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among Universiti Malaysia Sarawak (UNIMAS)
Undergraduate Nursing Students: A Survey-Based
(Quantitative) Study**

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Knowledge and Self-Efficacy on Asthma Management among Universiti Malaysia
Sarawak (UNIMAS) Undergraduate Nursing Students: A Survey-Based (Quantitative)
Study

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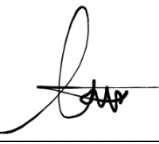
This project is submitted
In partial fulfilment of the requirements for the degree of
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DECLARATION

I hereby declare that this Final Year Project research entitled ‘Knowledge and self-efficacy on asthma management among Universiti Malaysia Sarawak (UNIMAS) undergraduate nursing students: a survey-based (Quantitative) study’ is an original work done by me and has been carried out in the Faculty of Medicine and Health Sciences (FMHS), Universiti Malaysia Sarawak (UNIMAS) under supervision during October 2024 until June 2025. I certify that all citations and references have been properly acknowledged in the text. I further declare that this research study has not been previously submitted to any other university or institution.



Signature

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ABSTRACT

Background: Asthma remains a prevalent chronic respiratory condition wide, posing significant challenges in management and patient education. Understanding and confidence in asthma care are critical for nursing students, who play a key role in promoting effective asthma control and patient self-management. **Objectives:** To assess the level of knowledge and self-efficacy on asthma management among UNIMAS undergraduate nursing students as well as to examine the relationship between the level of knowledge and self-efficacy on asthma management among UNIMAS undergraduate nursing students. **Methodology:** A cross-sectional study was conducted through a simple random sampling. The data were then collected from UNIMAS undergraduate nursing students ($n = 140$). The 17-item Asthma Knowledge and 16-item Asthma Self-Efficacy questionnaires were used to assess students' knowledge and self-efficacy on asthma management. **Results:** The mean score and standard deviation were 12.99 ± 2.22 , with a minimum-maximum score between 7 to 17. Most participants, 57.9% demonstrated moderate asthma knowledge. Then, for self-efficacy, the mean score and standard deviation were 46.89 ± 6.40 , with 26 as the minimum score and 63 as the maximum score. Most of the participants, 73.5%, exhibit a moderate level of self-efficacy. A weak positive relationship was found between the level of knowledge and self-efficacy on asthma management, [$r_s = 0.225$, $n = 140$, $p < 0.05$]. **Conclusion:** This study concluded that UNIMAS nursing students have moderate knowledge and self-efficacy. The study's findings need to emphasise more on targeted educational interventions, particularly in pharmaceutical knowledge and practice, focusing on medication administration that is correctly and safely administered.

Keywords: Asthma, knowledge, self-efficacy, nursing students, UNIMAS

ABSTRAK

Latar belakang: Asma kekal sebagai penyakit pernafasan kronik yang lazim di seluruh dunia dan menghadirkan cabaran besar dalam pengurusan serta pendidikan kesihatan pesakit. Kefahaman dan keyakinan dalam pengurusan asma amat penting bagi pelajar kejururawatan yang memainkan peranan utama dalam mempromosikan kawalan asma yang berkesan. **Objektif:** Kajian ini adalah untuk menilai tahap pengetahuan dan efikasi sendiri terhadap pengurusan asma dalam kalangan pelajar kejururawatan prasiswazah di UNIMAS serta mengkaji hubungan antara kedua-dua pemboleh ubah tersebut. **Metodologi:** Kajian keratan rentas ini dijalankan melalui persampelan rawak mudah dan data dikumpul daripada 140 orang pelajar kejururawatan prasiswazah UNIMAS. Dua instrumen digunakan iaitu soal selidik 17 item bagi menilai pengetahuan dan 16 item bagi menilai efikasi sendiri dalam pengurusan asma. **Hasil kajian:** Keputusan menunjukkan skor min dan sisihan piawai bagi pengetahuan ialah 12.99 ± 2.22 (skor minimum-maksimum: 7 hingga 17), di mana 57.9% responden menunjukkan tahap pengetahuan sederhana. Bagi efikasi sendiri, skor min dan sisihan piawai ialah 46.89 ± 6.40 (skor minimum-maksimum: 26 hingga 63), dengan 73.5% responden menunjukkan tahap efikasi sendiri yang sederhana. Terdapat hubungan positif yang lemah antara pengetahuan dan efikasi sendiri dalam pengurusan asma [$r_s = 0.225$, $n = 140$, $p < 0.05$]. **Kesimpulan:** Pelajar kejururawatan UNIMAS mempunyai tahap sederhana dalam kedua-dua aspek pengetahuan dan efikasi sendiri, dan hasil kajian ini menunjukkan keperluan untuk intervensi pendidikan yang lebih tertumpu, khususnya dalam aspek pengetahuan farmaseutikal dan amalan pemberian ubat yang betul serta selamat.

