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Factors Influencing Medication Competency among UNIMAS Undergraduate  
Nursing Students

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This project is submitted  
in partial fulfilment of the requirements for the degree of  
Bachelor of Nursing with Honours

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UNIVERSITI MALAYSIA SARAWAK

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## DECLARATION

I declare that the work in this thesis was carried out in accordance with the regulations of Universiti Malaysia Sarawak. Except where due acknowledgements have been made, the work is that of the author alone. The thesis has not been accepted for any degree and is not concurrently submitted in candidature of any other degree.



.....

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## ABSTRACT

**Background:** Medication errors continue to pose a significant threat to patient safety worldwide, often resulting in preventable harm or death. Despite numerous educational interventions, nursing students frequently demonstrate inadequate competency in medication management, particularly in applying theoretical knowledge to clinical practice.

**Objective:** This study aimed to assess the level of medication competency among undergraduate nursing students at Universiti Malaysia Sarawak (UNIMAS) and to identify and examine the relationship between individual, attitudinal, educational and practical, and cognitive factors influencing this competency. **Methods:** A quantitative, cross-sectional design was employed. A total of 139 second- to fourth-year nursing students were selected using simple random sampling. Data were collected through a self-administered questionnaire adapted from the validated Nurses' Perception of Medication Competency (NURSPeM) tool, comprising 44 items rated on a 5-point Likert scale. Descriptive and inferential statistics, including Spearman correlation tests, were used for data analysis via SPSS version 27.0. **Results:** The mean medication competency score was 143.25 ( $SD = 13.87$ ) out of 176, with 35.3% of students classified as having low competency, 31.7% moderate, and 33.1% high. Among the four domains, educational and practical factors showed the strongest correlation with medication competency ( $r_s = .851$ ,  $p < .001$ ), followed by attitudinal ( $r_s = .719$ ), cognitive ( $r_s = .660$ ), and individual factors ( $r_s = .651$ ), all with  $p < .001$ . While students exhibited high attitudinal and cognitive awareness, they rated educational and practical components lower, despite these being the strongest predictors of competency. **Conclusion:** Medication competency among UNIMAS nursing students remains suboptimal, especially in practical and educational areas. Strong positive

correlations across all four influencing factors highlight the multifaceted nature of medication competency. The findings underscore the importance of integrated educational strategies that combine theoretical, experiential, and reflective learning to enhance nursing students' preparedness for safe medication administration. Future research should incorporate longitudinal and multi-institutional designs, objective performance assessments, and explore additional psychological and environmental influences to guide curriculum reform and improve patient safety outcomes.

**Keywords:** medication competency, nursing students, medication safety, clinical education, simulation, UNIMAS

## ABSTRAK

**Latar Belakang:** Ralat ubat kekal menjadi ancaman utama terhadap keselamatan pesakit di seluruh dunia, yang sering kali mengakibatkan kemudaratan atau kematian yang boleh dicegah. Walaupun pelbagai intervensi pendidikan telah dilaksanakan, pelajar kejururawatan masih menunjukkan tahap kecekapan yang tidak mencukupi dalam pengurusan ubat, khususnya dalam mengaplikasikan pengetahuan teori kepada amalan klinikal. **Kaedah:** Kajian ini bertujuan menilai tahap kecekapan pengurusan ubat dalam kalangan pelajar kejururawatan prasiswazah di Universiti Malaysia Sarawak (UNIMAS) serta mengenal pasti dan meneliti hubungan antara faktor individu, sikap, pendidikan dan praktikal, serta kognitif yang mempengaruhi kecekapan tersebut. Reka bentuk kajian kuantitatif keratan rentas telah digunakan. Seramai 139 pelajar kejururawatan tahun dua hingga empat telah dipilih melalui pensampelan rawak mudah. Data dikumpulkan melalui soal selidik sendiri yang diadaptasi daripada instrumen yang telah disahkan, iaitu Nurses' Perception of Medication Competency (NURSPeM) yang mengandungi 44 item dan dinilai menggunakan skala Likert 5 mata. Statistik deskriptif dan inferensi, termasuk ujian korelasi Spearman, digunakan untuk analisis data melalui SPSS versi 27.0. **Dapatan:** Skor purata kecekapan pengurusan ubat adalah 143.25 (SD = 13.87) daripada 176, dengan 35.3% pelajar dikategorikan sebagai berkecekapan rendah, 31.7% sederhana, dan 33.1% tinggi. Keempat-empat faktor menunjukkan hubungan korelasi yang kuat dan signifikan, iaitu faktor pendidikan dan praktikal ( $r_s = .851$ ), faktor sikap ( $r_s = .719$ ), faktor kognitif ( $r_s = .660$ ), dan faktor individu ( $r_s = .651$ ), semuanya dengan  $p < .001$ . Walaupun pelajar menunjukkan tahap kesedaran sikap dan kognitif yang tinggi, mereka memberikan penilaian yang lebih rendah terhadap komponen pendidikan dan praktikal. **Kesimpulan:** Tahap

*kecekapan pengurusan ubat dalam kalangan pelajar kejururawatan UNIMAS masih belum memuaskan, terutamanya dalam aspek praktikal dan pendidikan. Hubungan positif yang kuat dalam keempat-empat faktor mencerminkan sifat multidimensi kecekapan ubat. Dapatan ini menekankan kepentingan strategi pendidikan bersepadu yang menggabungkan pembelajaran teori, pengalaman praktikal, dan reflektif untuk meningkatkan kesiapsiagaan pelajar kejururawatan dalam pentadbiran ubat yang selamat. Kajian masa depan disarankan agar menggunakan reka bentuk longitudinal dan pelbagai institusi, penilaian prestasi objektif, serta meneroka faktor psikologi dan persekitaran lain bagi membimbing reformasi kurikulum dan mempertingkatkan hasil keselamatan pesakit.*

**Kata kunci:** kecekapan pengurusan ubat, pelajar kejururawatan, keselamatan ubat, pendidikan klinikal, simulasi, UNIMAS



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## LISTS OF SYMBOLS AND EQUATIONS

### LIST OF SYMBOLS

|                |                                  |
|----------------|----------------------------------|
| D              | Kolmogorov-Smirnov test          |
| r              | Pearson correlation coefficient  |
| r <sub>s</sub> | Spearman correlation coefficient |
| %              | Percentage                       |

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## **LIST OF ABBREVIATIONS**

|         |                                                      |
|---------|------------------------------------------------------|
| NURSPeM | Nurses' Perception of Medication Competency          |
| UNIMAS  | Universiti Malaysia Sarawak                          |
| FMHS    | Faculty of Medicine and Health Sciences              |
| PMAR2   | Preparedness for Medication Administration Revised 2 |
| OSCE    | Objective Structured Clinical Examination            |
| SD      | Standard Deviation                                   |
| IQR     | Interquartile Range                                  |
| Min     | Minimum                                              |
| Max     | Maximum                                              |

## **CHAPTER 1: INTRODUCTION**

### **1.1 Background of the Study**

Injuries and avoidable harm in healthcare systems around the world are greatly increased by unsafe drug practices and mistakes (World Health Organization, 2024). A study indicated that the rate of medication errors in the emergency department of a Malaysian hospital was 30.5% (Shitu et al., 2020). This issue extended to nursing education, as highlighted by Dehvan (2021), which found that nearly half of nursing students encountered medication errors during their undergraduate studies, with about half of those errors going unreported. Furthermore, the study indicated that approximately 39.68% of nursing students experienced medication errors, primarily due to insufficient competence in medication safety (Dehvan et al., 2021).

Nurses are pivotal in ensuring medication safety and often serve as the last line of defence against medication errors. They involve in multiple stages of medication administration, including preparation, documentation, and monitoring of patient responses. Research indicated that medication-related activities occupy approximately 25 to 40 per cent of a nurse's working time, emphasizing the need for nursing students to possess adequate medication competence (Athanasakis, 2021).

To address this need, the use of technological aids, simulation experiences, and online learning modules has been proposed to enhance medication safety competence (Lee & Quinn, 2019). For instance, the Four Components Instructional Design (4C/ID) model has shown effectiveness in improving nursing students' knowledge and skills related to medication safety through structured training programs (Musharyanti et al., 2021). Additionally,

simulation-based learning has been advocated as an efficacious strategy to address the discrepancy between theoretical knowledge and practical application in clinical settings (Koukourikos et al., 2021).

Recent studies underscored the direct link between safe nursing care and the possession of competence in medication safety. A study by Mohebi et al. (2024) found a statistically significant relationship, indicating that improving medication safety training can enhance the quality of patient care. This reinforces the critical need to integrate medication safety competence into nursing education to mitigate medication-related risks.

In this study, the concept of medication competence was drawn from a concept analysis by Thelen (2022), which defines it as a comprehensive skill set, which developed through the integration of pharmacological knowledge, an understanding of pathophysiology and anatomy, the application of pharmacogenetics, proficiency in medication calculation and administration, clinical judgment, collaboration, and the efficient use of information technology.

Medication competency among nursing students is influenced by several interrelated factors, including individual, attitudinal, practical and educational, and cognitive domains. Individual factors such as pharmacological knowledge and proficiency in drug calculations are foundational but often underdeveloped, leading to medication errors. Positive attitudes, including adherence to safety protocols and professional responsibility, are critical in minimizing risks. Practical and educational experiences, such as simulations and clinical rotations, bridge the gap between theory and practice, though limited hands-on exposure can impede skill acquisition. Cognitive skills like critical thinking and decision-making are vital for navigating complex clinical scenarios and ensuring safe medication administration.

Addressing these factors is essential to improve nursing education and better prepare students for the challenges of clinical practices.

## **1.2 Problem Statement**

Medication errors pose a serious threat to patient safety, with the World Health Organization (WHO) estimating one death per 1 million people globally. In the European Union alone, the annual number of deaths resulting from medication errors has been estimated at approximately 163,000. In addition to these figures, data from Spain, Germany and the United States have indicated that medication errors contribute to between 60,000 and 131,000 deaths on an annual basis (European Alliance for Access to Safe Medicines, 2022). Most cases of morbidity and mortality result from medication errors and are the most frequent adverse events in hospitals (Khatun et al., 2024). These errors might cause severe consequences, including prolonged hospitalisation, increased healthcare expenditure, and even mortality (Tariq et al., 2024). Although healthcare professionals were confident, that they had confirmed the "Five Rights" of drug administration, many errors, including fatal mistakes, continue to occur, resulting in billions of dollars in avoidable healthcare costs each year (Grissinger, 2010; Tariq et al., 2024). Should the issue remain unaddressed, healthcare professionals who commit errors in the administration of medication may encounter a range of consequences, including the loss of patient confidence, civil lawsuits, criminal prosecution, and disciplinary action from medical boards. The prevalence of this issue across global healthcare settings highlights the critical need for comprehensive strategies to enhance medication competencies and reduce errors (Tariq et al., 2024).

In healthcare education, medication competency among nursing students is a growing concern, especially in clinical settings where students must apply theoretical knowledge in real-world scenarios (Amoo et al., 2022). Studies indicated that medication errors among nursing students during clinical placements occur at rates ranging from 1.1% to 6%, underscoring the importance of developing competencies that ensure safe medication administration (Stolic et al., 2022). The consequences extend beyond students, affecting patients and healthcare institutions alike. Patients are at risk of receiving incorrect dosages or inappropriate medications due to students' insufficient competency, which can result in adverse health outcomes or fatalities. Healthcare institutions may also experience increased liability and compromised care quality due to inadequately prepared staff.

While studies have identified knowledge deficits, attitudinal barriers, limited educational and practical experiences, and cognitive challenges as factors influencing medication competency, recent research on how these factors interacted within specific educational settings is scarce. Efforts to tackle this issue have involved incorporating simulation-based training and innovative instructional designs into nursing curricula. Also, the research indicated that simulation exercises significantly improve students' skills in safe medication administration, resulting in better adherence to safety protocols (Sandra et al., 2022). In addition, a proposal has been made for educational reforms to prioritise practical experience and decision-making skills as vital measures to address the disparity between theoretical and practical learning outcomes (Mishra et al., 2023). (Mishra et al.,2023). However, despite these initiatives, many nursing programs continue to face challenges in achieving the desired competency levels among their students, highlighting the need for ongoing research and the development of more effective teaching methodologies (Mohebi et al., 2024).

Although extensive research exists on nursing competencies and patient safety, the specific factors influencing medication competency among nursing students remain underexplored, both globally and locally. Understanding these factors is essential for improving educational strategies and ensuring patient safety.

In summary, inadequate medication competency among nursing students is a widespread issue in clinical settings globally, impacting patient safety and the quality of healthcare. Despite the implementation of numerous strategies to address this issue, considerable gaps remain, underscoring the necessity for further investigation and intervention. The present study aims to address this gap by identifying factors influencing nursing students' medication management skills.

### **1.3 Research Questions**

The research questions are:

- 1) What is the level of medication competency among UNIMAS undergraduate nursing students?
- 2) What are the factors influencing medication competency among UNIMAS undergraduate nursing students?
- 3) What is the relationship between the level of competency and the factors influencing medication competency among UNIMAS undergraduate nursing students?

#### **1.4 General Research Objective / Aim of the Study**

To assess the level of medication competency among UNIMAS undergraduate nursing students and to identify the factors associated with the competency.

#### **1.5 Specific Research Objectives**

- 1) To assess the level of medication competency among UNIMAS undergraduate nursing students.
- 2) To identify factors influencing medication competency among UNIMAS undergraduate nursing students.
- 3) To examine the relationship between the level of medication competency and the factors influencing medication competency among UNIMAS undergraduate nursing students.

#### **1.6 Research Hypothesis**

Alternative hypothesis (HA): There is a correlation between the level of medication competency and the factors influencing medication competency among UNIMAS undergraduate nursing students.

