lectures / presentations, suggested books, case-based presentations, workshops, debate in small groups, game play, interdisciplinary research in teams and practice in videotape of structured patient and many others would be the best manner of

integrating the importance of patient safety in undergraduate studies (Leung et al., 2010; Sandars et al., 2007; Sivanandy et al., 2016).

5.2 Demographic Characteristic

Table 5.1: Demographic characteristics of the respondents

Variable	Frequency	Percent	Valid Percent	Cumulative Percent
Academic Year				
Y1	53	18.5	18.5	18.5
Y2	51	17.8	17.8	36.4
Y3	63	22.0	22.0	58.4
Y4	38	13.3	13.3	71.7
Y5	81	28.3	28.3	100.0
Total	286	100	100	
Age Group				
16 - 20 year	55	19.2	19.2	19.2
21 - 25 year	229	80.1	80.1	99.3
26 - 30 year	1	0.3	0.3	99.7
> 30 year	1	0.3	0.3	100.0
Total	286	100	100	
Gender				
Male	108	37.8	37.8	37.8
Female	178	62.2	62.2	100.0
Total	286	100	100	

Table 5.1 shows the sample population from University of Malaya are 80.0% of the participants in the age group of 21 – 25 years old. From here, 62.2% of the respondents are females in total.

5.3 Attitude towards patient safety

For this study, APSQ-III questionnaire was used, and a Google Form was created to circulate the link of the survey via respective student emails.

First internal consistency of the items in each construct was tested using the reliability analysis. Usually a Cronbach's Alpha value of more than 0.700 is considered acceptable

(Taber, 2018). Cronbach's Alpha value is presented in Table 5.2. For each construct Ctonbach's Alpha value was more than 0.7. The overall Cronbach's Alpha for all the 30 items was 0.885. Next for each construct, the mean score was computed by taking the average of the student's responses. For example, in the first construct 1, training received, they were 3 items. For each student, the average for the responses in the 3 items were computed, where high score indicates high level agreement for that construct. The summary of the mean scores is provided in Table 5.2

Table 5.2: Summary Statistic

Variables	Cronbach's Alpha	Mean ±SD	Skewness	Kurtosis
1. Safety Training	0.902	4.02 ± 0.74	-0.64	0.54
2. Error Reporting	0.860	3.64 ± 0.80	-0.27	-0.11
3. Working Hours	0.855	4.20 ± 0.79	-1.04	1.09
4. Error Inevitability	0.720	3.40 ± 0.46	-0.75	2.45
5. Professional Incompetence	0.748	3.02 ± 0.71	0.20	0.69
6. Disclosure responsibility	0.710	3.38 ± 0.63	-0.38	2.01
7. Team Functioning	0.895	4.37 ± 0.76	-1.30	2.09
8. Patient Involvement	0.855	3.95 ± 0.80	-0.75	1.17
9. Safety Curriculum	0.741	4.35 ± 0.74	-1.33	2.31
Overall (30 items)	0.885			

Table 5.2 scores for all 9 dimensions are more than 3 therefore there is a positive opinion on all 9 dimensions under the APSQ-III questionnaire. Looking at the skewness values are less than 2 and the kurtosis value are less than 7, generally, the distributions can be considered to be normal (Kim, 2012). Comparing the confidence intervals, the Team Functioning scored the highest mean compared to all other dimensions and the mean for Professional Incompetence and Disclosure Responsibility are lowest compared to the rest. The difference is also evident from the spider plot in Figure 5.1.

Figure 5.1: Spider plot for mean scores of attitude towards patient safety.

As shown above in the figure, team functioning scored the highest mean of 4.37 compared to all the other 8 dimensions for medical students. The second-best importance was showed towards importance of patient safety in medical curriculum and followed by working hours as error cause. The element of patient safety training received and patient involvement in reducing error recorded 4 as mean which indicates its importance for medical students in attitude towards patient safety as well. For items such as error reporting confidence and error inevitability, they scored equally a fair mean of 3.64 and 3.40. Professional incompetence scored the lowest mean of 3.02.

5.4 Comparison of attitude towards patient safety by gender and year of study

In this section, the scores in each dimension are compared by gender and year of study.