Kata kunci: Asma, pengetahuan, efikasi sendiri, pelajar kejururawatan, UNIMAS

TABLE OF CONTENTS

DECLARATION	i
ACKNOWLEDGEMENT	ii
ABSTRACT	iii
ABSTRAK.....	iv
TABLE OF CONTENTS	v
LIST OF TABLES	ix
LIST OF FIGURES	x
LIST OF ABBREVIATIONS.....	xi
CHAPTER 1.....	1
INTRODUCTION	1
1.0 Introduction	1
1.1 Background of Study	1
1.2 Problem Statement.....	3
1.3 Research Question:	6
1.4 Research Objectives:	6
1.5 Significance of Study	6
1.6 Definition of Terms:	8
1.6.1 Asthma.....	8
1.6.2 Knowledge of Asthma Management	8
1.6.3 Self-Efficacy of Asthma Management	9
1.6.4 UNIMAS Undergraduate Nursing Students.....	9
1.7 Summary.....	9
CHAPTER 2.....	10
LITERATURE REVIEW	10

2.0 Introduction	10
2.1 Knowledge of Asthma Management among Nursing Students.....	10
2.2 Self-Efficacy of Asthma Management among Nursing Students.....	16
2.3 Relationship between Asthma Management Knowledge and Self-Efficacy among Nursing Students	19
2.4 Conceptual Framework.....	22
2.5 Summary.....	23
CHAPTER 3.....	25
METHODOLOGY	25
3.0 Introduction	25
3.1 Research Design	25
3.2 Research Setting	26
3.3 Inclusion and Exclusion Criteria	26
3.3.1 Inclusion criteria:.....	26
3.3.2 Exclusion criteria:	27
3.4 Sampling Method and Sample Size.....	27
3.5 Study Instrument	29
3.6 Ethical Considerations.....	31
3.7 Data Collection Procedure.....	31
3.7.1 Pilot Study.....	31
3.7.2 Data Collection.....	34
3.8 Data Analysis.....	37
3.9 Summary.....	38
CHAPTER 4.....	39
RESULTS / FINDINGS.....	39
4.0 Introduction	39

4.1 Socio-demographic Characteristics of UNIMAS Undergraduate Nursing Students....	40
4.2 Knowledge on Asthma Management among UNIMAS Undergraduate Nursing Students... ..	43
4.3 Self-efficacy on Asthma Management among UNIMAS Undergraduate Nursing Students... ..	46
4.4 The Relationships between Knowledge and Self-efficacy on Asthma Management among the UNIMAS Undergraduate Nursing Students	49
4.5 Summary.....	50
CHAPTER 5.....	52
DISCUSSION AND CONCLUSION	52
5.0 Introduction	52
5.1 Knowledge on Asthma Management among UNIMAS Undergraduate Nursing Students.... ..	52
5.2 Self-Efficacy of Asthma Management among Nursing Students	63
5.3 Relationship between Asthma Management Knowledge and Self-Efficacy among Nursing Students	70
5.4 Summary of the Findings	75
5.5 Implications and Recommendations.....	76
5.5.1 Implications and Recommendations for Nursing Practice	76
5.5.2 Implications and Recommendations to Nursing Education	77
5.5.3 Implications and Recommendations for Future Research.....	79
5.6 Limitations of the Findings	80
5.7 Conclusions	81
REFERENCES	82
APPENDIX A: COVER LETTER FOR ETHICAL APPLICATION.....	100
APPENDIX B: RESEARCH APPROVAL LETTER.....	102
APPENDIX C: PARTICIPANTS INFORMATION SHEET	104

