KNOWLEDGE OF PATIENT SAFETY LEVEL AMONG UNDERGRADUATE NURSING STUDENTS AT UNIVERSITI SAINS MALAYSIA

ADVEN TSEN JAIMIEH @ JAIMIT

SCHOOL OF HEALTH SCIENCES

UNIVERSITI SAINS MALAYSIA

2024

KNOWLEDGE OF PATIENT SAFETY LEVEL AMONG UNDERGRADUATE NURSING STUDENTS AT UNIVERSITI SAINS MALAYSIA

by

ADVEN TSEN JAIMIEH @ JAIMIT

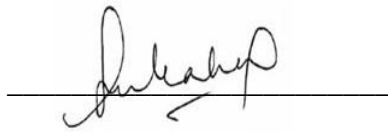Dissertation submitted in partial
fulfillment of the requirements for the degree of
Bachelor in Nursing with Honours

August 2024

CERTIFICATE

I certified that the dissertation entitled "Knowledge of Patient Safety Level Among Undergraduate Nursing Students at Universiti Sains Malaysia" is a bona fide record of research work done by Ms Adven Tsen Jaimieh @ Jaimit during the period from October 2023 to August 2024 under my supervision. Accordingly, I have read this dissertation, which, in my opinion, conforms to acceptable standards of scholarly presentation and is fully adequate, in scope and quality, as a dissertation to be submitted in partial fulfilment for the degree of Bachelor of Nursing (Honours).

Main supervisor,

ASSOC PROF DR SOON LEAN KENG

School of Health Sciences

Health Campus

Universiti Sains Malaysia

16150 Kubang Kerian

Kelantan, Malaysia

Date: 14 June 2024

DECLARATION

I hereby declare that this dissertation is the result of my study and own investigations, except where otherwise stated and duly acknowledged. I also declare that it has not been previously or concurrently submitted as a whole for any other degrees at Universiti Sains Malaysia or other institutions. Finally, I grant Universiti Sains Malaysia the right to use the dissertation for teaching, research, and promotional purposes.

ADVEN TSEN JAIMIEH @ JAIMIT

Student of Degree of Bachelor Health Sciences (Nursing)

School of Health Sciences,

Health Campus,

Universiti Sains Malaysia,

16150 Kubang Kerian,

Kelantan, Malaysia

Date: 14 June 2024

ACKNOWLEDGEMENT

I want to express my deepest appreciation to my supervisor, Associate Professor Dr Soon Lean Keng, for her invaluable guidance and feedback. I also could not have undertaken this journey without her knowledge and expertise sharing with me. She encouraged and reminded us of the quote by Lao Tzu: "A journey of a thousand miles begins with a single step," which serves as an inspiring reminder of the importance of taking that first step, regardless of the obstacles that may lie ahead during my research work journey in my final year nursing degree study.

Besides, this endeavour would not have been possible without the teaching and support of my course coordinator, Dr Norhasmah Mohd Zain.

Additionally, I sincerely thank my classmates, Abdul Halim Bin Sudarman, Nurmutiah Binti Mohd Yunus, and Nurafifah Binti Mohd Ariff, who motivated me throughout the research process, which I greatly appreciate.

Finally, I would like to mention my family, who provided me with unconditional support, such as emotional and financial support, to overcome the challenges. Thank you for lending a helping hand. Words can barely express how thankful I am that they are in my life. Also, they believe in me, encouraging me to work smart and hard to reach my goals.

TABLE OF CONTENTS

PAGE

LIST OF TABLES

LIST OF FIGURES

LIST OF ABBREVIATIONS

APEX	-	Accelerated Programme for Excellence
MPSG	-	Malaysian Patient Safety Goals
PS	-	Patient Safety
USM	-	Universiti Sains Malaysia
WHO	-	World Health Organisation

TAHAP PENGETAHUAN KESELAMATAN PESAKIT DALAM KALANGAN PELAJAR SARJANA MUDA KEJURURAWATAN DI USM

ABSTRAK

Keselamatan pesakit (PS) adalah aspek kritikal dalam penjagaan kesihatan, dan profesional penjanaan kesihatan, terutamanya pelajar kejururawatan, memainkan peranan penting dalam memastikannya. Oleh itu, memahami tahap pengetahuan dalam keselamatan pesakit adalah penting untuk meningkatkan kualiti penjagaan dan mengurangkan kejadian-kejadian yang merugikan dalam persekitaran kesihatan. Kajian ini bertujuan untuk menentukan tahap pengetahuan keselamatan pesakit di kalangan pelajar sarjana muda kejururawatan di Universiti Sains Malaysia. (USM). Satu kajian keratan rentas seramai 96 pelajar sarjana muda jururawat, dipilih secara rawak, dijalankan di USM dari 1 Februari 2024, sehingga 31 Mac 2024. Soal selidik tinjauan 27 item yang disahkan digunakan untuk mengukur tahap pengetahuan peserta mengenai keselamatan pesakit. Populasi kajian digambarkan oleh statistik deskriptif (min, sisihan piawai, frekuensi dan peratusan). Ujian pekali korelasi Pearson digunakan untuk menentukan hubungan antara ciri-ciri sosiodemografi dan skor pengetahuan keselamatan pesakit. Umur purata peserta ialah 23.00 ± 2.00 tahun. Daripada peserta, seramai 64.6% peserta mempunyai tahap pengetahuan keselamatan pesakit yang baik, manakala selebihnya, 35.4%, mempunyai pengetahuan sederhana tentang keselamatan pesakit. Korelasi yang signifikan diperhatikan antara pengetahuan keselamatan pesakit peserta dan jantina ($p=0.006$). Tiada hubungan yang signifikan secara statistik antara skor pengetahuan dan umur ($p=0.885$), tempoh praktikal ($p=0.421$), dan tahap pengajian ($p=0.421$). Secara keseluruhan, pelajar melaporkan bahawa mereka lebih yakin dalam pengetahuan mereka tentang keselamatan pesakit yang diperolehi dalam persekitaran klinikal berbanding

dalam bilik kuliah. Oleh itu, meningkatkan pengetahuan pelajar sarjana muda kejururawatan tentang keselamatan pesakit memerlukan pendekatan komprehensif yang mengintegrasikan bilik kuliah dan tetapan klinikal.