5.4.1 Comparison by gender

Table 5.3: Gender mean score analysis by dimensions

Variables	n	Mean ±S	p-value*
1. Safety Training			
Male	108	3.97 ± 0.81	0.402
Female	178	4.04 ± 0.70	
2. Error Reporting			
Male	108	3.66 ± 0.82	0.648
Female	178	3.62 ± 0.80	
3. Working Hours			
Male	108	4.14 ± 0.77	0.326
Female	178	4.24 ± 0.82	
4. Error Inevitability			
Male	108	3.44 ± 0.49	0.219
Female	178	3.37 ± 0.45	
5. Professional Incompetence			
Male	108	3.06 ± 0.67	0.514
Female	178	3.00 ± 0.74	
6. Disclosure responsibility			
Male	108	3.43 ± 0.59	0.360
Female	178	3.36 ± 0.65	
7. Team Functioning			
Male	108	4.38 ± 0.77	0.900
Female	178	4.37 ± 0.76	
8. Patient Involvement			
Male	108	4.00 ± 0.75	0.407
Female	178	3.92 ± 0.84	
9. Safety Curriculum			
Male	108	4.35 ± 0.76	0.916
Female	178	4.36 ± 0.73	

*p-values are based on Independent sample t-test

On the dimension of Error reporting, the mean indicated that male students have better attitude in reporting errors compared to female students. Next dimension, Professional

incompetence, the male students also scored higher mean values compared to their female counterparts. Its states that males are in denial compared to females when it comes to causes of medical error are possibility due to professional incompetence.

5.4.2 Comparison by year of study

Table 5.4: Year 1 to Year 5 mean score analysis by dimensions

Variables	n	Mean ±S	p-value*
1. Safety Training			
Y1	53	3.78 ± 0.84 [a]	
Y2	51	4.09 ± 0.67	
Y3	63	3.96 ± 0.83	0.044
Y4	38	4.02 ± 0.67	
Y5	81	4.17 ± 0.64 [a]	
2. Error Reporting			
Y1	53	3.53 ± 0.8	
Y2	51	3.7 ± 0.76	
Y3	63	3.69 ± 0.93	0.460
Y4	38	3.47 ± 0.83	
Y5	81	3.7 ± 0.72	
3. Working Hours			
Y1	53	4.03 ± 0.8	
Y2	51	4.21 ± 0.79	
Y3	63	4.35 ± 0.81	0.187
Y4	38	4.32 ± 0.64	
Y5	81	4.14 ± 0.85	
4. Error Inevitability			
Y1	53	3.25 ± 0.49	
Y2	51	3.43 ± 0.48	
Y3	63	3.43 ± 0.42	0.175
Y4	38	3.41 ± 0.34	
Y5	81	3.43 ± 0.5	
5. Professional Incompetence			
Y1	53	3.2 ± 0.71	
Y2	51	3.01 ± 0.59	
Y3	63	3.02 ± 0.87	0.240
Y4	38	2.86 ± 0.65	
Y5	81	2.99 ± 0.68	

Table 5.5, continued

Variables	n	Mean ±S	p-value*
6. Disclosure responsibility			
Y1	53	3.46 ± 0.61	
Y2	51	3.45 ± 0.62	
Y3	63	3.38 ± 0.74	0.489
Y4	38	3.4 ± 0.48	
Y5	81	3.28 ± 0.6	
7. Team Functioning			
Y1	53	4.25 ± 0.83^{b}	
Y2	51	4.68 ± 0.57^{ab}	
Y3	63	4.17 ± 0.86^{a}	0.006
Y4	38	4.43 ± 0.56	
Y5	81	4.39 ± 0.76	
8. Patient Involvement			
Y1	53	4.03 ± 0.78	
Y2	51	3.96 ± 0.75	
Y3	63	3.73 ± 0.92	0.113
Y4	38	3.91 ± 0.75	
Y5	81	4.08 ± 0.76	
9. Safety Curriculum			
Y1	53	4.34 ± 0.84	
Y2	51	4.4 ± 0.66	
Y3	63	4.25 ± 0.88	0.786
Y4	38	4.37 ± 0.52	
Y5	81	4.4 ± 0.69	