Null hypothesis (H<sub>0</sub>): There is no correlation between the level of medication competency and the factors influencing medication competency among UNIMAS undergraduate nursing students.

### **1.7 Significance of the Study**

The objective of this study is to address the critical gaps in nursing education regarding factors influencing medication competency among nursing students. While previous research has identified deficiencies in medication competence, few studies have simultaneously evaluated theoretical, practical, and decision-making skills across various stages of nursing education. The present study aims to provide a thorough understanding of the aforementioned issue by identifying individual, attitudinal, practical and educational, and cognitive factors influencing medication competency and examining the relationship between these factors and the level of competency. If left unaddressed, these gaps could lead to increased medication errors and adverse patient outcomes, compromising patient safety and public trust in healthcare.

The findings of the study could play a crucial role in educational policy and curriculum development by identifying weaknesses in theoretical knowledge, practical skills, and decision-making abilities. Nursing colleges may employ this data to improve their curriculum by including simulation-based training, competency-based evaluations, and structured medication safety programs. This can enhance the linkage between academic education and actual clinical application, ensuring that students have both the knowledge and confidence required for safe medication administration.



Beyond education, the study might influence clinical training protocols and hospital policies by advocating for structured mentorship programs, enhanced supervision, and standardized competency assessments before nursing students administer medications independently. Healthcare institutions may implement stricter protocols and competence assessments to ensure that nursing students and newly graduated nurses adhere to best practices in medication administration.

Additionally, the study highlights the importance of continuous professional growth in medication competency, alongside nursing education and practice. It may advocate for ongoing training programs, refresher courses, and certification requirements to ensure nurses are updated on the latest medication safety standards. Given that medication competency issues are observed globally, the study's findings could contribute to policy changes and standardized guidelines, raising the overall standard of nursing education and practice worldwide.

Ultimately, this research aims to improve the quality of nursing education, reduce medication errors, and enhance patient safety by ensuring that nursing students are well-prepared for the responsibilities of medication administration in clinical settings. The findings will have broad implications, emphasizing the urgent need for improved educational strategies in nursing programs both locally and globally.

## **1.8 Conceptual and Operational Definition of Key Terms**

### **1.8.1 Conceptual definition of medication competency**

Medication competency refers to a comprehensive skill set that consists of the integration of pharmacological knowledge, an understanding of pathophysiology and anatomy, the application of pharmacogenetics, proficiency in medication calculation and administration, clinical judgment, collaboration, and the efficient use of information technology (Thelen, 2022).

### **1.8.2 Operational definition of medication competency**

In this study, medication competency is referred as the nurse's self-perception about safe medication management about safe medication management and the frequency and practice of drug-dose calculation during training. This construct is measured using the validated Nurses' Perception of Medication Competency (NURSPeM) tool developed by Linares et al. (2022), which assesses various dimensions of medication safety competence. The questionnaire comprises 44 items that are evaluated using a 5-point Likert scale. The tool comprehensively assesses factors influencing medication competency, including individual, attitudinal, practical and educational, and cognitive aspects. The total score, ranging up to 176 marks, reflects the overall level of competency, with higher total scores denoting a greater level of medication competency.

### **1.8.3 Operational definition of Factors influencing Medication competency**

In this study, the factors influencing medication competency among UNIMAS nursing students are divided into four main categories: Individual, Attitudinal, Educational and Practical, and Cognitive. Each factor comprises specific dimensions measured through items in the NURSPeM questionnaire by Linares et al. (2022), which assesses students' self-perceptions of their ability to manage medication safely and their skills in drug dose calculation. The questionnaire includes 44 items across these dimensions, using a 5-point Likert scale to quantify competency levels. The total possible score for the questionnaire ranges from a minimum of 0 to a maximum of 176. The overall medication competency score will be categorised using visual binning. Specifically, percentile-based cut-off points will be applied to divide scores into distinct competency levels (Low, moderate, and high).

#### **1. Individual Factors (Total items are 11 items)**

Individual factors encompass drug knowledge and safety, assessed through 11 items focusing on students' understanding of medications, safe drug prescription practices, and recognition of factors that contribute to medication error. A higher score in this factor likely indicates a greater level of medication competency.

#### **2. Attitudinal Factors (Total items are 12 items)**

Attitudinal factors involve training in safe medication management, measured using 12 items that explore the relevance of safe practices in professional nursing, the importance of adhering to prescribed medication protocols, and the process of verifying medications prior

to administration. A higher score in this factor likely indicates a greater level of medication competency.

### **3. Educational/Practical Skills (Total items are 16 items)**

Educational and practical skills are addressed through 16 items that assess the frequency of drug dose calculations and the learning strategies used to enhance calculation accuracy. A higher score in this factor likely indicates a greater level of medication competency.

### **4. Cognitive Factors (Total items are 5 items)**

Cognitive factors are measured using 5 items that focus on the critical thinking processes involved in medication management, such as reflection, decision-making, and problem-solving. A higher score in this factor likely indicates a greater level of medication competency.

#### **1.8.4 Undergraduate Nursing Students**

An undergraduate nursing student refers to an individual presently enrolled in a Bachelor of Nursing program at a university, as stated by Dungen (2021). Therefore, an individual who is enrolled in the Bachelor of Nursing with Honours program at Universiti Malaysia Sarawak (UNIMAS) can be referred to as a UNIMAS undergraduate nursing student.

## **CHAPTER 2: LITERATURE REVIEW**

### **2.0 Introduction**

Prior to conducting the literature review on factors influencing medication competency among nursing students, the researcher systematically searched for relevant articles using academic databases such as PubMed, Research Gate and Google Scholar. The search was conducted with a combination of keywords, including “medication competency”, “nursing students”, “knowledge”, “practical” and “medication safety”. The researcher reviewed the identified articles to determine their relevance to the main concepts. Articles were excluded if they did not specifically address the factors influencing medication competency among nursing students or were outside the scope of the study's focus. The selected articles were then organized based on key themes identified in the literature. These themes included an overview of the level of medication competency, factors influencing medication competency, the relationship between the variables and a conceptual framework synthesizing these factors. The review incorporates findings from articles published between 2015 and 2024 to provide a comprehensive understanding of the topic in Chapter 2.

### **2.1 Level of Medication Competency**

The level of medication competency of nursing students is a critical area of study as it has a direct impact on their ability to administer medication safely and effectively in clinical practice. This review synthesises findings from multiple studies that explore this competency across different contexts and educational frameworks, using data and results to highlight the current state of competency and the methods used to evaluate it.

Linares et al. (2022) conducted a study to determine the levels of medication safety competence among junior and senior nursing students by assessing their performance using the Medication Administration Safety Assessment Tool (MASAT), a checklist-based evaluation applied during a series of simulated exercises. The results revealed that only 29.6% of junior and 14.4% of senior students demonstrated full competency across all MASAT items. Notably, despite senior students' greater educational exposure and clinical experience, their performance did not significantly exceed that of junior students, suggesting potential gaps in the curriculum's effectiveness in promoting skill retention. The descriptive comparative design allowed for a direct comparison of competency levels between the two groups, offering robust insights into the progression of skills across academic levels.

Similarly, Jarvill et al. (2022) employed a longitudinal, two-group pretest-posttest design to evaluate the effects of traditional and simulation-based educational strategies on medication administration performance among final-semester nursing students. The MASAT study revealed that a mere 33.8% of students attained perfect scores. No statistically significant disparities were observed between the results from the first and last semesters, nor between the various instructional methods employed. These results suggest that while simulation-based learning provides valuable hands-on experience, its implementation may not be sufficiently robust to ensure consistent skill improvement over time.

Also, Musafiri and Daniels (2020) explored nursing students' self-perceived competency in oral medication administration using questionnaires. Despite 92% of participants rotating in medical wards, only 19.2% felt competent in oral medication administration. The quantitative descriptive analysis revealed a critical gap between clinical exposure and competency development, suggesting that limited diversity at ward rotations and inadequate

hands-on practice contribute to this shortfall. The reliance on self-reported data highlights students' perspectives but may introduce subjective bias.

Another study by Mohebi et al. (2024) employed a descriptive cross-sectional study using the Medication Safety Competence Scale (MSCS) and Safe Nursing Care Scale (SNCS) to measure competency levels among nursing students. The findings showed that most students achieved average scores, with none reaching satisfactory levels of medication safety competence. Additionally, a positive correlation was identified between medication safety competence and overall safe nursing care. The study's use of validated tools provides reliable quantitative data, highlighting systemic deficiencies in nursing education and the need for comprehensive interventions to enhance both theoretical and practical competencies.

These studies highlighted consistent gaps in the level of medication competency among nursing students, as demonstrated by low-performance scores and self-perceived inadequacies. These gaps are compounded by insufficient skill retention, limited diversity in clinical exposure, and inadequate emphasis on specific competencies. The use of validated tools and varied study designs has provided a comprehensive picture of the challenges faced in nursing education. Addressing these issues requires curriculum revisions, enhanced clinical training opportunities, and the integration of effective simulation-based learning tools. Future research should standardise competency assessments and explore innovative educational interventions to improve medication administration skills among nursing students.

## **2.2 Factors influencing Medication Competency**

Medication competency is essential for safe and effective nursing practice, directly impacting patient safety and healthcare outcomes. It involves a combination of knowledge, skills, attitudes, and cognitive abilities. This literature review examines the key factors influencing medication competency, synthesizing findings on individual knowledge, professional attitudes, educational and practical skills, and also cognitive processes. By exploring these elements, the review aims to provide insights into improving nursing education and clinical practice for safer medication administration.

### **2.2.1 Individual Factors**

Sneck et al. (2016) conducted a descriptive correlational study that aimed to describe Finnish nurses' medication competence based on theoretical knowledge and drug calculation exams. The study established a positive correlation between theoretical knowledge and medication competency, particularly in the context of safe medication administration. Deficiencies in theoretical knowledge were evident as 5% of nurses had difficulty with drug calculations, and younger nurses or those in acute care performed better. These findings highlight the critical role of theoretical knowledge in preventing medication errors but also suggest a need for targeted interventions and regular competency assessments.

Preston et al. (2019) conducted a qualitative study with nursing students in the United States to explore their perceptions of pharmacology education. Among the 99 students who participated in the survey, 87% described pharmacology education as positively impacting safe medication administration. Students reported improved clinical confidence and



understanding of medication mechanisms but struggled with applying classroom learning to clinical settings due to overwhelming content. The data emphasized the challenges of translating knowledge into practice, underscoring the need for enhanced instructional strategies.

Sneck's large sample size lends strength to its generalizability, offering insights into the systemic challenges in medication competency. However, the study may lack depth in exploring individual learning barriers. Preston's qualitative approach provides rich, detailed insights into students' experiences, yet the findings are limited in scope due to the smaller sample and specific educational context. Together, these studies highlight the necessity of addressing both foundational knowledge and the transition from theory to practice to enhance overall medication competency.

### **2.2.2 Attitudinal factors**

Güney and Büyük (2022) conducted a descriptive and correlational study to examine the relationship between professional attitudes and medication administration errors among 115 pediatric nurses in Turkey. They found that 34% of nurses reported medication errors, with improper dosing being the most frequent. The study claimed that higher professional attitudes were associated with fewer errors, and error tendencies decreased with age and experience. The results underscored the role of professional maturity and attitude in fostering safer practices in medication administration.

Similarly, Ela Yılmaz Coşkun et al. (2024) conducted a descriptive, relationship-seeking study involving 310 nurses, revealing a significant positive relationship between adherence

to medication administration principles and attitudes toward patient safety. Notably, 32.9% of the participants reported personal involvement in medication errors, while 77.7% had witnessed such errors. These findings highlight that adherence to medication administration principles not only reflects professional attitudes but also plays a crucial role in enhancing medication safety. Among participants, 32.9% reported personal involvement in medication errors, while 77.7% had witnessed such errors. The findings suggest that adherence to principles not only reflects professional attitudes but also actively enhances medication safety.

Both studies highlight attitudes as critical to medication competency. Güney and Büyük (2022) emphasized professional maturity, whereas Coşkun et al. (2024) highlight the interplay between adherence to principles and safety attitudes. Together, they revealed that fostering professional attitudes and adherence to standards can significantly reduce error rates.

### **2.2.3 Educational and practical factors**

Tobey (2024) conducted a qualitative and descriptive investigation to ascertain how 14 bachelor's degree nursing students in the United States successfully overcame challenges related to medication administration. Students identified hands-on learning as essential for bridging theory and practice, with repetitive exposure in clinical settings improving confidence and skill. However, they criticised simulations as insufficient for real-world application. The data underscored the importance of integrating practical experiences into education.

Osuchukwu et al. (2024) conducted a randomised controlled trial with 238 nursing students to evaluate educational interventions in Nigeria. Post-intervention, knowledge scores increased from 66.7% to 90.6% in the intervention group, while practice assessments showed adherence to medication safety rising from 56.3% to 80.7%. The study demonstrated the effectiveness of structured interventions in enhancing both knowledge and practical application.

Tobey (2024) highlighted the value of hands-on learning for medication administration skill development, while Osuchukwu et al. (2024) provided empirical evidence of structured interventions' effectiveness on medication safety. Together, they suggest that combining hands-on practice with targeted educational programs can optimize competency outcomes.

#### **2.2.4 Cognitive factors**

Solberg et al. (2023) conducted an exploratory qualitative study to investigate the thinking strategies that were implemented by eight registered nurses in Norway during the administration of drugs. Observations of 175 drug dispensing episodes revealed diverse cognitive strategies, including clustering patient cues and anticipating errors. The study claimed that these strategies were essential for ensuring medication safety. The data highlighted the complexity of cognitive processes in clinical decision-making.

A qualitative descriptive case study by Domm et al. (2021) examined how 13 senior nursing students in Canada supported drug safety through clinical reasoning. Students relied on patient cues and contextual reasoning to administer medications safely, reflecting cognitive development during training. The study highlighted the significance of cognitive skills in bridging knowledge and practice.