KNOWLEDGE OF PATIENT SAFETY LEVEL AMONG UNDERGRADUATE NURSING STUDENTS AT USM

ABSTRACT

Patient safety (PS) is a critical aspect of healthcare, and healthcare professionals, especially nursing students, play a pivotal role in ensuring it. Hence, understanding the level of knowledge in patient safety is crucial to enhancing the quality of care and reducing adverse events in healthcare settings. This study aimed to determine the knowledge of patient safety level among undergraduate nursing students in Universiti Sains Malaysia (USM). A cross-sectional study of 96 undergraduate nursing students, randomly selected, was carried out at USM from February 1, 2024, to March 31, 2024. A validated 27-item survey questionnaire was used to measure participants' knowledge of patient safety. The study population was described by descriptive statistics (means, standard deviations, frequencies and percentages). The Pearson correlation coefficient test was employed to determine the association between socio-demographic characteristics and patient safety knowledge score. The mean age of participants was 23.00 ± 2.00 years old. Of the participants, 64.6% had a good knowledge level of patient safety, whereas the remainder, 35.4%, had moderate knowledge of patient safety. A significant correlation was observed between participants' patient safety knowledge and gender (p=0.006). There was no statistically significant association between the knowledge score and age (p=0.885), practical duration (p=0.421), and level of study (p=0.421), respectively. Overall, students reported that they were more confident in their knowledge about patient safety gained in the clinical setting than in the classroom setting. Therefore, enhancing undergraduate nursing students' knowledge of patient safety requires a comprehensive approach that integrates classroom and clinical settings.

CHAPTER 1

INTRODUCTION

1.1   Introduction

Patient safety (PS) is an essential component of healthcare. Nursing students, who are the future frontline healthcare providers, should be knowledgeable about PS. As the pillar of the healthcare system, they have to be equipped with the skills and information required to guarantee patient safety. Furthermore, there is an increasingly recognized need to prepare future healthcare professionals for patient safety (Tella et al., 2014). According to the Nursing and Midwifery Council (2020) on ensuring patient safety and enabling professionalism, and Health Education England (2020) on improving safety through education, different policies have been developed internationally, establishing that patient safety should be included as a major area of nursing education. However, the extent to which students pick up concepts linked to patient safety over time is not well documented (Bressan et al., 2021; Stevanin et al., 2015).   Therefore, this thesis presents a cross-sectional study determining patient safety among undergraduate nursing students at Universiti Sains Malaysia (USM).

Understanding the knowledge of patient safety is crucial to enhancing the quality of care and reducing adverse events in healthcare settings. The first chapter of this thesis gives context to the background context surrounding the research topic of the study. This chapter also includes the problem statement, research questions, research objectives, research hypotheses and significance of the study. Following the significance of the study, the conceptual and operational definitions were detailed to inform this study.

1.2   Background of the Study

Patient safety is the foundation of good patient care. The unnerving fact that healthcare can harm us as well as heal us is the reason for suggesting that patient safety is the heart of healthcare quality (Bressan et al., 2021). Furthermore, there is a growing recognition of the need to equip future healthcare workers for patient safety (Tella et al., 2014). The United Kingdom Nursing and Midwifery Council (2020) highlights the importance of patient safety in nursing education, prioritizing challenges and policies worldwide to ensure patient safety. The World Health Organisation (WHO) emphasizes patient safety as a global health priority, a key component of strengthening health systems for universal health coverage (WHO, 2023). Malaysia, in line with its Patient Safety Goals 2.0 (2021), has adopted WHO Global Patient Safety Challenges as a strategy to eliminate healthcare harm.

1.3   Problem Statement

The nursing profession prioritizes patient safety, as it is crucial for quality healthcare and a vital part of nurse education. Nursing students must be equipped to identify, address, and disclose potential safety concerns based on their professional competencies and proximity to patients, thereby safeguarding them from potential dangers (Usher et al., 2017). There is an increasingly recognized need to prepare future nursing students for patient safety. Patient safety is crucial in healthcare to prevent harm and mistakes (Sabzi & Farokhzadian, 2020). Nursing students should acquire the knowledge to prevent mistakes and adverse effects by the end of their training, as per studies by Torkaman, Sabzi & Farokhzadian (2022) and Levett-Jones et al. (2020).

The cornerstone for safe and efficient nursing practice is knowledge. However, most prior research examined nursing students' self-reported impressions of, or

confidence in, their level of patient safety knowledge rather than their knowledge. Given the pivotal role that nursing students play in maintaining patient safety, the results from this study may raise important information about the preparation of nursing students for safe and effective clinical practice.

1.4   Research Questions

Generating research questions is important as the research question gives focus, sets boundaries and provides direction (Polit & Beck, 2020). For this research, the following research questions serve as a guide to achieving the research study's objectives are as follows:

i.   What is the patient safety knowledge level among undergraduate nursing students at USM?

ii.   Is there any association between demographic characteristics (gender, age, year of study, and practical duration) and patient safety knowledge level among undergraduate nursing students at USM?