APPENDIX D: PARTICIPANT'S INFORMED CONSENT	107
APPENDIX E: DATA COLLECTION INSTRUMENTS	109
Section A: Sociodemographic Information	109
Section B: Asthma Knowledge Questionnaire	111
Section C: Asthma Self-Efficacy Questionnaire	113
APPENDIX F: PERMISSION TO USE TOOLS	116
Asthma Knowledge Questionnaire	116
Asthma Self-Efficacy Questionnaire	117
APPENDIX G: GANTT CHART.....	118
APPENDIX H: EXPENDITURE	120
APPENDIX I: TURNITIN SIMILARITY INDEX REPORT	121

LIST OF TABLES

Table 4.1 Socio-demographic characteristics of UNIMAS undergraduate nursing students	42
Table 4.2 Level of knowledge on asthma management among the UNIMAS undergraduate nursing students.....	43
Table 4.3 Level of self-efficacy on asthma management among the UNIMAS undergraduate nursing students	46
Table 4.4 The relationship between knowledge and self-efficacy on asthma management among UNIMAS undergraduate nursing students.....	50

LIST OF FIGURES

Figure 2.1 shows the conceptual framework	23
Figure 3.1 shows the data collection procedure from the pilot study to the actual study....	36
Figure 4.1 Frequency distribution of participants by gender and year of study	41
Figure 4.2 Percentage distribution of participants by race	41
Figure 4.3 Level of knowledge among UNIMAS undergraduate nursing students	45
Figure 4.4 Level of self-efficacy among UNIMAS undergraduate nursing students.....	48

LIST OF ABBREVIATIONS

AMBs	Asthma Management Behaviours
FMHS	Faculty of Medicine and Health Sciences
GINA	Global Initiative for Asthma
LPN	Licensed Practical Nurse
NCD	Noncommunicable Disease
OSCE	Objective Structured Clinical Examination
PBL	Problem-Based Learning
PEF	Peak Expiratory Flow
PMDI	Pressurised Metered-Dose Inhaler
RN	Registered Nurse
SE	Self-Efficacy
SLT	Social Learning Theory
SPSS	Statistical Package for the Social Sciences
UNIMAS	Universiti Malaysia Sarawak
WHO	World Health Organization

CHAPTER 1

INTRODUCTION

1.0 Introduction

This chapter will outline the study's background, problem statement, research question, objectives, and significance and conclude with the definition of terms.

1.1 Background of Study

Asthma is a prominent chronic respiratory condition impacting around 262.41 million individuals worldwide across various nations (Wang et al., 2023). The prevalence in Malaysia is predicted to be between 8.9% and 13.0% in children and 6.3% in adults (Hussein *et al.*, 2023). Asthma is often underdiagnosed and inadequately treated, especially in low- and middle-income nations (WHO, 2024). The global yearly mortality rate attributable to asthma ranges from 380,000 to 420,000 (James et al., 2018; Dahlén, 2019). The Global Initiative for Asthma (2023) estimated that asthma affects 1-18% of people worldwide. In 2019, 262 million individuals were diagnosed, leading to 455,000 fatalities (WHO, 2024).

Asthma can be defined as a prevalent, persistent condition in children and is classified as a noncommunicable disease (NCD) impacting both children and adults (WHO, 2023). It is a persistent airway inflammation with previous episodes of respiratory manifestations that fluctuate in duration and intensity, such as wheezing, dyspnoea, chest tightness, and cough. Asthma episodes likely happen when a trigger activates the immunological system. The precise aetiology of asthma remains unclear. Genetic factors and environmental influences contribute to the development of asthma (Sinyor & Perez, 2023).

An asthma attack may occur upon exposure to an asthma trigger, which may initiate or exacerbate asthma symptoms (Chau-Etchepare et al., 2019). Allergen-induced asthma is the predominant kind, impacting around 80% of children and 40–50% of adults with asthma in the United States (Lewsley, 2020). Allergens induce allergic responses, such as dust mites, pet dander, pollen from grasses, trees, and plants, and excrement from pests like cockroaches and mice. Non-allergenic stimuli, including inhalation of cold air, certain medications, home pollutants, illnesses including colds and influenza, outdoor air pollution, and tobacco smoking, induce nonallergic asthma. Occupational asthma is induced by inhaling chemicals or industrial particulates in the workplace, while exercise-induced asthma manifests during physical exertion, particularly in dry-air environments. Asthma triggers might vary across individuals and may evolve (Lux et al., 2020).