*p-values are based on ANOVA ^{ab} pairwise difference significantly

Table 5.4 indicates statistically significant difference between the medical students' years of study in team functioning and safety training. Based on post hoc analysis, for safety training mean for Year 5 (4.17 ± 0.64) was significantly higher compared to Year 1 (3.78 ± 0.84). Next, shows for team functioning the mean for Year 2 (4.68 ± 0.5) was significantly higher compared to Year 1 (4.25 ± 0.83) and Year 3 (4.17 ± 0.86).

Table 5.6: Tukey HSD - Safety Training

Variables	n	Subset for alpha = 0.05	
		1	2
Academic Year			
Y1	53	3.780	
Y2	63	3.958	3.958
Y3	38	4.018	4.018
Y4	51	4.092	4.092
Y5	81		4.169
Sig.		0.181	0.568

Table 5.5 clearly indicates that Year 1 students are lacking on the safety training component compared to the rest of the undergraduate medical students. It is their first year into medical school and any component tested on them may be new to them.

Table 5.7: Tukey HSD – Team functioning

Variables	n	Subset for alpha = 0.05	
		1	2
Academic Year			
Y3	63	4.175	
Y1	53	4.245	
Y5	81	4.389	4.389
Y4	38	4.434	4.434
Y2	51		4.677
Sig.		0.372	0.268

From the Table 5.6 above, Year 1 and Year 3 undergraduate medical students are lacking in the team functioning element. Year 1 students are very much new to the programme and Year 3 is probably the first exposure to their clinical years, hence the chances of difference in culture and being new to medical schools and entering the clinical phase, may cause the differences.

5.5 Discussion – Patient Safety Curriculum Guide for Medical University

The best health care practices are when every health care professionals are educated and competent in-patient safety measures, to prevent medical errors. Unfortunately, most educators share their view on patient safety measures should only be trained for practicing professionals and not students being involved in the implementation of patient safety curricula (Sen et al., 2020). Undergraduate medical students are highly encouraged to learn about medical errors in health care and the safe health care delivery methods by incorporating these studies into their curricula. Achieving a satisfactory standard of patient safety components is the main objective of every medical education curriculum at any undergraduate medical schools worldwide (Kutaimy et al., 2018). The external reason for importance in patient safety training comes from endorsements by medical professional bodies, increase intakes of student enrolment, and the fact that patients nowadays are not very open-minded of being examined by beginners. The internal reasons are cultural influences sociopolitical and, clinical practices, problem-based learning skills and a shift from hospital to community and primary health centers in healthcare practice (Hassan, 2007). In 2018, International Medical University (IMU) kick started the process of designing an online training module using the provided guidelines by MOH on Patient Safety Awareness course for junior health care professionals and this was published in their newsletter (IMU News, 2019).

'It may seem a strange principle to enunciate as the very first requirement in a hospital that it should do the sick no harm'(Nightingale, 1863). In 2013 the MOH developed a 16 parameter key result area in patient safety and launched the curriculum into the undergraduate medical programme in 2015 (Walton et al., 2010). The programme was mainly based on areas such as general patient safety, prescribing errors, communication, surgical errors, and they were all to be delivered in the form of lectures and video presentations in the clinical Year 4 of the medical curriculum (Ramachandran et al.,

2018). This curriculum guide is meant to prepare students for safer workplace practice, to inform universities about patient safety topics and to enhance their capacity as patient safety educators, to increase the patient safety profile and to promote international collaboration and research (Liu et al., 2018; Safety & Organization, 2011; Sandars et al., 2007). It also provides an extensive curriculum to support patient safety learning and integration (Safety & Organization, 2011). The guide proposes that a variety of teaching methods are used to incorporate patient safety topics into the present curriculum (Teigland et al., 2013), including: the inclusion of patient safety topics into problem-based learning scenarios, the use of high- and low-faith simulation-based learning, interactive and educational lectures, mentoring and coaching (Fleming & Wentzell, 2008; Walton et al., 2010). It also acknowledges that barriers have to be surmounted by adding to an already very busy curriculum (Nie et al., 2011). It also suggests that university, hospitals and faculty decision-makers be completely involved with explanation, the need and rational needs and that clinical medicine can be included into the teaching process to enhance existing material (Hassan, 2007; Sim, 2004; Yousuf et al., 2009).