1.5   Research Objectives

Research objectives describe concisely what the research is trying to achieve and explain the reason for pursuing it (Ryan, 2022).

1.5.1   General Objective

This study aims to determine the patient safety knowledge level among undergraduate nursing students in Universiti Sains Malaysia (USM).

1.5.2   Specific Objectives

i.   To determine the patient safety knowledge level among undergraduate nursing students at USM.

ii.   To determine the association between demographic characteristics (gender, age, year of study, and practical duration) and the patient safety knowledge level among undergraduate nursing students at USM.

1.6   Research Hypotheses

A research hypothesis is a statement of expectation or prediction that research will test (Polit & Beck, 2020). Following are the alternative (H_A) and null (H_O) research hypotheses of this study:

Hypothesis 1   :   There is a significant association between the selected demographic characteristics (gender, age, year of study, and practical duration) and patient safety knowledge levels among undergraduate nursing students in USM (H_A).

:   There is no significant association between the selected demographic characteristics (gender, age, year of study, and practical duration) and patient safety knowledge levels among undergraduate nursing students in USM (H_O).

1.7   Significance of the Study

Patient safety is an essential principle of health care, and it is thus an essential component of contemporary nursing care (Bressan et al., 2021). Nursing students are future pillars of the healthcare system and play a crucial role, requiring them to recognize, respond to, and disclose potential safety risks to protect patients from adverse events and close calls (Usher et al., 2017). Their knowledge, attitudes, and perceptions of safety issues significantly influence their adherence to these principles. However, nursing

students' knowledge of patient safety is inadequate (Sweeney et al., 2017)., leading to a high prevalence of adverse effects and medical errors (Ji, 2016). The primary obstacle to a safer healthcare system is fostering a patient safety culture, which involves implementing safe nursing practices to prevent harm to patients, requiring nursing students to possess comprehensive knowledge. However, a lack of knowledge is a significant issue, as nursing students play a vital role in maintaining patient safety in nursing care.

Despite studies in the nursing education field identifying this issue back in 1973, little knowledge is still available on how nursing students learn patient safety principles and the progression of such knowledge and competencies over time (Tella et al.,2014). Furthermore, the growing literature indicates a gap in knowledge about where and how patient safety is effectively taught in the pre-registration nursing program and about the level of knowledge students should obtain in specific patient safety areas (Kirwan et al., 2019; Tella et al., 2014). A European study under the COST Action project RANCARE, across 27 countries, has found that safety issues were not included as a separate module. Even if they were included in some syllabi, they were not taught as a stand-alone topic. Still, they were rather dispersed across the curriculum in several other subjects, giving the impression of limited importance. Also, the above study identified differences in nursing education across and within the countries examined (Kirwan et al., 2019). This study aims to determine the patient safety knowledge level among undergraduate nursing students at Universiti Sains Malaysia (USM). The findings of this study could provide crucial information about undergraduate nursing students' knowledge of patient safety in nursing practice, helping establish a benchmark for education, administration, and nursing practice. As efforts to include patient safety in health professional education increase, it

is important to capture nursing students' knowledge about patient safety. The findings may provide new perspectives and theoretical clarification of patient safety in nursing.

1.8 Conceptual and Operational Definition

The following conceptual and operational definitions specific to this research study are as follows:

Variables	Conceptual Definition	Operational Definition
Patient safety	Patient safety is 'the absence of preventable harm to a patient and reduction of risk of unnecessary harm associated with health care to an acceptable minimum' (WHO, 2023).	In this study, patient safety refers to the prevention of unnecessary harm to a patient during the process of health care and the reduction of the risk of unnecessary injury associated with health care to an acceptable minimum.
Patient safety knowledge	In the context of patient safety knowledge, it refers to the health professionals aiming to prevent and reduce risks, errors and harm that occur to patients while providing health care (Kavuluru, 2022).	In this study, patient safety knowledge refers to the nursing student's reflection on specific patient safety education outcomes regarding non-technical skills, as well as the gap between knowledge and clinical competence and measured using the Health Professional Education in

		Patient Survey (H=PEPSS) developed by Ginsburgy (2012). The questionnaire is composed of seven dimensions: Clinical safety issues (4 items), working in teams (6 items), communicating effectively (3 items), managing risk (3 items), human and environmental factors (3 items), adverse events (4 items) and culture of safety (4 items) (Appendix A), scored on a 5-point Likert scale ranging (1= 'Strongly disagree' to 5= 'Strongly agree'). Patient safety knowledge was categorised based on Bloom's Taxonomy: Good (80% and above), Moderate (60-79%) and Poor (59% and below)(Bloom, n.d.). Higher scores represent higher levels of self-perceived students' knowledge about patient safety in specific areas.

Undergraduate nursing student	An undergraduate nursing student is a person who is enrolled in an approved nursing educational school or program.	This study refers to Year 2, 3 and 4 undergraduate nursing students enrolled in the School of Health Sciences, USM.

CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

Chapter 2 details the literature review on scholarly articles and other sources relevant to this study entitled 'Patient safety knowledge level among undergraduate nursing students at Universiti Sains Malaysia (USM)' being investigated. A combination of keywords used to search these articles includes patient safety, patient harm, safe care, patient safety culture knowledge in nursing, and Malaysia. The literature review depicted in this chapter, includes various sub-headings, namely patient safety, patient safety culture in nursing, the association between knowledge level of patient safety and demographic characteristics and the study's conceptual framework underpinning the research study.