Risk factors include inadequately managed allergies, environmental trigger exposure, non-adherence to daily asthma medications, improper inhaler use, persistent depression or anxiety, and other chronic conditions such as cardiovascular disease or diabetes (DerSarkissian, 2022). Despite this, individuals with asthma can lead active, fulfilling lives with proper risk factor management (The National Asthma Council Australia, 2017).

Therefore, according to Alexandre-Sousa et al. (2024), nurses and nursing students who play essential roles in caring for patients with asthma must have in-depth knowledge of the specific requirements of asthma management to deliver effective and comprehensive nursing care. This encompasses the recognition of symptoms, identification of triggers, and proficiency in the administration of medications, including inhalers, to prevent exacerbations. Nursing students must possess high knowledge and self-efficacy (SE) in asthma management, as this significantly enhances their ability to make informed clinical

decisions, provide adequate patient education, and execute suitable interventions. Nurses and nursing students with strong knowledge of asthma management and SE can assist patients in controlling their asthma, preventing complications, and enhancing their entire quality of life.

In contrast, poor knowledge and low SE in asthma management among nursing students can adversely impact their capacity to deliver effective care. Challenges in recognising symptoms, administering medications accurately, or educating patients may result in suboptimal patient outcomes. Low SE causes poor confidence in critical decision-making and emergency responses, harming patient safety. However, a gap exists in understanding how these factors affect nursing students' readiness to adequately care for asthma patients (Karle et al., 2020).

1.2 Problem Statement

Asthma is an increasingly prevalent condition that substantially impacts the global population, with an increasing trend due to urbanisation. Effective asthma management involving pharmacological and non-pharmacological strategies requires healthcare providers to possess adequate knowledge and self-efficacy to ensure optimal patient care (Pinnock, 2015). However, studies indicated that nursing students lack an understanding of asthma management, which can lead to suboptimal care and poor patient outcomes (Norman & Griffiths, 2018). Research showed that many nursing students struggle with key aspects of asthma care, such as inhaler technique and symptom management, which lead to insufficient and improper asthma management, resulting in several adverse outcomes,

including worsening asthma, increased hospitalization, and adversely affected patient quality of life and overall function (Menziess-Gow et al., 2018).

This is associated with knowledge gaps in asthma management. Lack of knowledge may lead to errors in medication administration, failure to recognise exacerbations, and inadequate patient education. According to Pappalardo et al. (2019), an insufficient understanding of asthma may result in poor care methods. Another study by Halemaneyavaradanagowda and Gowda (2024) found that 55.0% of nursing students exhibited moderate knowledge, while 45.0% showed inadequate knowledge regarding pulmonary function tests (PFTs). Pulmonary function assessments allow healthcare workers to evaluate respiratory function in diverse clinical settings, such as asthma cases, particularly in the context of elevated risk factors for respiratory disorders, workplace exposure and pulmonary toxicity. This lack of knowledge may also impede effective communication and education for patients with asthma. A local study revealed that only 37% of participants had well-managed asthma, highlighting the need for improved education in asthma care (Hussein *et al.*, 2021). Hence, this struggle hinders nursing students' ability to provide effective treatment (Kimmel, 2022; Zrnić et al., 2023)

Similarly, low SE in asthma management, which is the belief in one's capability to execute tasks, can affect one's confidence in making clinical decisions and handling emergencies, further contributing to poor asthma management (Farley, 2019; Rafiei et al., 2024). For instance, the pretest indicated that 98% of 100 nursing students exhibited mild self-efficacy, while 2% demonstrated moderate SE. Post-test results indicated that 79.0% of students exhibited high SE in managing acute bronchial asthma, whereas 21.0% demonstrated moderate self-efficacy (Muhammad et al., 2023). Respiratory therapy students exhibited higher confidence levels than nursing students, with a mean difference of $0.742 \pm$

0.166 (Felemban, 2024). Thus, the belief in one's ability to manage asthma, known as self-efficacy, is essential for nursing students to foster comprehensive care. Increased SE is associated with enhanced patient education and asthma management competencies.