Based on patient safety education being incorporated into curricula at medical schools (Motola et al., 2013; Nie et al., 2011), it would be useful to develop ways for interested students to explore these subject areas and learn more about them and possibly manage their potential in this sector. Medical schools should also be prepared to offer patient safety interested students option terms or research projects (Hassan, 2007; Teigland et al., 2013). After graduation, rotating positions in the patient safety and quality improvement will need opportunities to be created by resident medical officers. Fellowships will help develop future patient safety clinic leader for those who want to go further. (Gallagher et al., 2006; Ghahramanian et al., 2017)

5.6 Summary

Chapter 5 mainly discussed the results from data analysis and each analysis was presented in table form. The mean scores of each dimension is also presented with a comparison of gender, age group and year of study. The essentials of patient safety education lies in prevention, not rectification, therefore the ideal pedagogical approach with regard to patients' safety is to teach students every opportunity to prevent error in clinical and to enhance safety and quality of care throughout their curricula.

CHAPTER 6: CONCLUSION AND IMPLICATION OF THE STUDY

Educating medical students regarding patient health is the foundation of better patient treatment in practice (Britnell, 2015). Many studies have indicated that there were significant variations in material, teaching methods and teaching staff awareness on patient safety (Gilkey et al., 2008; Hassan, 2007; Hayes et al., 2014; Rani, 2012; Sivanandy et al., 2016).

The current training of medical schools around the world also faces significant challenges (Vilcahuamán & Rivas, 2017). It is undeniable that the technique of teaching had to be reassessed to produce reliable results (Hassan, 2007; Thomas et al., 2011). Many medical students also had trouble opening up about medical mistakes (Liao et al., 2014; Liu et al., 2018; Sirriyeh et al., 2010). There needs to be a guideline for error reporting (Kiesewetter et al., 2014) and educational methods aimed at developing better communication skills (King & Hoppe, 2013) need to be taught at the undergraduate level to improve patient safety (Epstein, 2014). Awareness of the safety protocols used in a health care organization is the first step in identifying any areas for improvement, given that the knowledge, attitudes, and behavior of health care workers are one of the areas for improvement (Carayon et al., 2006; Oates et al., 2018; Sendelbach & Funk, 2013).

Patient safety is primarily the diagnosis, avoidance, and treatment of negative effects or accidents arising during health care (Emanuel et al., 2009). Hence, doctors must be educated about patient protection is while they are undergraduate students (Bishop et al., 2015). After graduation, their knowledge, awareness, and attitudes towards the observation of patient safety measures to prevent errors will be positive right from the start of their medical careers (Kamran et al., 2018) (Sandars et al., 2007) et al., 2007).

To maintain consistency in the methodology and material of teaching patient protection in medical school, the WHO has established a detailed framework for patient health. WHO Curriculum Guide topics (World Health Organization, 2012; Safety & Organization, 2011; Walton et al., 2010), include: what is patient safety; why applying human factors is important to patient safety; understanding of systems and the impact of complexity on patient care; being an effective team player; learning from harm prevention errors; understanding and managing clinical risk; using quality-improvement methods to improve care; engaging patients and caregivers; infection control and many others (Bakar, 2009; Kieny et al., 2017).

Medical students can be taught how different health care systems affect the safety of patients, how adverse events can be caused by poor communication, and how errors can be made inadvertently (Cho et al., 2017; Halbach & Sullivan, 2005). Students should understand how to cope with these problems at an early stage in their schooling such that their degree of knowledge is strong in alleviating medical errors (Carruthers et al., 2009b). A positive educational atmosphere and prompt training on patient safety concerns are required to enhance health care and respond to public expectations (Cosway et al., 2012; Vaismoradi et al., 2011).