Solberg et al. (2023) focused on experienced nurses, illustrating advanced cognitive strategies, while Domm et al. (2021) emphasized cognitive development in students. Both studies confirmed that cognitive processes are vital for medication competency, though they operate at different levels based on experience.

The reviewed studies highlighted that medication competency is shaped by the interplay of several factors. Knowledge and skills are essential, with both theoretical learning and practical experience critical for competency. Attitudes and professionalism significantly influence error rates, with positive attitudes and adherence to medication principles enhancing safety. Additionally, cognitive processes such as clinical reasoning are key for safe medication practices and adapting to experience. While each factor plays a unique role, their integration is vital for comprehensive competency development. Future research should explore these interactions through longitudinal and interdisciplinary approaches. Overall, this review emphasizes the need for targeted interventions in education, practice, and professional attitudes to ensure safer medication administration and improved patient care.

### **2.3 Relationship between the level of competency and the factor influencing medication competency**

The relationship between medication competency and its influencing factors is explored in depth by Sulosaari et al. (2015) and Kim and Lee (2022). Both studies provide complementary perspectives on how theoretical, practical, and decision-making competencies are shaped by various factors across different stages of nursing practice. These studies collectively highlighted that medication competency is a multifaceted skill influenced by both internal and external factors such as self-regulated learning, critical thinking disposition, and job stress.

Sulosaari et al. (2015) highlighted the significance of education in developing medication competency, particularly decision-making skills. Their study highlighted self-regulated learning as a critical factor influencing how nursing students acquire and refine their decision-making abilities over time. While theoretical and practical competencies showed less dramatic changes, the significant improvement in decision-making underscored the importance of fostering autonomy and self-directed learning during education. Furthermore, a prior nursing degree, despite the student not completing upper secondary school, was found to have a negative association with performance in medication calculation tests ( $p < 0.05$ ). In contrast, students who completed an extended mathematics syllabus achieved significantly higher scores compared to those with a shorter syllabus ( $p < 0.001$ ), suggesting that mathematical preparedness plays a crucial role in medication competency. The longitudinal approach of Sulosaari et al. (2015) captured the developmental trajectory of students throughout their training, providing valuable insights. However, the variability in

institutional teaching methods highlighted the potential influence of contextual factors on shaping medication competency outcomes.

Furthermore, Kim and Lee's (2022) study examined the influence of job stress, critical thinking disposition, and clinical decision-making capacity on medication safety competence among clinical nurses. Their findings revealed significant correlations between medication safety competence and critical thinking disposition ( $r = .63, p < .001$ ), clinical decision-making ability ( $r = .54, p < .001$ ), and job stress ( $r = .20, p = .021$ ). The researchers' findings indicated that critical thinking disposition was the strongest predictor, accounting for a substantial percentage of the variance in medication safety competence. This aligned with Sulosaari et al. (2015) emphasized on decision-making but extends the discussion by demonstrating how workplace factors like stress can either hinder or enhance competency. While reliance on self-reported surveys provides valuable insights into individual experiences, it introduces potential biases. Nonetheless, the study underscored the importance of targeted workplace interventions, including stress management programs and professional development opportunities, to sustain and improve competency in clinical practice. Both studies demonstrated a strong connection between medication competency and its influencing factors, highlighting the dynamic nature of competency development shaped by educational experiences and clinical practice. Sulosaari et al. (2015) emphasized the role of self-regulated learning and educational strategies in building foundational decision-making skills, essential for achieving medication competency. Conversely, Kim and Lee (2022) explore how critical thinking and stress management influence the practical application of these skills, bridging the gap between theoretical preparation and real-world execution.

## **2.4 Summary**

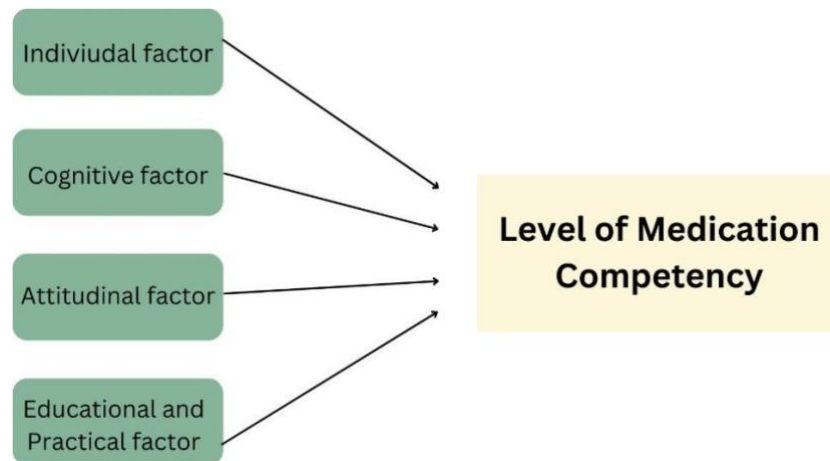
Together, these findings suggest that medication competency arises from the interaction of individual skills and external circumstances. They advocate for a holistic approach, with educational institutions focusing on fostering self-regulated learning and decision-making capabilities, while healthcare organizations prioritize addressing workplace stress and enhancing critical thinking. By aligning these efforts, nursing professionals can experience a smoother transition from education to clinical practice, ensuring safe and effective medication management throughout their careers.

## **2.5 Conceptual Framework**

In this study, the researcher investigated the relationship between various factors and medication competency among undergraduate nursing students at UNIMAS. According to this conceptual framework, the level of competency is influenced by factors, indicating that factors play a significant role in shaping students' medication competency. Consequently, this conceptual framework has been developed.

**Figure 2.1**

*The conceptual framework for factors influencing the level of medication competency*





## **CHAPTER 3: METHODOLOGY**

### **3.0 Introduction**

Chapter 3 provides a comprehensive overview of the research design, encompassing the methodological approach, research setting, inclusion and exclusion criteria, as well as the sampling method and sample size. Additionally, it addresses the utilisation of study instruments, ethical considerations, data collection procedures, data analysis, and the study's limitations.

### **3.1 Research Design**

This study employed a quantitative, cross-sectional research design in order to assess the factors influencing medication competency among UNIMAS undergraduate nursing students. A cross-sectional study is a research design that involves the collection of data from a diverse group of individuals at a single point in time, with the variables being observed without any interference or manipulation (Thomas, 2023). This approach was selected as it facilitates the collection of quantifiable data to identify patterns, relationships, and trends.

### **3.2 Research Settings**

This study was conducted at the Faculty of Medicine and Health Sciences (FMHS), Universiti Malaysia Sarawak (UNIMAS), located in Kota Samarahan, Sarawak. The FMHS offers two main programs: a four-year Bachelor of Nursing with Honours and a five-year Bachelor of Medicine with Honours. The research focused on undergraduate nursing

students enrolled in the FMHS. The total number of undergraduate nursing students currently enrolled in UNIMAS is 235, comprising 51 first-year students, 63 second-year students, 57 third-year students, and 64 fourth-year students.

### **3.3 Inclusion and Exclusion criteria**

#### **3.3.1 Inclusion criteria**

Second-year to fourth-year nursing students was selected to participate in this study. Students who expressed a willingness to participate were also included.

#### **3.3.2 Exclusion criteria**

The exclusion criteria for this study included postgraduate nursing students and those who declined to participate. Postgraduate students were excluded because they have more experience in medication administration than other nursing students. First-year nursing students were also being excluded, as their pharmacology education was limited to classroom learning and they had not yet gained clinical experience in drug administration. Also, a total of 13 students from Years 2 to 4 were excluded from the actual study as they had been recruited for the pilot study.

### **3.4 Sampling method and Sample size**

#### **3.4.1 Sampling method**

The population selected for this study comprises nursing students in their second through fourth years from the Faculty of Medicine and Health at the University of Malaysia Sarawak (UNIMAS). The sampling method used is a simple random sample in which ensures that every individual within the selected population has an equal probability of being selected, except for those postgraduates since they are being excluded (Thomas, 2023). The researcher has randomly chosen the participants from the population by using IBM SPSS Statistics version 27.0 and collected the data from the sample.

The population selected for this study comprises nursing students in their second through fourth years from the Faculty of Medicine and Health Sciences at Universiti Malaysia Sarawak (UNIMAS). This study utilised simple random sampling, guaranteeing that each eligible participant has an equal probability of selection, except for postgraduate students, who are excluded due to their advanced level of experience in medication administration (Thomas, 2023). A complete list of all eligible Year 2, Year 3, and Year 4 nursing students was acquired from faculty records. Their names were recorded on a master sheet, with each student identified using their matric number to prevent duplication and ensure accuracy. To maintain equitable participation across academic years, students were classified into three categories which are Year 2, Year 3, and Year 4.

Subsequently, IBM SPSS Statistics Version 27.0 was used to conduct the random selection process. The random sample function in SPSS was applied to each academic year group to ensure unbiased selection. A total of 13 participants were randomly chosen for the pilot study, with four students from Year 2, four from Year 3, and five from Year 4. The selected

participants was documented in the master sheet and contacted regarding their participation in the study. This structured and systematic sampling approach ensures fair representation, eliminates selection bias and enhances the reliability of the study findings.

The population for this study comprises nursing students in their second, third, and fourth years of study at the Faculty of Medicine and Health Sciences, Universiti Malaysia Sarawak (UNIMAS). This study employed a simple random sampling method, which ensures that each eligible student has an equal probability of selection, except for postgraduate students who are excluded due to their advanced clinical experience in medication administration (Thomas, 2023).

To initiate the sampling process, the researcher first obtained a complete list of all eligible Year 2, Year 3, and Year 4 nursing students from the faculty's academic records. The students' particulars, specifically their names and matriculation numbers, were compiled into a master sheet using Microsoft Excel. This step ensured that all students were accounted for accurately, with each student uniquely identified by their matric number to prevent duplication and maintain the integrity of the data.

The master sheet comprised 184 students across three academic years. The Excel file was subsequently imported into IBM SPSS Statistics Version 27.0 to facilitate the randomisation process. In SPSS, the "Select Cases" function under the "Data" menu was utilised to perform the random selection. Using this function, 139 participants were randomly selected from the original pool of 184 students. The random selection was conducted without replacement to ensure that each student could only be selected once.

The final sample consisted of 50 students from Year 2, 41 students from Year 3, and 48 students from Year 4. The selected students' names and matriculation numbers were

documented in the updated master sheet. These students were then contacted and invited to participate in the study.

This structured and systematic sampling protocol ensures fair representation across the different academic years, minimises selection bias, and strengthens the reliability and validity of the study findings.

### 3.4.2 Sample size

The sample size in this study was calculated according to the total number of nursing students in UNIMAS, which is from Year 2 to Year 4 ( $N = 184$ ). In this study, the Taro Yamane formula (1967) was used to estimate the sample size. The following is the calculation for the sample size:

Taro Yamane formula (1967):

$$n = \frac{N}{1 + N(E)^2} \quad \text{Equation 3.1}$$

Where,

$n$  = the sample size

$N$  = the sample population ( $N = 184$ )

$E$  = level of significance (5%)

1 = unite (a constant value)

The following calculation details the methodology employed to determine the required sample size for this study:

$$n = \frac{184}{1 + 184 (0.05)^2}$$

$$n = 126.03$$

$$n \approx 126$$

10% of the attrition rate = 12.6

$\approx 13$  respondents

After adding an attrition rate of 10%, the final sample size = 139 respondents

### **3.5 Study Instrument**

The data for this study were collected using a self-administered paper questionnaire, which is divided into two sections.

The first section gathered socio-demographic information about the participants, including their age, gender, year of study and clinical hours experiences at UNIMAS.

The second section assesses the level of medication competency among nursing students and identifies the factors influencing it. This section has 44 questions assessed using a 5-point Likert scale, with answers ranging from (0) never, (1) sometimes, (2) sometimes, (3) most of the time, to (4) always. A higher score in this section reflects a greater level of medication

competency. Higher total scores indicate greater medication competency and a stronger influence of contributing factors, with a maximum possible score of 176.

The questionnaire was adapted from the research conducted by Linares et al. (2022) to assess the relationship between the level of medication competency and the factors influencing it. The study focuses on nine key domains which are Safety in drug prescription, Familiarity with pharmacological concepts, Relevance for professional practice, Relevance for professional practice, Factors associated with risk of error, Importance of administering medications as prescribed, Verifications prior to drug administration, Thinking process in relation to medication management, Frequency of drug dose calculation and Learning drug dose calculation.

The study instrument comprehensively evaluates contributors to medication competency. Individual factors are assessed by examining participants' knowledge and understanding of medications, including Safety drug prescription, Familiarity with pharmacological concepts and Factors associated with risk of error. Attitudinal factors are measured through the Relevance for professional practice, Importance of administering medication, and Verification prior to drug administration. Educational and practical skills are assessed based on the Frequency of calculation and Learning drug dose calculation. Lastly, cognitive factors are evaluated by the Thinking process in relation to medication management. This holistic approach aims to provide valuable insights into the multifaceted determinants of medication competency.

### **3.6 Ethical Considerations**

To ensure ethical compliance, this study was conducted following approval from the Institutional Research Ethics Committee, FMHS UNIMAS. Written permission to use the questionnaire was obtained from the original author via email, and this correspondence was included in Appendix V. Nursing students from UNIMAS were invited to participate voluntarily, with participation contingent upon signing an informed consent form.

Before obtaining consent, the researcher provided participants with an information sheet and thoroughly explained the study's purpose and procedures. Participants were informed that their participation is completely voluntary and that they may withdraw from the research at any time without justification or repercussions. If a participant chooses to withdraw before data collection is completed, their data will be securely destroyed.

To uphold confidentiality, completed questionnaires were sealed in envelopes and stored in a locked cabinet. Participant identities were kept strictly confidential, and the presentation of the results was entirely anonymous, ensuring that no identifying particulars could be traced back to individual respondents. These measures are implemented to protect participants' privacy and ensure that the data collected is used solely for this study.