High SE is correlated with enhanced patient outcomes, including fewer exacerbations and hospitalisations, while fostering better work performance among healthcare professionals (McCabe et al., 2021; Montalbano et al., 2022). Self-efficacy is integral to the iterative process of asthma management, whereby healthcare professionals examine, implement, and evaluate treatment strategies efficiently (Montalbano et al., 2022). Thus, nursing students must have strong knowledge and SE in asthma management, mainly for accurate care, educating patients, managing emergencies, and enhancing patient outcomes, thereby facilitating improved asthma control and well-being.

Despite the importance of asthma knowledge and self-efficacy, limited research exists on these factors among nursing students in Malaysia, particularly in Sarawak. This deficiency shows a gap in understanding how well nursing students are prepared to manage asthma and deliver proper care. Thus, more focused research is required.

To address these issues, it is essential to explore the level of knowledge and self-efficacy of undergraduate nursing students about asthma management. The purpose of this study is to examine the knowledge and self-efficacy as well as understand how they influence the nursing students' capability at UNIMAS to manage asthma effectively. By improving asthma education, nursing students can enhance their skills and confidence, leading to better patient outcomes and more effective asthma management in clinical settings.

1.3 Research Question:

1. What is the knowledge level of asthma management among UNIMAS undergraduate nursing students?
2. What is the level of self-efficacy toward asthma management among UNIMAS undergraduate nursing students?
3. What is the relationship between the knowledge and self-efficacy toward asthma management among UNIMAS undergraduate nursing students?

1.4 Research Objectives:

1. To assess the level of knowledge of asthma management among UNIMAS undergraduate nursing students.
2. To evaluate the level of self-efficacy toward asthma management among UNIMAS undergraduate nursing students.
3. To examine the relationship between the knowledge and self-efficacy toward asthma management among UNIMAS undergraduate nursing students.

1.5 Significance of Study

The prevalence of people with asthma globally, including in Malaysia, is on the rise, resulting in a global issue. Nursing students represent the future of healthcare professionals, preparing to serve communities in diverse settings, such as hospitals, clinics, and residential care facilities. Nurses and nursing students should advance their understanding and confidence concerning asthma to promote better health outcomes and vitality in asthma patients.

This study is important in evaluating the knowledge and SE of asthma management among UNIMAS undergraduate nursing students, identifying gaps in those variables, and ensuring preparedness for future practice. Assessing knowledge and SE is vital to measuring nursing students' understanding and confidence in effectively applying asthma care knowledge in clinical settings.

Therefore, the findings may inform guidelines to encourage nursing students to have higher knowledge and SE skills to promote asthma management efficiency. Additionally, continuous improvement should also be advocated to reduce or minimise knowledge and SE gaps by encouraging a culture of regular assessment and feedback in the nursing curriculum to ensure ongoing enhancement of asthma competencies.

Furthermore, by conducting this research, the institution may introduce better interventions to enhance the knowledge and SE of UNIMAS nursing students in managing asthma. For instance, high-fidelity asthma simulation-based training and video-assisted case study, such as problem-based learning (PBL). In addition, Additionally, 40% of Medical-Surgical nursing curricula must emphasise respiratory care, especially the most common case, asthma; therefore, increasing the practicum course credit hours would be a beneficial initiative to address this issue, so an increase in the practicum course credit hours will be a good initiative for this issue. Therefore, these will promote awareness, knowledge, and confidence instilled in nursing students and help them improve their skills and critical thinking.

Relevant specific nursing students' skills and knowledge assessment for asthma during practicum to raise awareness and clinical reasoning in asthma management for patients. Essential areas of focus encompass comprehending the aetiology and

manifestations of asthma, identifying triggers, and performing comprehensive patient evaluations. Lastly, many studies have been undertaken worldwide on the management of asthma. Nevertheless, the literature review still lacks publications about asthma management among nursing students. As a result, the study's results will be added to the statistical evidence.