2.2 Patient Safety

World Health Organization (WHO) defines patient safety as 'the absence of preventable harm to a patient and reduction of risk of unnecessary harm associated with health care to an acceptable minimum' (WHO, 2023). Patient safety is a global health concern in both developed and developing nations. Globally, it has been estimated that one out of ten patients experienced safety issue(s) while receiving hospital care; this represents the 14th cause of the global disease burden (WHO, 2019). Patient safety is a construct that implies behaviour intended to minimize the risk of harm to patients through effectiveness and individual performance designed to avoid injuries to patients from the care intended to help them (Albrecht, 2015).

2.3   Patient Safety Culture and Knowledge in Nursing

The fundamentals of good nursing are reflected in Florence Nightingale's (1896) quoted words, "First, do no harm", and are expressed in codes of ethics and responsibility (Francis, 2015). Patient safety is linked to the working conditions of nurses and the application of patient safety guidelines to avoid mistakes and unfavourable outcomes. It is expected that nurses to be able to intervene by care standards. Hence, this can be accomplished by fostering a culture of patient safety, implementing educational programs and providing timely feedback and reminders (O'Brien et al., 2017). As healthcare personnel who aim to aid patients reach vigour, patient safety should be a top priority. The discipline of patient safety is to avoid, lessen, document, and review errors and other unnecessary harm that frequently lead to negative patient occurrences (WHO, 2023).

Undergraduate nursing education is an important starting point in advancing patient safety in knowledge, attitude, and skills in preparing future nurses (Kirwan et al., 2019). Therefore, education has been identified as one of the most important improvement interventions for lowering the risk of damage for nursing students, as the future workforce, to comprehend the nature of risk in health care and the necessity for system strengthening.

Literature has identified that teaching patient safety to undergraduate nursing students is necessary; however, there is still no consistency in the teaching methods nor an agreement on which areas to focus or prioritize. Patient safety has remained a "hidden element" within the curriculum (Kirwan et al., 2019; Usher et al., 2018; Raymond, Medves & Godfrey, 2017). Therefore, studying nursing students' knowledge of what they have learned about patient safety in both the classroom and the clinical practice could be a starting point.

2.4 Association between Knowledge Level of Patient Safety and Demographic Characteristics

In a multi-site, cross-sectional, web-based study of 732 Chinese undergraduate nursing students in China found females were the dominant nursing population. Undergraduate nursing students were more confident in clinical safety skills but were less in understanding sociocultural aspects of patient safety and speaking up about it. Less than half of the nursing students felt capable of approaching unsafe practices and were hesitant to voice concerns about adverse events. The study found significant differences in patient safety competence across regions, learning styles, self-assessed competence levels, and experiences of adverse events, accounting for almost 15% of the total variance in patient safety competence scores. A better understanding of patient safety competence was noted among final-year nursing students (Huang et al., 2020). Chen et al.'s (2019) study found that the Chinese version of the H-PEPSS is a reliable and valid instrument for evaluating undergraduate nursing students' competence in patient safety education.

A longitudinal study of 90 nursing students at Udine University in Italy found that nursing students had an average of 4.19 out of 5 patient safety knowledge at the end of the first year. This knowledge remained stable at the end of the second and third years, with no statistical differences observed over the years. However, the competencies acquired in clinical settings decreased significantly at the end of the second year and increased at the end of the third year. Thus, this suggests nursing students' competencies in patient safety issues increase over time, while their knowledge remains stable. However, students were more vulnerable at the end of the first year when they appeared overconfident about patient safety issues (Bressan et al., 2021).

A descriptive, comparative study involving nursing students from Cyprus and Greece found that their knowledge about patient safety was significantly higher in the

classroom than in the clinical setting. The knowledge in clinical aspects was highest while working in teams was lowest. Cypriot students reported higher levels of knowledge in most dimensions, while Greek students had lower knowledge in clinical aspects and teamwork (Dimitriadou et al., 2021).

A descriptive study in Turkey involving 391 nursing students found that patient safety competency levels were above moderate, with higher mean attitude scores than knowledge and skill scores. The study recommends organizing patient safety training to develop competencies and integrating teaching methods to improve knowledge, attitudes, and skills. The results should be evaluated for further improvement (Erkuş Küçükkelepçe et al., 2023).

A cross-sectional study of 92 nursing students in one private college University in Malaysia found that 98.9% had good knowledge about patient safety. However, the relationship between students' knowledge and age, year, semester, and total clinical posting was not significant (Zulkifli et al., 2021).

2.5   Conceptual Framework for the Study

Patient safety is a critical and long-standing issue in nursing research. To serve as a guide and ballast to research (Ravitch & Riggan, 2016), a conceptual framework was used to inform the researcher to visualize or anticipate the association between the concepts, constructs and variables in this present study. The conceptual framework allows the researcher to conclude, mapping out the variables the researcher may use in the study and the interplay between them. For this study, the knowledge framework was the foundation for the researcher to unpack the nature of knowledge in this area of knowledge, "Patient Safety Knowledge among Undergraduate Nursing Students in USM". Figure 2.1 illustrates the framework used to establish the relationship between the concepts such as

patient safety knowledge among undergraduate nursing students in USM, which contains

the seven dimensions (clinical safety issues, working in teams, communicating effectively,

managing risk, human and environmental factors, adverse events and culture of safety)

and their demographic characteristics. The higher the scoring percentage, the higher the