### **3.7 Data Collection Procedure**

A pilot study was done by selecting 10% of the sample size, which is only 13 respondents who met the inclusion criteria. The pilot study employed the same inclusion and exclusion criteria and sampling method as the actual proposed study to ensure consistency in participant selection. The pilot study is required to assess the questionnaire's validity as well



as reliability before finalising the research design. IBM SPSS Statistic version 27.0 is being used to test the reliability, which tests the internal consistency for obtaining Cronbach's alpha for the factors' items. The reliability coefficient ranges from 0 to 1, offering an overall assessment of a measure's consistency. A "good" reliability coefficient typically falls between 0.65 and 0.8, with higher values often being preferable in many cases (Goforth, 2015). In this study, the Cronbach's alpha across all 44 items was 0.85, indicating a high level of internal consistency and reliability of the instrument.

Linares et al. (2022) validated the questionnaire using Cronbach's alpha. Cronbach's alpha for self-assessments on safe medication management and the frequency and learning of drug dosage calculation was 0.893 and 0.894, respectively.

During the data collection process, the questionnaire was printed and distributed to selected nursing students during their break time in the tutorial room. The researcher has explained the purpose of the study and provided instructions, emphasising that participants should complete the questionnaire independently without discussing it with others. Students who consented to participate were required to complete an informed consent form. They have been given approximately 15 minutes to complete the questionnaire and have returned it directly to the researcher.

Data collection commenced following research approval and took place between March and April 2025.

### **3.8 Data Analysis Method**

The analysis of data for this research was conducted using SPSS version 27.0. Before analysis, the dataset was cleaned by rectifying missing values and outliers.

Descriptive statistics such as mean, standard deviations, minimum, maximum and frequencies were employed to present sociodemographic data, medication competency levels, and factors influencing medication competency. The normality of continuous data was evaluated through the Kolmogorov-Smirnov test, given that the sample size exceeds 50 (Mishra et al., 2019). A p-value of less than 0.05 will be deemed statistically significant (Kwak, 2023).

The relationship between the factors and medication competency was analysed using both Pearson and Spearman correlation tests. The Pearson correlation test will be utilised to evaluate the relationship if the data adheres to a normal distribution. If the data does not follow a normal distribution, the Spearman correlation will be used instead. The null hypothesis is rejected when the p-value is below 0.05, signifying a significant relationship. If the p-value exceeds 0.05, the null hypothesis remains accepted, indicating an absence of a significant relationship.

## **CHAPTER 4: RESULTS**

### **4.1 Sociodemographic characteristics of respondents**

A total of 139 undergraduate nursing students from UNIMAS participated in the study, yielding a 100% response rate. Table 4.1 presents the socio-demographic characteristics of the respondents. The participants' ages ranged from 20 to 26 years, with a mean age of 22.25 years ( $SD = 1.10$ ). Among the 139 respondents, 15.1% were male and 82.7% were female. Most participants identified as Malay (43.2%). The highest proportion of respondents were Year 2 students (36.0%), and the most common duration of clinical experience reported was 8 weeks.

**Table 4.1***Socio-demographic characteristics of the respondents (n=166)*

| <b>Variables</b>                              | <b>Frequency,<br/>n</b> | <b>Percentage<br/>(%)</b> | <b>Mean (SD)</b> | <b>Min. (Max.)</b> |
|-----------------------------------------------|-------------------------|---------------------------|------------------|--------------------|
| <b>Age</b>                                    |                         |                           | 22.25 (1.10)     | 20 (26)            |
| <b>Gender</b>                                 |                         |                           |                  |                    |
| Male                                          | 24                      | 17.3                      |                  |                    |
| Female                                        | 115                     | 82.7                      |                  |                    |
| <b>Ethnicity</b>                              |                         |                           |                  |                    |
| Malay                                         | 60                      | 43.2                      |                  |                    |
| Chinese                                       | 4                       | 2.9                       |                  |                    |
| Iban                                          | 22                      | 15.8                      |                  |                    |
| Others                                        | 53                      | 38.1                      |                  |                    |
| <b>Year of Study</b>                          |                         |                           |                  |                    |
| Year 2                                        | 50                      | 36.0                      |                  |                    |
| Year 3                                        | 41                      | 29.5                      |                  |                    |
| Year 4                                        | 48                      | 34.5                      |                  |                    |
| <b>Total Weeks of<br/>Clinical Experience</b> |                         |                           |                  |                    |
| 8 weeks                                       | 50                      | 36.0                      |                  |                    |
| 28 weeks                                      | 41                      | 29.5                      |                  |                    |
| 52 weeks                                      | 48                      | 34.5                      |                  |                    |

## 4.2 Level of medication competency and factors influencing it

Table 4.2 shows the total mean score of the medication competency level and the four factors that might influence the medication competency level: “individual factor”, “educational factor”, “cognitive factor” and “educational and practical skills”.

**Table 4.2**

*Central tendency and range of the Level of medication competency and the influencing factors*

| Variables                      | Mean (SD)      | Median (IQR) | Min. | Max. |
|--------------------------------|----------------|--------------|------|------|
| Level of medication competency | 143.25 (13.89) | -            | 107  | 176  |
| Individual factor              | 30.12 (4.99)   | -            | 18   | 44   |
| Educational & Practical factor | -              | 53 (10)      | 36   | 64   |
| Cognitive factor               | -              | 16 (5)       | 10   | 20   |
| Attitudinal factor             | -              | 43 (6)       | 32   | 48   |

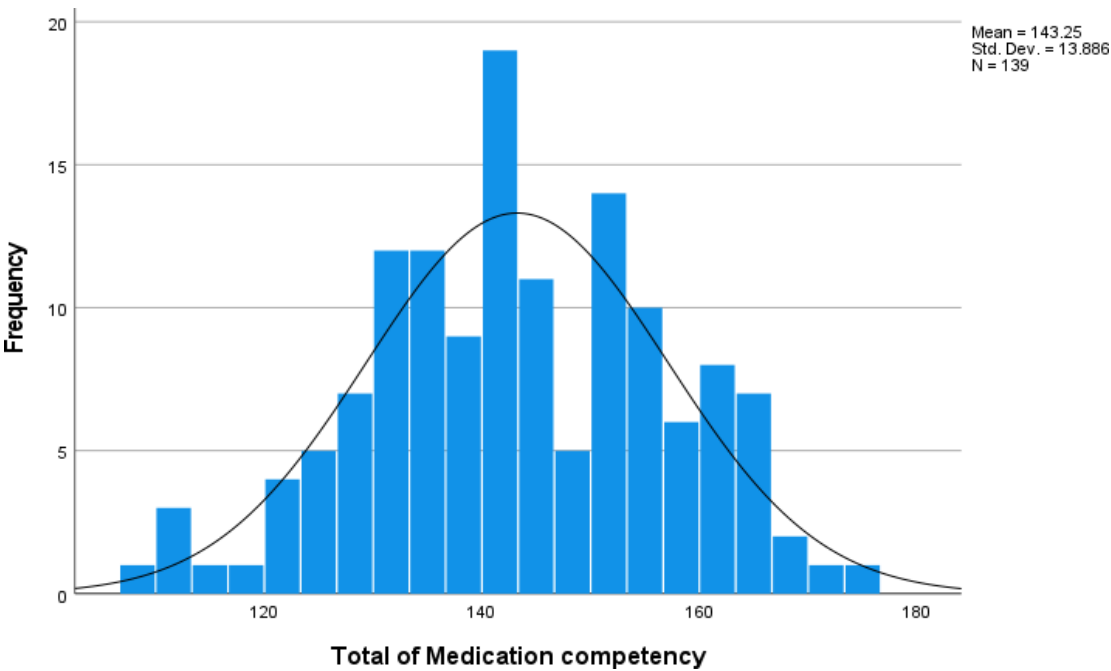
### 4.2.1 Level of medication competency

There are no outliers or extreme values noted from the box plot for the total medication competency score. A Kolmogorov-Smirnov test showed a significant normal distribution,  $D(139) = .061$ ,  $p = .200$ . The mean competency score among the participants was 143.25 (SD = 13.87) out of a maximum possible score of 176. Recoding of the total medication competency score into three levels was done using the visual binning in SPSS. Out of the 139 participants, it was revealed that 49 (35.3%) of the participants demonstrated a low level

of medication competency and 44 participants (31.7%) fell within the moderate level, while 46 (33.1 %) of them achieved a high level of competency.

**Figure 4.1**

*Histogram for the level of medication competency*

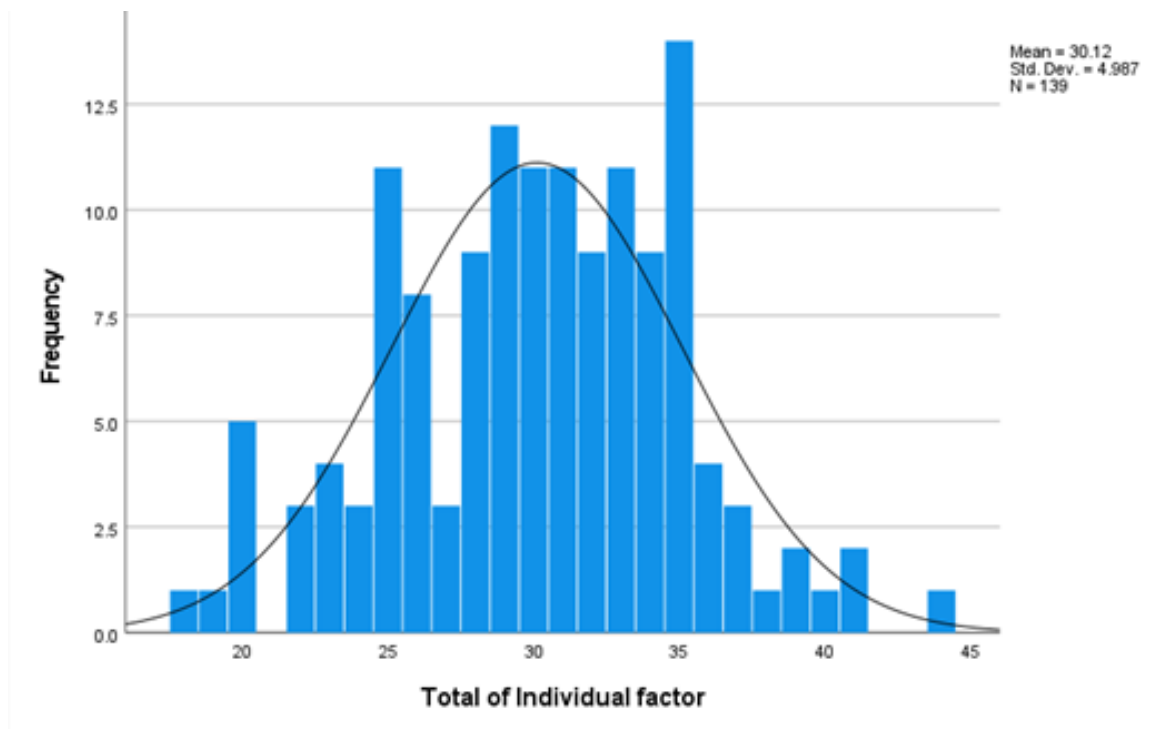


#### 4.2.2 Individual factor

There were no outliers or extreme values noted from the box plot. A Kolmogorov–Smirnov test indicated the data were normally distributed,  $D(139) = .066$ ,  $p = .200$ . The mean individual factor score was 30.20 ( $SD = 4.99$ ).

**Figure 4.2**

*Histogram for individual factor*

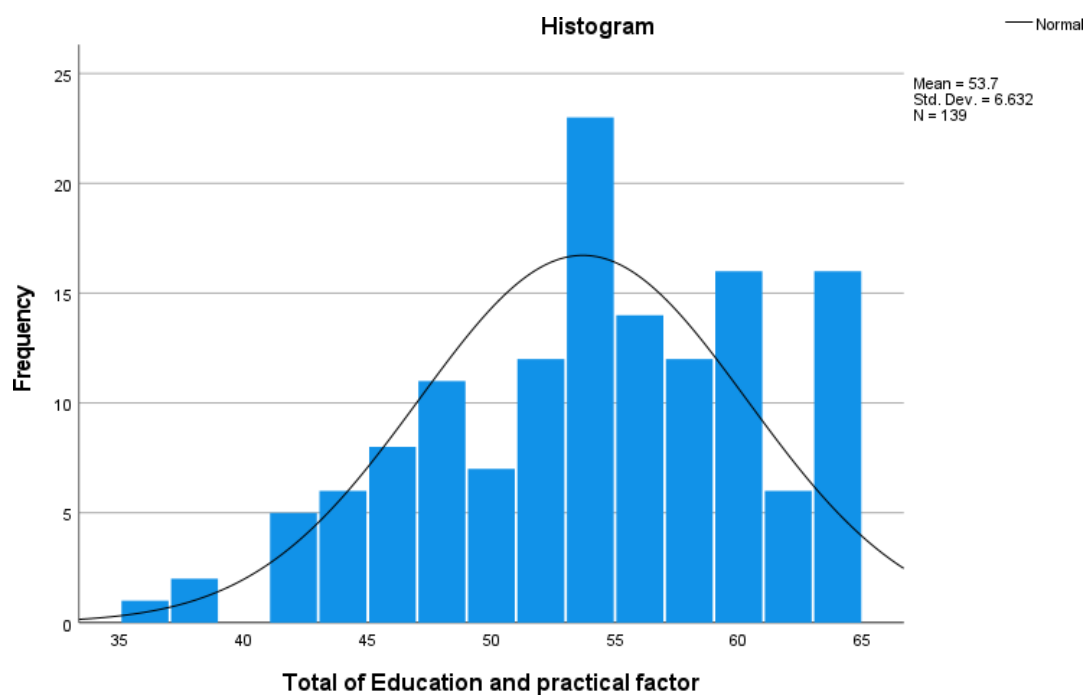


### 4.2.3 Educational and practical factor

There were no outliers or extreme values noted from the box plot. A Kolmogorov–Smirnov test showed that the data did not follow a normal distribution,  $D(139) = .084$ ,  $p = .018$ . The median score was 53 points ( $IQR = 10$  points). The maximum score is 64 points, while the minimum score is 36 points. The range is 28 points. The mode score is 53 points.