1.6 Definition of Terms:

1.6.1 Asthma

Asthma is a long-term respiratory disorder that affects people across various age ranges. Inflammation and muscle constriction around the airways increase breathing difficulty (WHO, 2024).

1.6.2 Knowledge of Asthma Management

Knowledge can be defined as proficiency in comprehending information on a subject acquired via experience or academic study (Cambridge Dictionary, 2019). In this study, knowledge of asthma management among nursing students refers to their understanding of asthma and its management. Thus, knowledge among nursing students will be assessed using the 24-item questionnaire adapted from Demilaray (2004). It includes asthma definition, pathophysiology, aetiology, precipitating factors, symptoms, prognosis, pharmacotherapy, and adverse effects of inhaled drugs. Mean scores in asthma knowledge will be calculated. Thus, a higher score will indicate a higher knowledge of asthma.

1.6.3 Self-Efficacy of Asthma Management

Self-efficacy (SE) refers to an individual's confidence in their ability to perform a task or achieve a goal (Cherry, 2024). In this research study, the self-efficacy of asthma management is related to their confidence in implementing their knowledge and skills to manage asthma, including patient education, trigger identification, treatment administration, and emergency response in clinical settings. Self-efficacy in asthma management among nursing students will be assessed using the Asthma Self-Efficacy Questionnaire, a 16-item adaptation from Quaranta (2013). A greater score indicates greater self-efficacy.

1.6.4 UNIMAS Undergraduate Nursing Students

A nursing student is an undergraduate who is actively enrolled in a bachelor's degree program in nursing at UNIMAS, currently doing practical training or attachment at a hospital or clinic.

1.7 Summary

This chapter examined the study's background and problem statement and emphasized the importance of the research in understanding its relevance to undergraduate nursing students in Malaysia. The study aims to investigate the knowledge and SE related to asthma management in undergraduate nursing students at UNIMAS. Chapter two includes a literature review on asthma management knowledge, SE related to asthma, and the relationships between knowledge and SE on asthma management among undergraduate nursing students at UNIMAS.

CHAPTER 2

LITERATURE REVIEW

2.0 Introduction

This chapter provides a literature review which provides an overview of the knowledge and SE related to asthma management among undergraduate nursing students at UNIMAS. This study examines the relationship between knowledge and SE in students. Various internet databases were used as sources, including SciSpace, ResearchGate, Google Scholar, and PubMed. The literature encompasses the period from 2015 to 2025 to ensure relevance. To provide comprehensive research, it is essential to evaluate the quality of studies by assessing their methodology, sample size, reliability, and validity while prioritising those with rigorous procedures and significant findings. The keywords used were “knowledge”, “self-efficacy”, “asthma management”, and “nursing students”.

2.1 Knowledge of Asthma Management among Nursing Students

Some research has been conducted to explore the baseline knowledge of nursing students regarding asthma management. Nursing students enrolled in professional training programs must comprehensively understand asthma management to effectively and safely provide holistic care to patients as future healthcare professionals. Individuals with poorly managed asthma could have sleep disturbances, daytime exhaustion, diminished focus, and severe symptoms that need emergency medical care. Doctors may also admit these patients to the hospital for treatment and monitoring. In extreme instances, asthma may result in mortality (WHO, 2024).

A descriptive cross-sectional research study was conducted by Roopavathy et al. (2016) involving 45 second-year nursing students of the Bachelor of Science in Nursing at the Government College of Nursing, Bengaluru, which showed that the knowledge of asthma was 63% before the test, which increased to 85.5% after the educational intervention. The questionnaire had 24 inquiries on the diagnosis, pathophysiology, aetiology, precipitating factors, symptoms, prognosis, pharmacotherapy, adverse effects of inhaled drugs, and inquiries concerning pMDI. Before the educational intervention, 100% of students were aware of asthma symptoms, 70% understood the prognosis, and 63% understood asthma therapy. These improved to 100%, 85%, and 75% after the instructional intervention. Before the educational intervention, 52% of students were knowledgeable of the adverse effects of inhaled drugs, such as sore throat, hoarseness, and oral thrush; this awareness increased to 82% after the session. Thus, the educational intervention was effective, resulting in a statistically % improvement in asthma knowledge by 22.5%.