knowledge of patient safety.
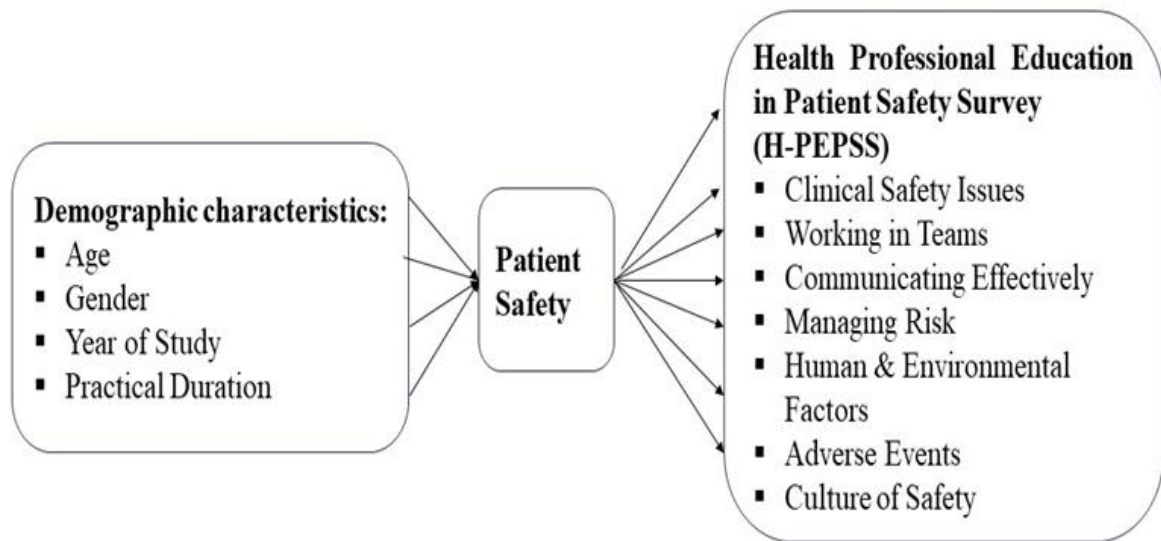
Figure 2.1   Conceptual Framework of Patient Safety Knowledge

CHAPTER 3

RESEARCH METHODOLOGY

3.1 Introduction

Chapter 3 contains the research methodology for this study, the explanation of the approach and the rationale used to support the chosen research methodology. Determining and understanding an appropriate research design is essential for achieving the study's aims. Therefore, the chapter begins with a description of a cross-sectional design and justification for using this approach, followed by a description of the study setting, population, participant selection criteria, sampling plan, sample size determination, and instrumentation, including analytical processes used with the quantitative data through data collection methods and the proposed research outcomes. The final section will explain the ethical considerations.

3.2 Research Design

This study utilized a cross-sectional design to determine the patient safety knowledge levels among undergraduate nursing students at Universiti Sains Malaysia (USM). The justification and rationale are that in a cross-sectional study, data are collected on the whole study population at a single point to examine variables of interest (Polit & Beck, 2020).

3.3 Study Setting and Population

The target study setting of the study was Universiti Sains Malaysia. The university was chosen due to the university's classification as an Accelerated Programme for Excellence (APEX) in 2008. The study population was undergraduate nursing students

enrolled in USM's Bachelor of Nursing (Honours) Programme.

3.3.1 Inclusion Criteria

Specific eligibility requirements for inclusion in this study:

      i.   Year 2, 3 and 4 undergraduate nursing students in USM. Year 1 undergraduate nursing students are not included because they have not participated in clinical posting yet.

3.3.2 Exclusion Criteria

      ii.   Undergraduate nursing students who are extending their study programme.

      iii.   Undergraduate nursing students who are absent or on sick leave during the survey period.

3.4 Sampling Plan

Sampling is the process where the researchers take a predetermined number of observations from a larger population (Polit & Beck, 2020).

3.4.1 Sampling Method

This study employed a simple random sampling method to select participants, ensuring an equal and fair chance of selection. This method ensured an unbiased representation of the population and was unaffected by the researcher (Noor *et al.,* 2022).

The study utilized a random number generator software to select participants randomly. A list of Year 2 to 4 undergraduate nursing students' names was obtained from the Academic Office, School of Health Sciences, USM. The numbers will be randomly selected using the Microsoft Excel program to choose the participants. This study involved 96 undergraduate nursing students, each marked with a unique number ranging from 1 to 99. After clicking 'OK', a randomly sorted number was displayed in a selected cell, representing the total population of 96 participants.

3.4.2 Sampling Size Estimation

Consequential research requires an understanding of the statistics that drive sample size decisions. Calculating the sampling size for a study is important to ensure it represents the population. In addition, a large sample may lead to wasting time, money, and energy, whereas a small sample size tends to produce inaccurate results (Six Sigma, 2012). To establish the sample size, the sample size calculation was estimated based on the research objectives for this study. The increasing demand for a representative statistical sample in empirical research has led to the development of a table by Krejcie & Morgan (1970) to determine the sample size for a given population. For objective 1, the Krjejcie and Morgan table for determining sample size for a finite population was used, considering the number of undergraduate nursing students in USM in different years (Year 2=33; Year 3=32; and Year 4= 34). Thus, the total number of undergraduate nursing students for this study was 80 (Table 3.1). If n is the sample size required as per the formula and if d (20%) is the dropout rate, then adjusted sample size N is obtained as N = n/(1-d) = 96. Therefore, the total sample size for objective one was 96 participants.