**Figure 4.3**

*Histogram for educational and practical factor*



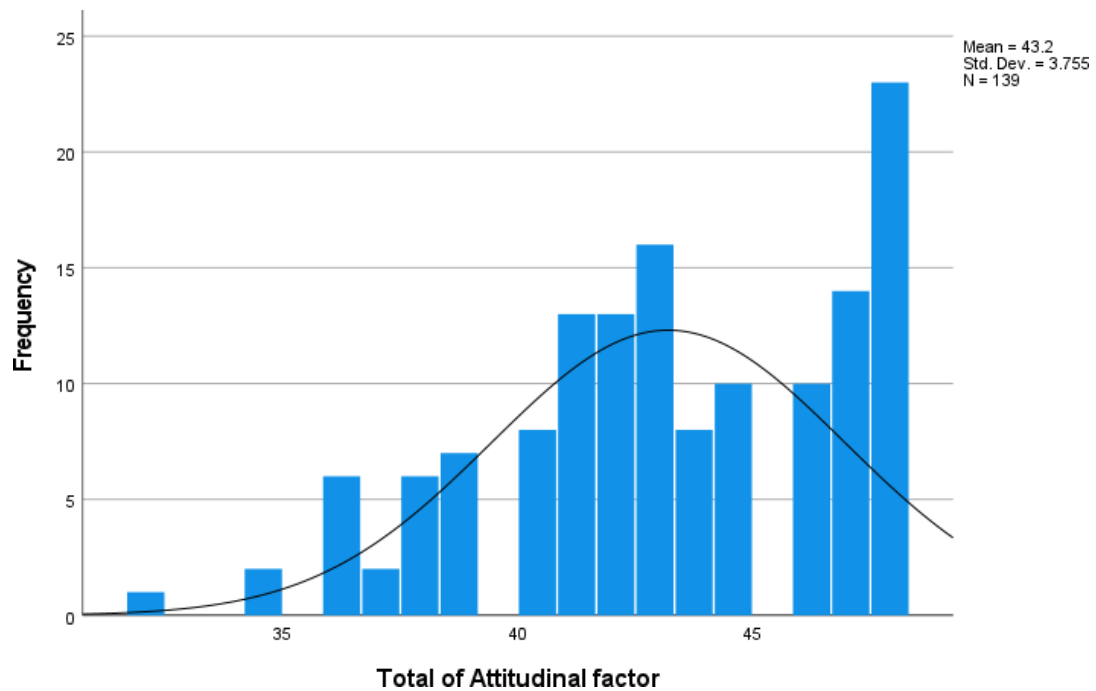


#### 4.2.4 Attitudinal factor

There were no outliers or extreme values noted from the box plot. A Kolmogorov–Smirnov test showed that the data did not follow a normal distribution,  $D(139) = .111, p < .001$ . The median score was 43 points ( $IQR = 6$  points). The maximum score is 48 points, while the minimum score is 32 points. The range is 16 points. The mode score is 48 points.

**Figure 4.4**

*Histogram of attitudinal factor*

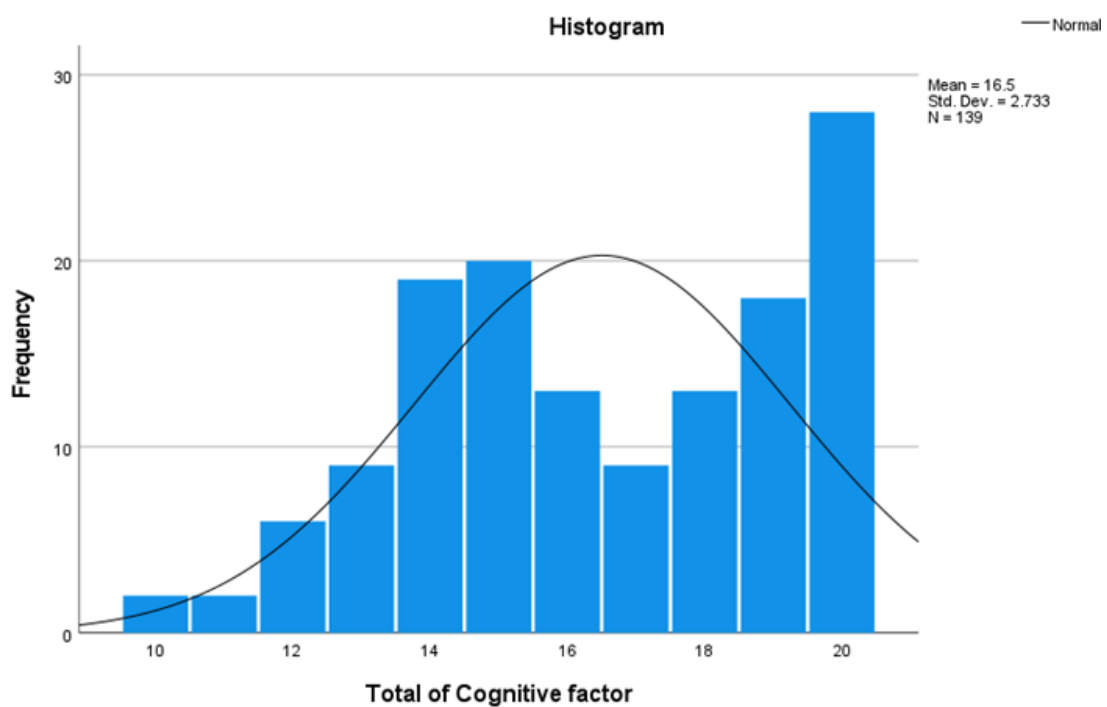


#### 4.2.5 Cognitive factor

There were no outliers or extreme values noted from the box plot. A Kolmogorov–Smirnov test showed that the data did not follow a normal distribution,  $D(139) = .150, p < .001$ . The median score was 16 points ( $IQR = 5$  points). The maximum score is 20 points, while the minimum score is 10 points. The range is 10 points. The mode score is 20 points.

**Figure 4.5**

*Histogram of cognitive factor*



### **4.3 Relationship between the level of medication competency and the factors influencing it**

A normality analysis was conducted for the medication competency score. The box plot revealed no outliers or extreme values. The Kolmogorov-Smirnov test showed a significant departure from normality,  $D(139) = .061, p = .200$ . Therefore, Spearman correlation coefficient analysis was performed to investigate the relationship between the level of medication competency and the four influencing factors.

The results showed a strong positive correlation between individual factors and medication competency,  $r_s(139) = .651, p < .001$ , suggesting that higher individual factor scores are associated with higher levels of medication competency.

Furthermore, a very strong positive correlation was found between attitudinal factors and medication competency, with,  $r_s(139) = .719, p < .001$ . indicating that participants with more favourable attitudes tend to have higher medication competency.

Similarly, a very strong correlation was observed between educational and practical factors and medication competency, with  $r_s(139) = .851, p < .001$ , indicating that higher levels of education and practical experience are strongly linked to higher medication competency.

Lastly, cognitive factors also showed a strong positive correlation with medication competency, with  $r_s(139) = .660, p < .001$ . This shows that higher cognitive abilities are positively associated with increased medication competency.

*Table 4.3 Correlation coefficient test between medication competency level and four factors*

|                                  | 1 | 2      | 3      | 4      | 5      |
|----------------------------------|---|--------|--------|--------|--------|
| 1 Medication competency level    | - | .651** | .851** | .660** | .719** |
| 2 Individual factor8 weeks       |   | -      | .349** | .330** | .268** |
| 3 Educational & Practical factor |   |        | -      | .491** | .530** |
| 4 Cognitive factor               |   |        |        | -      | .415** |
| 5 Attitudinal factor             |   |        |        |        | -      |

\*\* Correlation is significant at the 0.01 level (2 tailed)

## **Chapter 5**

### **5.1 Introduction**

This chapter discusses the findings or results of this study in Section 5.2. In this section, the discussion will include the level of medication competency among UNIMAS undergraduate nursing students , factors influencing medication competency among UNIMAS undergraduate nursing students, and the relationship between the level of medication competency and the factors influencing medication competency among UNIMAS undergraduate nursing students. Section 5.3 presents the summary findings of the study, while Section 5.4 presents the implications of the study. Section 5.5 will present the limitations of the study, and lastly, Section 5.6 presents the conclusion of study.

### **5.2 Discussion of the findings/results**

#### **5.2.1 Level of medication competency among UNIMAS undergraduate nursing students**

The study revealed that the overall medication competency among UNIMAS nursing students was low. Based on visual binning, the majority (35.3%) of participants have a low level of medication competency with a mean score of 143.25 ( $SD = 13.87$ ).

Similar findings have been reported by a few studies. Linares et al. (2022) reported that only 14.4% of senior nursing students demonstrated full medication competency during simulations, while Musafiri and Daniels (2020) found that only 19.2% of students felt competent in oral medication administration. Despite adequate clinical exposure, the previous study has indicated that students continue to demonstrate low medication

competency. Poor knowledge in relation to pharmacology and lack of practice could be some of the possible reasons for the low competency performance. Thomas (2024) found that nursing students themselves perceive inadequate pharmacology knowledge, fear of making mistakes, and poor mathematical skills as major barriers to medication competence. The study also underscored the importance of strong clinical supervision and recommended both increased practice opportunities and improved curriculum structure. Adding to this, Tomas and Fillipus (2024) revealed that student nurses perceive fear of making mistakes, insufficient pharmacology knowledge, and weak mathematical skills as major barriers to achieving competency. Participants in the study emphasised the critical role of supervision in promoting learning and ensuring medication safety. As a result, the study recommended that students be given more structured opportunities to practice medication and dosage calculations and nurse educators enhance their supervision during clinical training. These insights suggest that clinical exposure alone is not sufficient; foundational pharmacological education, confidence-building, and guided practice are all essential components of developing medication competence

Differ, Irvine et al. (2024) in their study reported that international nursing students showed higher levels of self-reported preparedness for medication administration. This difference may be explained by how clinical training is structured in different countries, as well as the tendency for some students to overestimate their abilities when using self-assessment. In some countries, students are given early and frequent opportunities to practice medication administration in real clinical settings under close supervision. In contrast, other programs may delay clinical exposure or place greater emphasis on simulation rather than real patient care. These differences in how and when students are exposed to clinical practice can affect their confidence levels, even if their actual competency has not been objectively assessed.

### 5.2.2 Medication Competency and Factors Influencing

The study identified four influencing factors—individual, educational and practical, cognitive, and attitudinal, each showing moderate to higher self-perceived scores. However, due to unequal item totals and scoring scales, direct comparisons between factors are limited. To better interpret the nature of students' responses across these domains, it is important to consider the distribution shape of each factor. According to Pallant (2020), a positively skewed distribution indicates that most responses are clustered toward the lower end, with a few higher scores stretching the tail to the right, while a negatively skewed distribution suggests the opposite. This understanding of skewness supports the interpretation of response patterns in the educational and practical, cognitive, and attitudinal factors. Meanwhile, for the individual factor, the average per-item Likert score of 2.74 further clarifies that students generally perceived themselves as moderately competent in medication-related knowledge and responsibilities.

The individual factor consisted of 11 items on a 5-point Likert scale (*0 = strongly disagree* to *4 = strongly agree*). The total mean score was 30.12 (*SD* = 4.99), resulting in a per-item mean of approximately 2.74. This indicates that students generally rated themselves between “*neutral*” and “*agree*,” reflecting a moderate level of perceived individual competency in medication-related knowledge and responsibilities. The moderate mean score suggests that while students acknowledged some personal capability in managing medication tasks, there was also noticeable uncertainty or inconsistency in their self-assessments. The relatively wide standard deviation (*SD* = 4.99) implies considerable variability in individual perceptions, indicating that students' confidence in their own knowledge, learning motivation, and medication-related roles differed substantially.

These findings resonate with those of Sneek et al. (2016), who conducted a quantitative descriptive correlational study on Finnish nurses' medication competence. The study revealed that 5% of the sample struggled with drug calculations, and that theoretical knowledge was positively associated with medication competency. Nurses working in acute care and those who were younger tended to perform better. Although the study involved registered nurses rather than students, the variation in performance and the emphasis on knowledge-based competency are paralleled with the variation observed in our student responses. The study by Sneek et al. (2016) highlighted the importance of strong foundational knowledge in developing individual competence. This aligns with the present study, where some participants demonstrated greater confidence than others, likely due to differences in their underlying knowledge.

In a qualitative study, Preston et al. (2019) explored U.S. nursing students' perceptions of pharmacology education. Out of 99 students, 87% acknowledged a positive impact of pharmacology learning on safe medication practices. However, most of them also reported feeling overwhelmed by the content and having difficulty applying theory in clinical settings. This suggests that although students believe they are learning valuable content, they often lack confidence in transferring that knowledge into practice

Also, a study by Sari et al. (2024) further broadened the concept of individual factors through a qualitative phenomenological study involving seven Indonesian nursing graduates who had failed their competency exams. The students identified low motivation, poor study habits, anxiety, and overconfidence as key contributors to failure during competency exams. The study showed that many students underestimated the difficulty of the exam, spent excessive time on distractions like mobile phones, and lacked structured preparation. These qualitative



findings are consistent with the variation observed in the current study's results. The relatively high standard deviation indicates that students differed widely in their self-assessed individual competency. This suggests that those who rated themselves moderate may share behavioural traits described in previous qualitative research, such as low motivation, anxiety, or lack of preparedness.