In Malaysia, medical education does not teach students to assume liability for any mistake (Sirriyeh et al., 2010). Their inexperience, minimal clinical skills, and anxiety of performing poorly in their appraisals may contribute to caution in speaking up (Myung et al., 2012; Noh, 2011). Education is the best strategy to improve student knowledge and attitudes towards patient safety at an early stage before any ingrained bias can occur. Faculty and medical staff involved in teaching students should encourage students to observe and actively communicate to responsible staff when they see any errors or near misses (Leung et al., 2010; Thomas et al., 2011). This will encourage all health care

professionals to work towards reducing mistakes in patient care and will allow and motivate students to become champions of patient safety (Carrier et al., 2010; Studdert et al., 2005).

All health care workers need to be mindful of situations that increase the likelihood of error for human beings in any situation (Sultana et al., 2018). This is especially important for medical students and other inexperienced junior staff to be aware of (Hayes et al., 2014). Two factors with the most impact are fatigue and stress (Halbach & Sullivan, 2005; Sirriyeh et al., 2010). There is strong scientific evidence linking fatigue and performance decrement making it a known risk factor in patient safety (Owens et al., 2001). Understanding the interaction and interrelationships between humans and the tools and machines they use. Understanding the inevitability of error and the range of human capabilities and responses in any given situation is essential to knowing how application of human factors principles can improve health care and this should be nurtured from their undergraduate medical studies (Liu et al., 2018; Rendas et al., 2006).

The current study conducted to determine the strengths and weaknesses of each key factor regarding the patient safety attitude among the medical students in Malaysia. An authenticated and reliable questionnaire, APSQ-III used for the purpose. The questionnaire made in the online version for easy access to reach the target respondents. Although the sample size in the current study smaller than previously conducted research, the sample size number still fulfilled the statistical requirement (Chuan & Penyelidikan, 2006).

Based on the results, the respondents strongly agreed to seven out of the nine dimensions mentioned in the questionnaire. The respondents agreed that they received adequate patient safety training, confidence to report medical errors, long working hours or shifts may cause themselves to make medical errors, must take the responsibility to

disclose the medical error they made, professional incompetence as an error cause is important to prevent medical errors, error inevitability is inevitable in the medical field, patient involvement in the treatment process reduce the medical error, and patient safety should be made a priority in medical students training. Only for the factor of "patient safey training" and "team functioning", the respondents do not agree on the fact that those two constructs plays a role in attitude towards patient safety unless there is a change in the way questions were asked. For gender factor against patient safety attitude, the male respondents showed a better attitude towards the error reporting compared to the female respondents. For "Professional Incompetence as the cause of the error", the mean scores among the male medical students were higher compared to the female medical students. The seniority years (Year 5) shown a better understanding of patient safety compare to year one medical students.

Overall results mentioned the undergraduate medical students from University of Malaya given positive feedbacks on patient safety elements in medical curricula. Although the male students showed a better attitude on patient safety, it cannot consider as the number of male and female students is not equal therefore need to investigate to some extent. Interestingly, the number of the academic year indicates a better agreement that experiences given a better understanding of patient safety. This point indicates that educational developers should modify the content of medical education so that the students from beginner levels have adequate attitude of patient safety. For other aspects of prolonged working hours and shift key factors, the agreement needs to testify with service medical doctors which would give a real comparison of the situation.

Several limitations in the current study were firstly focused the sample size was too small. The modification of the medical curricula depending on the number of positive responses from respondents. The more positive responses, the higher changes to improve

in medical curricula as the number of samples justifies the need for the situation. The results implied that the need for the inclusion of patient safety in medical curricula from year one to final year's students is vital to reduce medical errors in the future. Secondly, in this study we used self-administered questionnaire, and there was some level of doubt if the participants, the undergraduate medical students; answered those questions honestly. The reason being is, it might have led to inaccurate reflections on the study on undergraduate medical students' attitude towards patient safety. Finally, the questionnaire link was sent via students' personal email in the Faculty of Medicine (FOM), the response rate were not as expected. In future, if the department of the medical education take the initiatives to perform such study among their medical students and analyse the results, it would be really good if the instructions comes directly from them to students to participate in the study; as response rate and timely reply would be better.

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