Table 3.1   Krejcie and Morgan Table For Determining Sample Size

N	S	N	S	N	S
10	10	220	140	1200	291
15	14	230	144	1300	297
20	19	240	148	1400	302
25	24	250	152	1500	306
30	28	260	155	1600	310
35	32	270	159	1700	313
40	36	280	162	1800	317
45	40	290	165	1900	320
50	44	300	169	2000	322
55	48	320	175	2200	327
60	52	340	181	2400	331
65	56	360	186	2600	335
70	59	380	191	2800	338
75	63	400	196	3000	341
80	66	420	201	3500	346
85	70	440	205	4000	351
90	73	460	210	4500	354
95	76	480	214	5000	357
100	80	500	217	6000	361
110	86	550	226	7000	364
120	92	600	234	8000	367
130	97	650	242	9000	368
140	103	700	248	10000	370
150	108	750	254	15000	375
160	113	800	260	20000	377
170	118	850	265	30000	379
180	123	900	269	40000	380
190	127	950	274	50000	381
200	132	1000	278	75000	382
210	136	1100	285	1000000	384

Note.—N is population size.   S is sample size.

Source: Krejcie & Morgan (1970)

16

For objective 2, the single proportion formula and the population proportion were employed based on Chen et al. (2019), whose recognition of patient safety was 0.055 from the results of socio-demographic data. The estimated sample size for this objective was calculated using the sample size estimation formula as follows:

$$N = \left[\frac{1.96}{0.05}\right]^2 0.055(1 - 0.055)$$

$$N = 80$$

If n is the sample size required as per the formula and if d (20%) is the dropout rate, then adjusted sample size N is obtained as N = n/(1-d) = 96. Therefore, the total sample size for objective two was 96 participants.

In quantitative research, the biggest sample size was used to validate more representative results in this study. Because both objectives have the same number, the sample size for this study was 96 students.

3.5   Instrumentation

Instrumentation is the use of or work completed by planned instruments around the research topic (Polit & Beck, 2019).   The instrument adopted in this study is the Health Professional Education in Patient Safety Survey (H-PEPSS) (Appendix A) from Ginsburg et al. (2012) with permission (Appendix B).

3.5.1   Instrument

A self-administered questionnaire in English consisting of two sections (Sections A and B) was utilized. Section A contains the demographic data of the participants (gender, age, year of study, and practical duration) that were collected. Section B contains the Health Professional Education in Patient Safety Survey (H-PEPSS) questionnaire developed by Ginsburg (2012). The questionnaire includes 38 items divided into three

sections. However, Section 3, which explores the comfort of speaking up (4 items), was not included in the present study, due to it is not relevant and not suitable for this context. The 1st section is composed of 27 items, divided into seven dimensions: one dimension focuses on clinical safety issues (technical aspect: 4 items), and six dimensions focus on the socio-cultural aspects of patient safety, proposed by the Canadian Patient Safety Institute (CPSI)(2009). These are: (a) Contributing to a culture of patient safety (4 items); (b) Working in teams for patient safety (6 items); (c) Communicating effectively for patient safety (3 items); (d) Managing safety risks (3 items); (e) Optimising human and environmental factors (3 items); and (f) Recognising, responding to and disclosing adverse events and close calls (4 items). Students were asked to indicate their agreement for each item regarding contents learned in the classroom in and during their clinical experience with a separate score on a 5-point Likert scale ranging from 1 = 'strongly disagree' to 5 = 'strongly agree', respectively. The 2nd section is composed of seven items focusing on how broader patient safety (PS) issues are addressed in health professional education. In both sections, each item is reported as a statement, scored on a 5-point Likert scale ranging from 1 = 'strongly disagree' to 5 = 'strongly agree'. Higher scores represent higher self-perceived nursing students' knowledge about patient safety in specific areas.

3.5.2 Translation of Instruments

The original version of the Health Professional Education in Patient Safety Survey (H-PEPSS) questionnaire was in English. At USM, undergraduate students often have extensive experience in English classes, making instrument translation unnecessary.

3.5.3 Validity and Reliability of the H-PEPSS Instrument

The Health Professional Education in Patient Safety Survey (H-PEPSS) questionnaire adopted from the original authors, Ginsburg et al. (2012), reported that the

internal consistency reliability of the factors for the full sample (n=1016) exceeded 0.80 for all seven PS competency domains. The psychometric properties of the instrument H-PEPSS were examined by several researchers (Usher et al., 2017) who concluded that it is reliable (Cronbach's α showed > 0.72) and a valid instrument, capable of evaluating competencies in patient safety perceived by undergraduate nursing studies.

The H-PEPSS may be used to assess patient safety knowledge learned from the classroom and PS competence acquired directly from clinical settings. Thus, the H-PEPSS is suitable for use by students who have recently completed, or have almost completed, their training, such as final-year nursing students (Ginsburg et al., 2012). The H-PEPSS has been translated into multiple languages and has been validated in many countries (Bressan et al., 2016; Hwang et al., 2016). For example, Bressan et al. (2016) validated the Italian version of the H-PEPSS in 574 undergraduate nursing students using explorative factor and reliability analysis.

The Italian version of the H-PEPSS was shown to exhibit a Cronbach's alpha of 0.94 in both the classroom and clinical practice versions; the six-factor structure was confirmed to explain 69.34% and 70.43% of the total variance of the scale for classroom and clinical practice, respectively. In another study, Hwang et al. (2016) translated the H-PEPSS into Korean and confirmed its reliability and validity; Cronbach's alpha (a) was 0.91 across the entire scale and 0.70–0.81 for each of the seven subscales. In addition, Cronbach's α value for patient safety knowledge was 0.718, as reported by a previous study of patient safety among nursing students in a private college in Malaysia (Bakrin et al., 2022).