Previous studies [Sneck et al. (2016); Preston et al. (2019); and Sari et al. (2024)] revealed a consistent emphasis on internal attributes such as motivation, confidence, preparation, and responsibility as key elements influencing medication competency. While knowledge, learning experiences, behavioural readiness, both cognitive and affective components may bridge the gap between knowledge acquisition and self-regulation, providing a more comprehensive perspective on individual competency.

On the other hand, the median for the attitudinal factor was 43 ( $IQR = 6$ ), with a left-skewed distribution as illustrated in *Figure 4.4 (Page 40)*. This skewness indicates that the responses were strongly clustered toward the higher end of the scale. These results suggest that students consistently demonstrated positive professional attitudes related to medication safety and responsibility.

The result was supported by Coşkun et al. (2024), who conducted a quantitative study involving 310 nurses. The study found that 77.7% of nurses had witnessed medication errors, and those with better adherence to safety principles were significantly less likely to commit errors. The study highlighted the importance of a safety-oriented mindset in daily practice, similar to current findings, where students valued professional responsibility highly.

Similarly, Güney and Büyük (2022) conducted a quantitative descriptive and correlational study among 115 pediatric nurses in Turkey found that 34% of pediatric nurses reported

having made medication errors, but error rates declined with age and stronger professional maturity. Thus, developing strong attitudes and accountability over time among the health care professionals may result in reduction of medication errors rate. According to Anugrahini & Hariyati (2022), strong safety culture is important as it reinforced positive attitudes, because nurses who received ongoing training and worked in supportive environments tends to show higher compliance.

Attitudes improve with increased exposure and experience (Fernandez et al., 2022), which may explain the strong professional attitudes demonstrated by nursing students in current study. With a shared curriculum and an emphasis on medication safety and ethics, a more unified and positive attitude can be developed across cohorts. The presence of strong attitudinal foundations among the students affirms that professional responsibility and adherence to safety protocols are already embedded in their practice mindset. Therefore, nursing education should continue to reinforce a culture of safety through simulations, reflective exercises, and real-world clinical exposure to further strengthen these attitudes over time.

Descriptive data for the educational and practical factor shows that the median score was 53 ( $IQR = 10$ ), with the distribution slightly skewed to the right, as illustrated in *Figure 4.3*. (Page 39). This skewness indicates that respondents did not strongly perceive educational and practical elements, such as lectures, simulations, or clinical placements, as key contributors to their medication competency. Similarly, Tobey (2024) found that perceived hands-on experience was more valuable than simulations. The fact that although students attended theory classes and clinical placements regularly, they may feel that these learning experiences do not focus enough on medication knowledge or provide sufficient hands-on

practice. As a result, they may not fully recognise the impact of educational and practical experiences on their medication competency. In the current study, students may undervalue the classroom or simulated training, possibly due to limited real-life medication administration opportunities during clinical postings.

Many students in the current study did not strongly agree that educational and practical experiences contributed significantly to their medication competency, suggesting possible gaps in teaching methods or clinical exposure. However, Osuchukwu et al. (2024) conducted a randomised controlled trial with 238 nursing students in Nigeria to evaluate the impact of structured educational interventions. The findings showed that in post-intervention, knowledge scores rose from 66.7% to 90.6%, and medication safety adherence increased from 56.3% to 80.7%. These dramatic gains showed that education, when applied effectively, may directly improve competency.

Although educational and practical experiences significantly contribute to medication competency, the students in the current study may not fully recognise or appreciate their importance. Thus, curriculum designers must ensure that educational interventions are authentic, clinically relevant, and linked to patient safety. High-fidelity simulations and supported clinical placements may help improve students' perceptions of this factor.

The median score for the cognitive factor was 16 ( $IQR = 5$ ), with a left-skewed distribution as illustrated in *Figure 4.5. (Page 41)*. This skewness indicates that the responses were strongly clustered toward the higher end of the scale. These results show that many students reported maximal agreement with items related to decision-making and reasoning. The distribution suggests that cognitive strategies such as error anticipation, clinical reasoning,

and cue recognition are widely recognised and valued among students during their medication management.

These findings are consistent with a qualitative exploratory study in Norway by Solberg et al. (2023) involving 175 observed drug-dispensing episodes among experienced nurses. The study found that nurses utilised advanced cognitive strategies such as clustering patient cues and predicting medication errors, which were essential in maintaining medication safety. Although our sample consists of students, the similarity in cognitive emphasis suggests that foundational reasoning skills are being formed early in training.

Similarly, Domm et al. (2021) stated that senior nursing students relied on contextual reasoning and patient cues when administering medications, reflecting strong development of clinical judgment skills. These patterns of reasoning are aligned with current findings, where respondents appeared confident in their ability to assess situations and apply critical thinking when making medication-related decisions.

In contrast, Hikmat et al. (2024) revealed that 61.2% of Indonesian nursing students exhibited low metacognitive skills during the COVID-19 pandemic, largely due to poor self-evaluation, ineffective time management, and limited institutional support. The disparity with current findings is likely due to differences in the learning environment. While student in the study was conducted under online learning conditions, students in the current study likely benefited from face-to-face classes, structured clinical placements, and active case discussions. These in-person educational strategies may have provided greater opportunities for real-time reflection, clinical reasoning, and feedback that facilitated the development of cognitive competency in medication management.

Students in this study demonstrated a high awareness of the cognitive skills necessary for safe medication practice. Their strong performance on decision-making and reasoning suggests that this factor is already well-integrated into their curriculum. To further strengthen these skills, nursing education should continue to prioritise case-based learning, critical thinking exercises, and simulation debriefings, all of which can reinforce clinical judgment and promote safe, reflective practice

### **5.2.3 Relationship between the level of medication competency and the factors influencing it**

This study examined the relationship between medication competency and four influencing factors—educational and practical, attitudinal, individual, and cognitive factors among undergraduate nursing students. The findings revealed that each of these factors was significantly and positively correlated with medication competency levels. This suggests that nursing students who exhibit stronger performance in these areas are more likely to perceive themselves as competent in medication management, supporting the understanding that medication competency is a multidimensional construct shaped by both internal attributes and external learning experiences.

Individual factor demonstrated a strong positive correlation with medication competency ( $r_s = .651, p < .001$ ). This factor includes personal attributes such as pharmacological knowledge, self-confidence, and a sense of responsibility. The result aligns with Sneek et al. (2016), indicating that deficits in pharmacology knowledge and drug calculation were major contributors to medication errors among nursing students. Preston et al. (2019) similarly

found that while students may possess adequate theoretical knowledge, they often struggle to apply it effectively in clinical settings due to cognitive overload or lack of confidence.

Additionally, Kim and Lee (2022) examined job stress as an individual factor and reported a weaker but still significant correlation with medication safety competence ( $r = .20$ ,  $p = .021$ ). This suggests that although emotional readiness and psychological factors are relevant to medication competency, their influence may be less substantial compared to factors such as cognitive ability and educational preparation.

Unlike Kim and Lee's narrower focus on job stress, the current study examined a broader scope of individual characteristics, including self-efficacy, emotional regulation, and knowledge base, which may explain the stronger correlation observed. Furthermore, students may benefit from supportive learning environments that include peer mentoring, stress management training, and confidence-building opportunities, all of which contribute to improved individual preparedness. Individual readiness, including pharmacological understanding, confidence and emotional regulation, plays a vital role in medication competency. Educational strategies should therefore go beyond content delivery to include psychological support, resilience training, and mentorship programs that help students transition theory into safe clinical practice.

Attitudinal factors showed a very strong positive correlation with medication competency ( $r_s = .719$ ,  $p < .001$ ), suggesting that students with more favourable attitudes such as accountability, patient-centeredness, and ethical awareness are more likely to report higher medication competency. This result is supported by Coşkun et al. (2024) and Güney and Büyük (2022), both studies found that individuals with positive attitudes toward safety protocols and professional responsibility were less likely to commit medication errors.

Attitudes such as vigilance and ethical conduct were strongly associated with safer practices. The strong correlation observed in the current study may reflect an educational emphasis on value-based learning, reflective practice, and ethics within the nursing curriculum. Additionally, institutional or cultural values that promote responsibility and safety may contribute to these findings.

Positive professional attitudes are integral to medication competency. Nursing programs should continue to incorporate strategies such as guided reflection, ethical case discussions, and professional role modelling to further strengthen attitudes that support safe medication administration.

Cognitive factors demonstrated a strong positive correlation with medication competency ( $r_s = .660, p < .001$ ). This suggests that students with stronger critical thinking, reasoning, and decision-making abilities are more confident and competent in managing medication-related tasks. The finding is consistent with Domm et al. (2021), who reported that senior nursing students utilised clinical reasoning and patient cues to support safe medication decisions. Likewise, Solberg et al. (2023) found that experienced nurses employed advanced cognitive strategies such as cue clustering and anticipatory thinking during drug administration.

Furthermore, Kim and Lee (2022) found that critical thinking disposition ( $r = .63, p < .001$ ) and clinical decision-making ability ( $r = .54, p < .001$ ) were significantly associated with medication safety competence among clinical nurses, further supporting the importance of cognitive development. However, the correlation in the current study was even stronger than that reported by Kim and Lee. This may be due to differences in study populations, as Kim and Lee studied experienced nurses, while the current research focused on undergraduate

students who may have overestimated their competence through self-reporting. Differences in measurement tools or the structure of clinical education may also have influenced the result.

Cognitive skills are essential for medication safety. Nursing education should continue to promote the development of reasoning and clinical decision-making through approaches such as simulation-based scenarios, case-based discussions, and structured reflective exercises. These strategies help students adapt knowledge to complex, real-world clinical settings.

Finally, educational and practical factors demonstrated a very strong positive correlation with medication competency (  $r_s = .851, p < .001$ ), indicating that students with more exposure to clinical practice and structured educational experiences reported higher levels of medication competency.

This finding aligns with the results of Osuchukwu et al. (2024), who found that simulation-based training and clinical rotations significantly improved students' medication knowledge and safety practices. Tobey (2024) also emphasised that repeated real-world exposure enhanced students' confidence and accuracy in administering medications.

The very strong correlation found in this study may reflect the effectiveness of specific teaching approaches in the current nursing program, such as high-fidelity simulations, OSCEs (Objective Structured Clinical Examination), and mentorship during clinical placements. These features may not be as robustly implemented in other programs, possibly explaining the stronger association found here.



The findings highlight that experiential learning is a critical foundation for developing medication competence. Nursing education should ensure that theoretical knowledge is consistently applied in clinical settings through supervised practice, simulations, and debriefing sessions. In summary, the present study reinforces the idea that medication competency is not the result of a single factor, but rather a combination of experiential, attitudinal, cognitive, and knowledge-based domains. These findings build on previous research by showing that the integration of all four factors within a structured and supportive nursing curriculum significantly enhances students' preparedness for safe medication administration. Moreover, the consistency of these findings with previous literature suggests that these relationships may be generalizable beyond the single-institution context, especially within similar nursing education frameworks across Southeast Asia. Future studies may benefit from exploring how these domains interact over time and how self-reported competency aligns with objective clinical performance assessment.

### **5.3 Summary of findings of the study**

The results of this study showed that medication competency among UNIMAS undergraduate nursing students was relatively low. Individual factor, educational and practical factor, attitudinal factor and cognitive factors also showed a strong and significant relationship between medication competency, indicating that professional responsibility, adherence to safety protocols, critical thinking, and decision-making play important roles in shaping competency. Individual factors, such as pharmacological knowledge and confidence, were similarly significant. Overall, the findings suggest that medication competency is a multifaceted construct influenced strongly by all four factors.

## **5.4 Implications, Recommendations & Future Research**

### **5.4.1 Implications & Recommendations for future research**

To strengthen the methodological rigour and applicability of future studies, researchers should aim to refine the measurement of medication competency by ensuring equal weighting across all influencing domains. This will allow for more accurate comparison of their relative contributions. Additionally, the use of advanced statistical techniques, such as regression analysis and structural equation modelling (SEM), is recommended to explore predictive relationships between factors and overall competency outcomes.

Longitudinal research designs are also needed to track how students' medication competency develops from program entry through graduation, offering insights into when key improvements occur and which educational stages have the greatest impact. Future studies should incorporate objective clinical performance data, such as direct observations or structured assessments, to validate self-reported competency levels.

To increase generalizability, researchers should expand the scope to include multiple institutions across Malaysia and Southeast Asia, assessing whether findings at UNIMAS reflect broader trends. Moreover, studies should explore barriers to clinical exposure, including placement quality, access to supervision, and hands-on training opportunities, as these may significantly affect competency development.

Further research is also warranted to examine psychological factors such as test anxiety, learning motivation, and self-confidence, and how these variables interact with cognitive and individual domains to influence medication safety. Lastly, adopting mixed methods

approaches, which integrate quantitative findings with qualitative insights from interviews or focus groups, can offer a more nuanced understanding of students' experiences and perceptions of medication competency development.

#### **5.4.2 Implications for Nursing Practice**

From a practical standpoint, it is recommended that standardised mentorship and feedback mechanisms be implemented during clinical placements to foster safe medication administration. Clinical supervisors should be equipped with structured observation tools to assess students' medication decision-making in real time and provide targeted feedback. Additionally, national nursing boards and policymakers should consider adopting validated assessment instruments, such as the Nursing Students' Self-Perceptions about Safe Medication Management (NURSPeM), to periodically evaluate student competency and ensure that clinical practice standards align with national and global patient safety goals.