The knowledge of asthma management among nursing students may be affected by the educational approach they received. Approaches integrating theoretical education with hands-on training, including simulations and clinical practice, are more effective in preparing students with the requisite knowledge and skills for optimal asthma care. Despite doctors and nurses, nursing students play a vital role in empowering their competency for the future during clinical attachment, such as managing patients with asthma through intervention implementation and, for example, assessing vital signs, signs and symptoms, peak expiratory flow (PEF), and intervening doctor orders through the administration of oxygen and medication prescribed under clinical instructor supervision. Also, involvement in health education to manage crises and avoid relapse (Alexandre-Sousa et al., 2024).

In 2018, Urrutia-Pereira *et al.* conducted research in Brazil to evaluate the comprehension of conditions such as asthma, an allergic reaction, and dietary allergies between educators, carers, and university students. The research includes 577 randomly enrolled individuals, involving 299 students in higher education with an average age of 30 years, categorized into two groups: Group 1, with 181 students from medical, nursing, and physiotherapy, and Group 2, with 118 students from the pharmacy and physical education. The research revealed that while most college students could recognize asthma symptoms and triggers, pharmacy and physical education students had a statistically superior understanding of asthma triggers compared to the first group. Thus, this showed that nursing students have moderate knowledge of asthma management compared to students enrolled in pharmacy and physical education courses.

On the contrary, Alobaidi (2021) conducted research that found that respiratory therapy students did not show a greater level of asthma knowledge recommendations compared to other healthcare students. Minor differences in awareness of asthma guidelines among respiratory therapy and other healthcare majors can be linked to the limited sample size of respiratory therapy students in Alobaidi's study. In contrast, the present study encompassed 91 respiratory therapy students who took part in the research. The findings highlighted the importance of changing educational interventions across various disciplines to ensure that all healthcare students, including nursing students, reach an elevated level of competency in asthma management.

A research study by Ünal (2023) conducted a randomized controlled trial involving fourth-year nursing students who had not attended educational simulation classes. This research implemented a simple random sampling technique, leading to a simulation group that consists of 53 participants and a control group that consists of 62 participants. A

knowledge questionnaire assessed nursing students' intellectual development regarding asthma episodes immediately following theoretical classes and again three months later. The simulation group demonstrated pretest knowledge scores of 7.24 ± 2.15 and post-test knowledge results of 14.27 ± 2.91 , highlighting a statistically significant gap compared to the control group ($p < 0.05$). The final post-test knowledge results of students in the simulation group were 6.95 ± 2.08 higher than the pretest knowledge scores of 12.52 ± 3.06 . A statistically significant difference was found between both groups during the pretest and post-test knowledge assessment ($p < 0.05$).

Similarly, Grissa et al. (2023) compared simulation-based training with video-based training for managing acute asthma. The findings showed that high-fidelity simulation-based training resulted in superior long-term knowledge retention and increased student satisfaction when contrasted with interactive video case teaching. The studies collectively emphasize that simulation-based training effectively enhances nursing students' knowledge and skills in asthma management.

In contrast to those assigned as a control group, participants in the simulation group had a superior degree of knowledge, as assessed to evaluate intellectual competency in managing asthma attacks (Ünal, 2023). Previous research has shown that simulation is beneficial in instructing the treatment of asthma exacerbations (Drummond et al., 2017). Simulation training eases the integration of diverse facts across cognitive or intellectual, psychomotor skills, and sensorial domains, so getting essential abilities (Bortolato-Major et al., 2019). Consequently, achieving and sustaining reasonable control of asthma is essential in nursing care; thus, nursing students must possess the knowledge and practical capabilities to deliver care to asthma patients during emergency scenarios. Knowledge and skills may be cultivated via high-fidelity simulation experiences (Lee et al., 2015).

Felemban (2024) conducted a descriptive cross-sectional study among 145 nursing students at Byrdine F. Lewis College of Nursing and Health Professions, Georgia State University. The target demographic consists of students pursuing entry-level master's and bachelor's degrees in respiratory therapy, as well as graduate programs in physical therapy and occupational therapy and undergraduate nursing programs at both institutions. Convenience sampling was employed in the study to recruit participants. The findings indicated that students enrolled in nursing with asthma diagnoses demonstrated a greater understanding of the condition's causes, signs, and symptoms, as well as a more thorough awareness of asthma treatments, compared to their non-asthmatic peers. However, Felemban (2024) mentioned that nurses and healthcare students have an insufficient understanding of asthma's origins, symptoms, and treatment.