According to Goforth (2015), the recommended minimum Cronbach alpha coefficient between 0.65 and 0.8 is usually acceptable (Goforth, 2015), indicating that the instruments used in this study are reliable and valid. Despite the reliability and validity of

research studies that have been conducted on the instrument and applied to this study, a pilot test is deemed appropriate to collect validity and reliability evidence of the research due to different geographical study settings and to measure the concept under study accurately (Polit & Beck, 2020). Therefore, pilot testing was conducted with 10% of the sample size among diploma nursing students who were not part of the study participants in determining questionnaire appropriateness and ethical soundness. The alpha coefficient for the H-PEPSS tool was (α= 0.871), indicated good internal reliability with Cronbach's alpha value (Taber, 2018).

3.6   Variables

The dependent and independent variables were used in this research study. The dependent variable is a variable that depends on the independent variables (Kowalczyk, 2015). An independent variable is a variable that stands alone and is unaffected/changed by the other variables the researcher is trying to measure (Kowalczyk, 2015). Table 3.2 illustrates the independent and dependent variables employed in this study.

Table 3.2   Independent and Dependent Variables.

Independent variables	Demographic characteristics of participants (gender, age, year of study, and practical duration).
Dependent variables	Patient safety knowledge levels

3.6.1   Measurement of Variables

The study's variables were measured using self-administered questionnaires answered by the participants who fulfil the inclusion criteria. For example, in determining the knowledge of patient safety among nursing students, this part comprises 27 items,

which then divided into seven dimensions: one dimension focuses on clinical safety issues (technical aspect) (4 items), and six dimensions focus on the socio-cultural aspects of patient safety, which includes: (a) Contributing to a culture of patient safety (4 items); (b) Working in teams for patient safety (6 items); (c) Communicating effectively for patient safety (3 items); (d) Managing safety risks (3 items); (e) Optimizing human and environmental factors (3 items); and (f) Recognizing, responding to and disclosing adverse events and close calls (4 items). Students were asked to indicate their agreement for each item regarding contents learned in the classroom in and during their clinical experience with a separate score on a 5-point Likert scale ranging from 1 = 'strongly disagree' to 5 = 'strongly agree', respectively. As for the scores, since there is total 27 statements, thus, the score range should be 27 to 270 points. Higher scores represent higher self-perceived students' knowledge about patient safety in specific areas. In this study, nursing students' patient safety knowledge levels will be defined as "good", "moderate", or "poor" based on Bloom's cut-off point. Students with knowledge levels of 80% and above (216-270 points) were considered good, while those within the 60-79% range (161-215 points) were moderate and below 59% (0-160 points) were regarded as poor. The 2nd sub-section comprises seven items focusing on how broader PS issues are addressed in health professional education. Each item is reported as a statement in both sections, scored on a 5-point Likert scale ranging from 1 = 'strongly disagree' to 5 = 'strongly agree'. Higher scores represent higher self-perceived nursing students' knowledge about patient safety in specific areas.

3.7 Data Collection Process

Data was collected from January 2024 to February 2024 after obtaining ethical approval from the Human Research Ethical Committee, USM. In addition, permission