#### **5.4.3 Implications for Nursing Education**

The study highlights the need for academic institutions to consistently integrate simulation-based training throughout the nursing curriculum. Simulation programs have been shown to effectively enhance students' medication safety knowledge, clinical decision-making, and practical skills (Osuchukwu et al., 2024). Nursing education should also adopt a competency-based framework that aligns curriculum design with the key dimensions influencing competency: pharmacological knowledge (individual factor), professional accountability (attitudinal factor), clinical exposure (educational and practical factor), and

reasoning ability (cognitive factor). To support this framework, validated tools such as Preparedness for Medication Administration Revised 2 (PMAR2) and NURSPeM should be embedded into instruction and assessment strategies, allowing for continuous tracking of student progress. Additionally, the early cultivation of professional attitudes, including ethics, safety awareness and accountability, should be prioritised through seminars, case-based learning, and mentorship programs.

A comprehensive assessment approach is also recommended, combining self-perceived measures with objective evaluations such as OSCEs and supervisor checklists to offer a fuller picture of students' actual competencies. Finally, bridging the theory-practice gap requires seamless integration of simulations and real-world clinical training, ensuring that students apply classroom knowledge in authentic clinical settings.

### **5.5 Limitations of the study**

The results are limited in their generalisability due to the single-institution design of the study. They may not fully represent nursing students from other institutions in Malaysia or elsewhere around the world, particularly those with differing curricula, teaching styles, or clinical training environments, as the data were solely collected from undergraduate nursing students at Universiti Malaysia Sarawak (UNIMAS).

The dependence on self-reported data from the NURSPeM questionnaire may have resulted in social desirability bias, leading students to potentially overestimate their true skill levels or views about drug safety. Although the instrument is validated, self-assessment may not accurately represent actual performance, and the lack of objective measures, such as

practical evaluations or supervisor assessments, restricts the capacity to verify such perceptions.

The cross-sectional design of the study limits the capacity to determine causation between the affecting factors and the level of medication competency. Since data were collected at a single point in time, the study cannot account for changes in students' competency throughout their education or identify long-term effects of interventions.

Although the instrument covers every factor in its four groups (individual, attitude, educational and practical, and cognitive), the small sample size may have resulted in some subcomponents, particularly in the cognitive domain, being underrepresented. This may influence the degree of understanding of students' critical thinking and decision-making abilities regarding medicine administration.

Despite those limitations, the study offers significant insights into the multifaceted nature of pharmaceutical proficiency among nursing students and emphasises certain instructional domains that may be addressed to improve competency levels. The findings are pertinent for comprehending the perceived advantages and disadvantages of the current training framework at UNIMAS and can inform future curriculum development.

## **5.6 Conclusion**

This study examined the level of medication competency among undergraduate nursing students at UNIMAS, identified influencing factors, and explored the relationship between these factors and competency levels. The findings offer important insights into the multidimensional nature of medication competency and its implications for nursing

education. The results indicated that most students demonstrated low-level medication competency, highlighting a gap between theoretical instruction and practical application. This aligns with prior research suggesting that current educational approaches may not adequately prepare students for safe medication administration. Four influencing factors were identified, which are individual, attitudinal, educational and practical, and cognitive factors. While students showed strong attitudinal and cognitive awareness, particularly in ethical responsibility and clinical reasoning, they rated educational and practical experiences less favourably. Notably, the study revealed that the latter factors had a strong correlation with overall competency, underscoring a disconnect between students' perceptions and the actual impact of experiential learning. The significant positive correlations across all factors support the study's hypothesis and reinforce the conceptual framework. Medication competency is not solely dependent on knowledge but is shaped by a combination of clinical skills, attitudes, and reasoning developed through structured, meaningful learning experiences. In conclusion, these findings underscore the need for a shift toward medication competency-based nursing education that prioritises high-fidelity simulation, supervised clinical practice, and reflective learning. Addressing all relevant domains can better equip nursing students for the demands of medication administration, enhance patient safety, and align educational outcomes with professional standards in healthcare.

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## APPENDICES

### APPENDIX A: RESEARCH APPROVAL

Pejabat Akademik  
**Fakulti Perubatan dan Sains Kesihatan**  
*Academic Office*  
*Faculty of Medicine & Health Sciences*  
☎: 581000 samb 7768  
📠: 665152

**UNIVERSITI MALAYSIA**  
**SARAWAK**  
94300 Kota Samarahan

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#### MEMORANDUM

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**Reference** : UNIMAS/NC-21.05/03-03 Jld. 8(115)

**To** : Felicia Sim Shu Jie (79427)  
Bachelor of Nursing with Honours  
Faculty of Medicine and Health Sciences

**From** : Dean  
Faculty of Medicine and Health Sciences

**Date** : 05 March 2025

**Subject** : **Final Year Project - Research Approval: Factors influencing Medication Competency among Unimas Undergraduate Nursing Students**

The above matter is referred.

The Faculty of Medicine and Health Sciences, Universiti Malaysia Sarawak (UNIMAS) has granted the **RESEARCH APPROVAL** for this Final Year Project research based on the appraisal by the Department of Nursing, Faculty of Medicine and Health Sciences, Universiti Malaysia Sarawak (UNIMAS) on 24 February 2025. The Final Year Project research details stated below:

**Student Name** : Felicia Sim Shu Jie

**Student ID** : 79427

**Programme** : Bachelor of Nursing with Honours

**Research Title** : *Factors influencing Medication Competency among Unimas Undergraduate Nursing Students*

**Supervisor Name** : Madam Azylina Anak Gunggu

**Supervisor H/P** : +60 19-468 3120

All records and data are to be kept strictly **CONFIDENTIAL** and can only be used for the purpose of this study. All precautions are to be taken to maintain data confidentiality. Permission from the all relevant heads of departments/units where the study will be carried out must be obtained prior to the study.

Please note that the approval is valid from **February 2025** to **November 2025** only. The reference number for this letter must be stated in all correspondence related to this study to facilitate the process.

Thank you with regards and well wishes.

Yours sincerely,



Professor Dr. Asri bin Said  
**Dean**

**c.c** : Deputy Dean of Undergraduate  
: Head of Nursing Department  
: Bachelor of Nursing with Honours  
: MDJ4653 Final Year Project 1 Course Coordinator

## APPENDIX B: COVER LETTER FOR ETHICAL APPLICATION

**Felicia Sim Shu Jie**

Faculty Medicine and Health Sciences,  
Universiti Malaysia Sarawak,  
94300 Kota Samarahan,  
Sarawak.

**The Chairman,**

Medical Research Ethics Committee,  
Faculty Medicine and Health Sciences,  
Universiti Malaysia Sarawak,  
94300 Kota Samarahan,  
Sarawak.

15<sup>th</sup> December 2024

Professor/Associate Professor/Dr/Sir/Madam,

### **REQUEST FOR APPROVAL TO CONDUCT RESEARCH PROJECT**

I am a final-year student pursuing a Bachelor of Nursing with Honours at the Faculty of Medicine and Health Sciences, UNIMAS. I enrolled in MDJ 4653 Final Year Project I, in which the course is coordinated by Madam Shalin Lee Wan Fei. Please find my details as follows:

**Full name: Felicia Sim Shu Jie**

**Matrix number: 79427**

**IC No.: 010807-13-1132**



I would like to request for the kind approval from the Faculty of Medicine and Health Sciences Medical Research Ethics Committee to conduct the following study:

**Research title:** Factors influencing medication competency among Unimas Undergraduate Nursing Students

**Supervisor's name:** Azylina Anak Gunggu

**Email address:** 79427@siswa.unimas.my

**Supervisor's HP number:** 0194683120

Please find the required documents as appended for your kind consideration and approval.

Thank you.

Yours sincerely,



(Felicia Sim Shu Jie)

## APPENDIX C: PARTICIPANT INFORMATION SHEET (PIS)

V1.29.12.2023



### PARTICIPANT INFORMATION SHEET/ MAKLUMAT KAJIAN PESERTA

- |                                             |                                                                                                 |
|---------------------------------------------|-------------------------------------------------------------------------------------------------|
| 1. Title of the study/ <i>Tajuk kajian</i>  | : Factors influencing medication competency among Unimas Undergraduate nursing students         |
| 2. Main Researcher/ <i>Penyelidik utama</i> | : Felicia Sim Shu Jie                                                                           |
| 3. Supervisor/ <i>Penyelia</i>              | : a) Course coordinator: Shalin Lee Wan Fei<br>b) Main research supervisor: Azylina Anak Gunggu |
| 4. Institution/ <i>Institut</i>             | : Department of Nursing<br>Faculty of Medicine & Health Sciences<br>Universiti Malaysia Sarawak |
| 5. Name of sponsor/ <i>Nama Penaja</i>      | : No external funding/ <i>Tiada penaja luar</i>                                                 |

V1.29.12.2023

**PARTICIPANT INFORMATION SHEET AND INFORMED CONSENT FORM**  
(for adult subjects)

**6. Introduction:**

It is important that you understand why the research is being done and what it will involve. Please take your time to read through and consider this information carefully before you decide if you are willing to participate. Ask the study staff if anything is unclear or if you would like more information. After you are properly satisfied that you understand this study, and that you wish to participate, you must sign this informed consent form.

Your participation in this study is voluntary. You do not have to be in this study if you do not want to. You may also refuse to answer any questions you do not want to answer. If you volunteer to be in this study, you may withdraw from it at any time. If you withdraw, any data collected from you up to your withdrawal will still be used for the study. Your refusal to participate or withdrawal will not affect any medical or health benefits to which you are otherwise entitled.

This study has been approved by the Medical Research and Ethics Committee, Ministry of Health Malaysia.

**7. What is the purpose of the study?**

The purpose of this study is to assess the level of medication competency among Unimas undergraduate nursing students and to identify the factors associated with the competency. This research is necessary to address critical gaps in nursing education regarding factors influencing medication competency among nursing students.

This research will be conducted for duration of 5 months (26/1/2025 till 30/06/2025). The expected number of participants is 140 individuals.

**8. Who can participate in this study?**

This study will comprise students from the Faculty of Medicine and Health Sciences, UNIMAS. Inclusion criteria include Year 2 - Year 4 nursing students enrolled in the Bachelor of Nursing with Honours Programme. Exclusion criteria include year 1 & postgraduate nursing students, 13 students from Years 2 to 4 had been recruited for the pilot study and those who declined to participate.

**9. What are my responsibilities when taking part in this study?**

It is important that you answer all of the questions asked by the study staff honestly and completely which will take about 15 minutes of your time.

You will be given a physical questionnaire to answer which will need to be returned upon completion. This form contains (2) sections which the first section gathers socio-demographic information about the participants, including the age, gender, and year of study at UNIMAS.

V1.29.12.2023

And, the second section assesses the level of medication competency among nursing students and identifies the factors influencing it.

**10. What are the potential risks and side effects of being in this study?**

Participation in this study is voluntary and any decisions regarding participation will not affect your future treatment. The level of risk associated with this study participation is minimal and is mainly related to time consumption. You are free to decline to answer any of the questions that you feel uncomfortable with, and you may withdraw from the study at any point without incurring any penalties.

**11. What are the benefits of being in this study?**

There may or may not be any benefits to you. Information obtained from this study will help to highlight the factors influencing medication competency, especially nursing students.

**12. Who is funding the research?**

This study does not receive any external funding. You will not be paid for participating in this study.

**13. Will my medical information be kept private?**

All your information obtained in this study will be kept and handled in a confidential manner, in accordance with applicable laws and/or regulations. When publishing or presenting the study results, your identity will not be revealed without your expressed consent. Individuals involved in this study, qualified monitors and auditors, and governmental or regulatory authorities may inspect the study data, where appropriate and necessary.

**14. Who should I call if I have questions?**

If you have any questions about the study or want information about this study, please contact the main study researcher, Felicia Sim Shu Jie, at the contact number 011-35357057 or email [snowpilot87@gmail.com](mailto:snowpilot87@gmail.com), or supervisor of this study, Lecturer, Madam Azylina Anak Gunggu, who can be reached through the email address: [gazylina@unimas.my](mailto:gazylina@unimas.my).

If you have any questions about your rights as a participant in this study, please contact: The Secretary, Medical Research & Ethics Committee, Ministry of Health Malaysia, at telephone number 03-3362 8407/8205/8888.

## APPENDIX D: INFORMED CONSENT

V1.29.12.2023

### INFORMED CONSENT FORM

Title of Study: Factors influencing medication competency among Unimas Undergraduate nursing students.

By signing below I confirm the following:

- I have been given oral and written information for the above study and have read and understood the information given.
- I have had sufficient time to consider participation in the study and have had the opportunity to ask questions and all my questions have been answered satisfactorily.
- I understand that my participation is voluntary and I can at anytime free withdraw from the study without giving a reason and this will in no way affect my future treatment. I am not taking part in any other research study at this time. I understand the risks and benefits, and I freely give my informed consent to participate under the conditions stated. I understand that I must follow the study investigator's instructions related to my participation in the study.
- I understand that study staff, qualified monitors and auditors, the sponsor or its affiliates, and governmental or regulatory authorities, have direct access to my medical record in order to make sure that the study is conducted correctly and the data are recorded correctly. All personal details will be treated as STRICTLY CONFIDENTIAL
- I will receive a copy of this subject information/informed consent form signed and dated to bring home.

**Subject:**

Signature:  
e:

I/C  
number:

Name:

Date:

V1.29.12.2023

**Investigator conducting informed consent:**

Signature:  
e:

I/C  
number:

Name:

Date:

**Impartial witness:**

Signature:  
e:

I/C  
number:

Name:

Date:

## APPENDIX E: QUESTIONNAIRE

\*Instruction: Please tick (✓) the boxes provided for the answer you feel is the correct response and write your answer in the space provided.

### Section A: Sociodemographic Information

1. Age: \_\_\_\_\_ years old
2. Gender:
  - a. Male
  - b. Female
3. Ethnicity:
  - a. Malay
  - b. Chinese
  - c. Indian
  - d. Iban
  - e. Others
4. Year of Study:
  - a. Year 2
  - b. Year 3
  - c. Year 4
5. Weeks of clinical experience (Please state below):

-----

**Section B: level of medication competency and the factors influencing it**

Please circle your answer in the provided boxes.