from the Dean of the School of Health Sciences, USM, was obtained to access the study setting and nursing students. This study used a one-to-one, face-to-face data collection method at the student hostel lounge. Participants were informed about the study's purpose and consent was obtained. The survey took 10-15 minutes. Figure 3.1 shows the data collection process, while Appendix G details the Gantt Chart, research activity planning, and milestones.
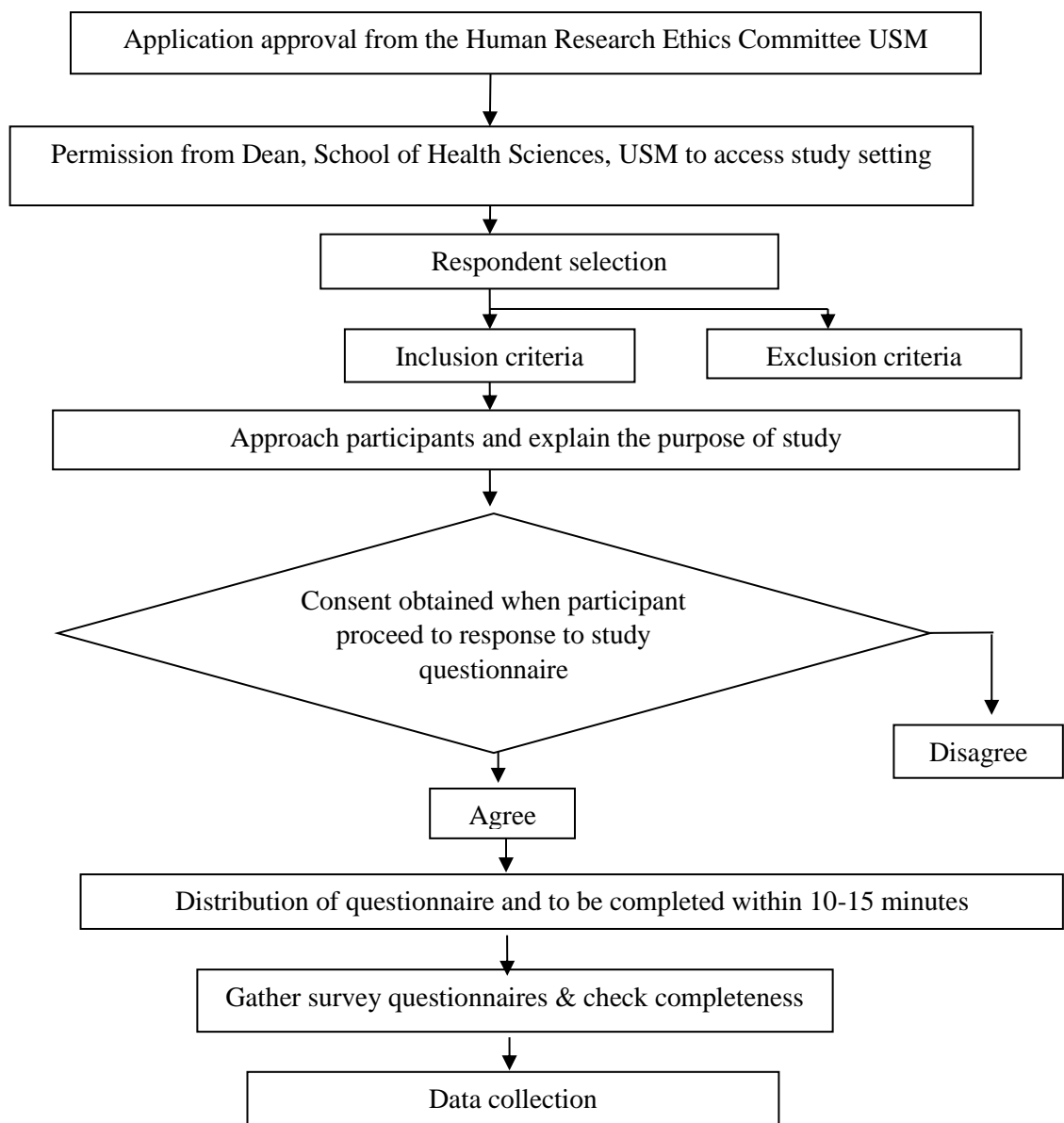
```
┌─────────────────────────────────────────────────────────────┐
│   Application approval from the Human Research Ethics         │
│   Committee USM                                               │
└─────────────────────────────────────────────────────────────┘
                              │
                              ▼
┌─────────────────────────────────────────────────────────────┐
│  Permission from Dean, School of Health Sciences, USM to      │
│  access study setting                                         │
└─────────────────────────────────────────────────────────────┘
                              │
                              ▼
              ┌─────────────────────────────┐
              │     Respondent selection     │
              └─────────────────────────────┘
                    │                    │
                    ▼                    ▼
        ┌──────────────────┐   ┌──────────────────┐
        │ Inclusion criteria│   │ Exclusion criteria│
        └──────────────────┘   └──────────────────┘
                    │
                    ▼
┌─────────────────────────────────────────────────────────────┐
│   Approach participants and explain the purpose of study      │
└─────────────────────────────────────────────────────────────┘
                    │
                    ▼
              ◇ Consent obtained when participant
                proceed to response to study
                questionnaire ◇ ─────────────► Disagree
                    │
                    ▼
                 Agree
                    │
                    ▼
┌─────────────────────────────────────────────────────────────┐
│  Distribution of questionnaire and to be completed within     │
│  10-15 minutes                                                │
└─────────────────────────────────────────────────────────────┘
                    │
                    ▼
        Gather survey questionnaires & check completeness
                    │
                    ▼
              Data collection
```

Figure 3.1   Flow Chart of Data Collection Process

3.8   Ethical Consideration

Ethical considerations in research are principles that guide the research designs and practices and adhere to a certain code of conduct when collecting data from humans.

3.8.1   Permission to Conduct the Study

The Human Research Ethics Committee (HREC), USM approved this study (USM/JEPeM/KK/23120963)(Appendix E). Permission to conduct a study among undergraduate nursing students was also obtained from the Dean of the School of Health Sciences, USM (Appendix F). Participants were provided an information sheet which contained a comprehensive understanding of the study informing about the study's purpose, procedures, potential risks and benefits, and their role (Appendix C). Informed consent was obtained from each participant before the start of the study, indicating the willingness to participate in this study.

3.8.2   Permission to Use the Instrument from Original Author (s)

Permission from the original author was obtained for instrument use (Appendix F).

3.8.3   Subject Vulnerability

The study was voluntary, with participants informed of the study's nature, not influenced by treatment, coercion, or persuasion using simple language understandable to the participants, including the right to withdraw at any time without penalty, as mentioned in the information sheet.

3.8.4   Declaration of Absence of Conflict of Interest

There are no conflicts of interest to declare, as this study was part of the final-year research project. However, the researcher acknowledged no funding was received for this study or financial conflicts to maintain the study's integrity.

3.8.5 Privacy and Confidentiality

The research was performed following the 1964 Helsinki Declaration and the institutional requirements. Subject data's privacy, anonymity and confidentiality were assured for academic and research purposes following institutional ethic's guidelines. Only the researcher and supervisor can access the data obtained from the survey. Furthermore, the individual identity was kept and strictly protected from the third party to avoid data exploitation. Finally, data records were destroyed or disposed of in a manner that leaves no possibility for the reconstruction of information after five years from the date of the study. Appropriate methods for destroying or disposing of paper records include shredding and cross-shredding.

3.8.6 Community Sensitivities and Benefits

Nursing students, are pillars of the healthcare system surround patient care contributed to the reduction of preventable adverse events associated with health care. Data from this research study could be useful to inform policymakers and academic curricula to develop effective competencies guideline to assure patient safety throughout their professional life.

3.8.7 Honorarium and Incentives

Participants were acknowledged that this study has no internal or external funds or grants. Therefore, no honorarium or incentives were given. However, a verbal thank-you message was communicated to all participants at the end of the survey.

3.9 Data Analysis

Data drawn and analyzed using the Statistical Package for Social Science (SPSS) version 27.0 for Windows. Regarding pertinent factors, descriptive statistics (means, standard deviations, frequencies and percentages) defined the study population (gender,