The following questions will be asked regarding nursing students' self-perceptions about factors influencing safe medication management.

Note: (0) never, (1) occasionally, (2) sometimes, (3) most of the time, to (4) always

| A) Individual factors                     |                                                                                                                                    |       |              |           |                  |        |
|-------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------|-------|--------------|-----------|------------------|--------|
| Safety in drug prescription               |                                                                                                                                    |       |              |           |                  |        |
|                                           |                                                                                                                                    | Never | Occasionally | Sometimes | Most of the time | Always |
| 1                                         | How often do you know the most common dose of the drugs you administer to patients?                                                | 0     | 1            | 2         | 3                | 4      |
| 2                                         | How often do you know the most common prescription of the drugs you administer to patients?                                        | 0     | 1            | 2         | 3                | 4      |
| 3                                         | How often do you know the most common route of the drugs you administer to patients?                                               | 0     | 1            | 2         | 3                | 4      |
| 4                                         | In general, do you feel confident about performing drug calculations?                                                              | 0     | 1            | 2         | 3                | 4      |
| Familiarity with pharmacological concepts |                                                                                                                                    |       |              |           |                  |        |
| 5                                         | To what extent are you familiar with the expected effects of the drugs that you administer to patients?                            | 0     | 1            | 2         | 3                | 4      |
| 6                                         | To what extent are you familiar with the specific care or monitoring that a patient requires according to the drug you administer? | 0     | 1            | 2         | 3                | 4      |
| 7                                         | To what extent are you familiar with the side effects of the drugs you administer to patients?                                     | 0     | 1            | 2         | 3                | 4      |
| 8                                         | To what extent are you familiar with the possible interactions that may exist between the drugs you administer to patients?        | 0     | 1            | 2         | 3                | 4      |
| Factors associated with risk of error     |                                                                                                                                    |       |              |           |                  |        |



|                                                      |                                                                                                                                                                   |   |   |   |   |   |
|------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|---|---|---|---|
| 9                                                    | Do you think that the way nurses organise their duties and manage medication has an influence on the likelihood of errors?                                        | 0 | 1 | 2 | 3 | 4 |
| 10                                                   | Do you think that workload can influence drug dose calculation and medication management?                                                                         | 0 | 1 | 2 | 3 | 4 |
| 11                                                   | Do you think that fatigue can influence drug dose calculation and medication management?                                                                          | 0 | 1 | 2 | 3 | 4 |
| <b>B) Attitudinal Factors</b>                        |                                                                                                                                                                   |   |   |   |   |   |
| Importance of administering medication as prescribed |                                                                                                                                                                   |   |   |   |   |   |
| 12                                                   | How important is it for you to administer the exact dose of the prescribed drug (without rounding off)?                                                           | 0 | 1 | 2 | 3 | 4 |
| 13                                                   | How important is it for you to check a patient's drug prescription?                                                                                               | 0 | 1 | 2 | 3 | 4 |
| 14                                                   | How important is it for you to know how to calculate the dose of a prescribed drug?                                                                               | 0 | 1 | 2 | 3 | 4 |
| 15                                                   | To what extent do you think it is important to adhere to the prescribed frequency of the drugs you administer to patients?                                        | 0 | 1 | 2 | 3 | 4 |
| Verifications prior to drug administration           |                                                                                                                                                                   |   |   |   |   |   |
| 16                                                   | Do you check the patient's identity before administering a drug?                                                                                                  | 0 | 1 | 2 | 3 | 4 |
| 17                                                   | Do you check the six rights during drug preparation?<br>Six rights: right individual, right medication, right dose, right time, right route, right documentation. | 0 | 1 | 2 | 3 | 4 |
| 18                                                   | How often do you check that the drug is in good condition (expiry date, stability, colour, appearance, etc.) before administering it?                             | 0 | 1 | 2 | 3 | 4 |
| Relevance for professional practice                  |                                                                                                                                                                   |   |   |   |   |   |
| 19                                                   | Rate the following statements according to the importance you believe they have for your professional practice:                                                   |   |   |   |   |   |
| 19.1                                                 | Knowledge about drug effects                                                                                                                                      | 0 | 1 | 2 | 3 | 4 |
| 19.2                                                 | Drug dose calculation                                                                                                                                             | 0 | 1 | 2 | 3 | 4 |
| 19.3                                                 | Management of drug administration                                                                                                                                 | 0 | 1 | 2 | 3 | 4 |
| 19.4                                                 | Drug interactions                                                                                                                                                 | 0 | 1 | 2 | 3 | 4 |
| 19.5                                                 | Required care of the patient during drug administration                                                                                                           | 0 | 1 | 2 | 3 | 4 |

| C) Educational/Practical Skills    |                                                                                                             |   |   |   |   |   |
|------------------------------------|-------------------------------------------------------------------------------------------------------------|---|---|---|---|---|
| Frequency of drug dose calculation |                                                                                                             |   |   |   |   |   |
| 20                                 | How often do you calculate the dose of an oral medication?                                                  | 0 | 1 | 2 | 3 | 4 |
| 21                                 | How often do you calculate the dose of a parenteral medication (IM, SC, IV)?                                | 0 | 1 | 2 | 3 | 4 |
| 22                                 | How often do you calculate the dose of IV infusions?                                                        | 0 | 1 | 2 | 3 | 4 |
| 23                                 | How often do you calculate the IV flow rate in ml/h?                                                        | 0 | 1 | 2 | 3 | 4 |
| 24                                 | How often do you calculate the IV flow rate in drops/min?                                                   | 0 | 1 | 2 | 3 | 4 |
| 25                                 | How often do you calculate the IV flow rate in microdrops/min?                                              | 0 | 1 | 2 | 3 | 4 |
| 26                                 | How often do you check drug calculations using a different mathematical method (reasoning, equation, etc.)? | 0 | 1 | 2 | 3 | 4 |
| 27                                 | I feel confident about the drug calculations that I perform                                                 | 0 | 1 | 2 | 3 | 4 |
| 28                                 | I ask someone else to check my drug calculations                                                            | 0 | 1 | 2 | 3 | 4 |
| 29                                 | My drug calculation skills are assessed while on clinical placement                                         | 0 | 1 | 2 | 3 | 4 |
| 30                                 | I only maintain my drug calculation skills while on clinical placement                                      | 0 | 1 | 2 | 3 | 4 |
| Learning drug dose calculation     |                                                                                                             |   |   |   |   |   |
| 31                                 | I maintain my drug dose calculation skills by doing practice exercises in my own time:                      |   |   |   |   |   |
| 31.1                               | I studied drug calculation during my bachelor studies                                                       | 0 | 1 | 2 | 3 | 4 |
| 31.2                               | By attending classes and clinical skills workshops                                                          | 0 | 1 | 2 | 3 | 4 |
| 31.3                               | Through self-study with books                                                                               | 0 | 1 | 2 | 3 | 4 |

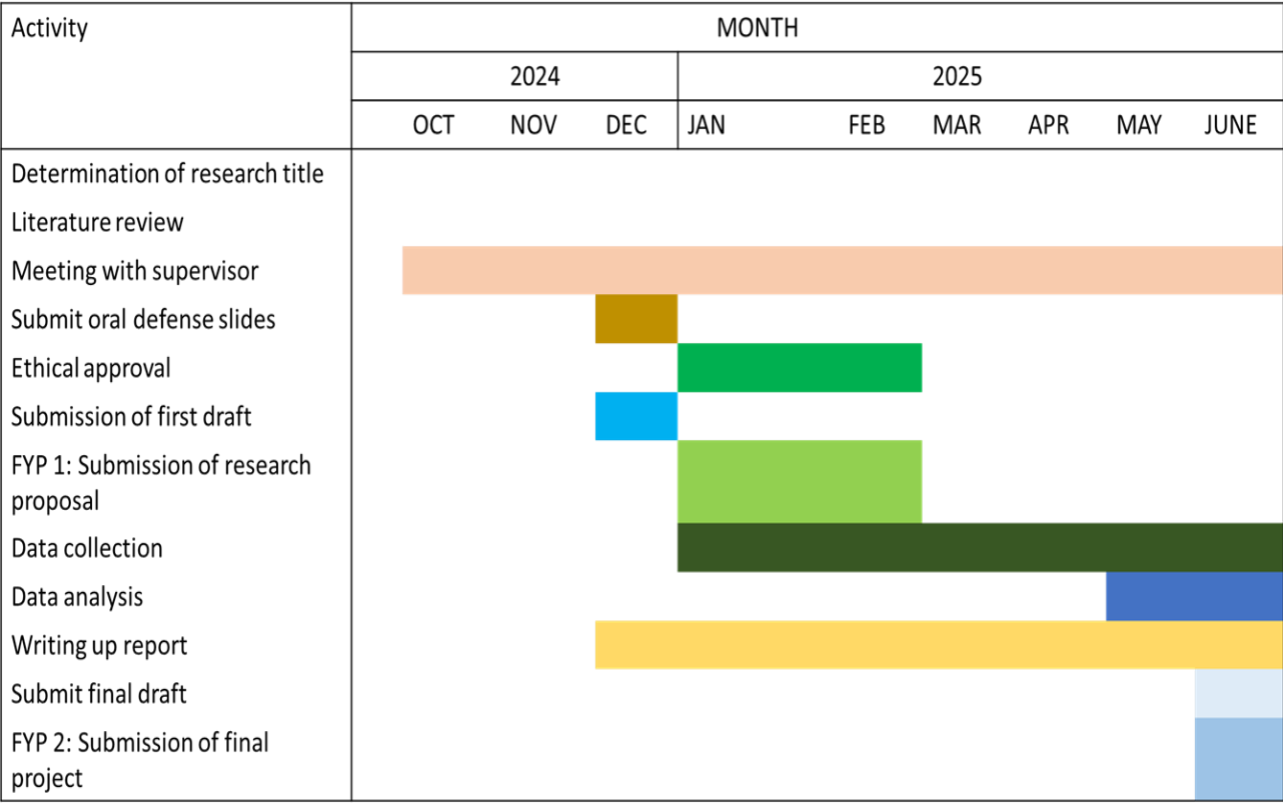
|                                                       |                                                                                                                                          |   |   |   |   |   |
|-------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------|---|---|---|---|---|
| 31.4                                                  | Through self-study with a computer                                                                                                       | 0 | 1 | 2 | 3 | 4 |
| 31.5                                                  | With another person                                                                                                                      | 0 | 1 | 2 | 3 | 4 |
| <b>D) Cognitive Factors</b>                           |                                                                                                                                          |   |   |   |   |   |
| Thinking process in relation to medication management |                                                                                                                                          |   |   |   |   |   |
| 32                                                    | Do you check for side effects related to the drugs you administer to patients?                                                           | 0 | 1 | 2 | 3 | 4 |
| 33                                                    | Do you check the expected effect of the drugs you administer to patients?                                                                | 0 | 1 | 2 | 3 | 4 |
| 34                                                    | Do you explain to the patient/family why a drug is being administered?                                                                   | 0 | 1 | 2 | 3 | 4 |
| 35                                                    | Do you explain to the patient/family the expected effects of the administered drug?                                                      | 0 | 1 | 2 | 3 | 4 |
| 36                                                    | When planning and administering medication, do you take into account the other interventions (such as tests) that the patient undergoes? | 0 | 1 | 2 | 3 | 4 |

## APPENDIX F: PERMISSION OBTAINED FROM ORIGINAL AUTHOR TO USE



## QUESTIONNAIRE

**APPENDIX G: GANTT CHART**



**APPENDIX H: BUDGET**

| <b>Items</b>                           | <b>Unit Prices (RM)</b> | <b>Quantity</b> | <b>Amount (RM)</b> |
|----------------------------------------|-------------------------|-----------------|--------------------|
| <b>Proposal defence<br/>hard copy</b>  | 0.20/Paper              | 13 papers       | 2.60               |
| <b>SPSS software</b>                   | 5                       | 1               | 5.00               |
| <b>Internet data plan</b>              | 40/Month                | 9 months        | 360.00             |
| <b>Hard copy<br/>questionnaire</b>     | 0.60/Set                | 139             | 83.40              |
| <b>Poster</b>                          | 78/Poster               | 1               | 78.00              |
| <b>Binding hardcopy<br/>FYP report</b> | 0.20/Paper              | 110             | 22.00              |
| <b>Total</b>                           |                         |                 | 551.00             |

## APPENDIX I: TURNITIN SIMILARITY INDEX REPORT

|                    |                                                                                                                                                                                                            |              |                |
|--------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|----------------|
| FYP                |                                                                                                                                                                                                            |              |                |
| ORIGINALITY REPORT |                                                                                                                                                                                                            |              |                |
| 11 %               | 9 %                                                                                                                                                                                                        | 4 %          | 4 %            |
| SIMILARITY INDEX   | INTERNET SOURCES                                                                                                                                                                                           | PUBLICATIONS | STUDENT PAPERS |
| PRIMARY SOURCES    |                                                                                                                                                                                                            |              |                |
| 1                  | ir.unimas.my<br>Internet Source                                                                                                                                                                            | 1 %          |                |
| 2                  | www.ncbi.nlm.nih.gov<br>Internet Source                                                                                                                                                                    | 1 %          |                |
| 3                  | Submitted to Universiti Malaysia Sarawak<br>Student Paper                                                                                                                                                  | 1 %          |                |
| 4                  | www.mdpi.com<br>Internet Source                                                                                                                                                                            | <1 %         |                |
| 5                  | www.researchgate.net<br>Internet Source                                                                                                                                                                    | <1 %         |                |
| 6                  | Submitted to Charles Sturt University<br>Student Paper                                                                                                                                                     | <1 %         |                |
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|    | journals.plos.org                                                                                                                                                         |      |

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