This may be linked to personal experience with asthma, as those who have lived with the condition are likely to be more aware of its management and therapeutic approaches. Their direct experience with asthma triggers, medications, and treatment regimens enhances their understanding and confidence in managing the condition. Proper inhaler use is essential; nevertheless, many students struggle with the best approaches. Evaluations found prevalent mistakes, highlighting the need for specialized training (Kimel, 2022). Therefore, this highlights the insufficient knowledge of nursing students in implementing nursing care for inhaler use. Nursing students often demonstrate an adequate understanding of asthma; nonetheless, a significant deficiency in inhaler technique competency persists. Ongoing educational initiatives are crucial to close this gap and improve asthma management competencies among prospective healthcare practitioners.

In the same study by Felemban (2024), results indicated that nursing students possess favourable opinions about asthma treatment, with the most significant consensus on the

statement, "I need to recognize common signs and symptoms of asthma as a healthcare student", with a mean score of 6.76 ($SD \pm .852$). This is linked to research highlighting the importance of early detection in reducing asthma exacerbations (Hoch & Liu, 2018). The study found the weakest consensus regarding the statement "I utilize the Global Initiative for Asthma (GINA) guidelines as a student in medical line", which had a mean result of 4.04 ($SD \pm 2.181$), indicating a significant gap in the application of evidence-based guidelines by nursing students.

This gap suggests a lack of familiarity or insufficient emphasis on integrating Global Initiative for Asthma (GINA) guidelines into their education, which could hinder nursing students' ability to provide standardised and optimal care (Cho & Hwang, 2020). Research indicated that exposure to evidence-based practices markedly enhances nursing students' knowledge and confidence in asthma management (Critchlow & Heather, 2018). Addressing these disparities will equip nursing students with the essential knowledge and advanced tools for effective asthma care.

Research showed that nursing and other healthcare students have good perspectives on asthma treatment recommendations. However, there is a demand for further education, training, and evaluation to guarantee that nursing students sustain and enhance their asthma treatment, undeniably competencies, especially as guidelines change (Felemban, 2024). Thus, education enhances comprehension of asthma and its treatment.

A survey has shown that just 36.5% of nurses showed proficient asthma treatment practices before educational interventions, which rose to 80.8% after training by GINA recommendations (Chichi & Foluso, 2023). This shows a substantial deficiency in understanding contemporary asthma care regimens among nursing students. Updated

training on asthma treatment strategies is essential for nursing students because of the rising incidence of asthma and the critical role nurses fulfil in patient education and care. Proficient asthma care requires nurses to be knowledgeable about contemporary recommendations and practices, empowering patients and enhancing health outcomes.

Nurses must use evidence-based strategies for asthma care, as research showed substantial enhancements in patient knowledge and self-management abilities after nurse-led interventions (Chichi & Foluso, 2023; Kalam et al., 2024). Training familiarises nurses with the newest GINA standards, improving their treatment practices from 36.5% to 80.8% after instruction (Chichi & Foluso, 2023).

2.2 Self-Efficacy of Asthma Management among Nursing Students

Self-efficacy is individuals' confidence in their ability to manage risks and surmount substantial challenges (Zulkarnain et al., 2023). Nursing students must cultivate strong SE in asthma management because it not only improves their capacity to provide treatment for patients who have been diagnosed with asthma but also directly influences their future practice and patient outcomes, with higher SE leading to more efficient asthma care. Self-efficacy influences nursing students' confidence in managing asthma-related scenarios, enabling them to effectively address patient needs, including medication administration and education on their disease (McCabe et al., 2019).

Bandura's social learning theory (SLT) (1977), later renamed social cognitive theory in 1986, introduced self-efficacy as a key component (Bandura, 1986). SE refers to "belief in one's ability to plan and carry out the courses of action needed to produce given achievements" (Bandura, 1997). Self-efficacy generates variability in individuals' cognition,

emotions, and self-motivation. Nursing students exhibiting poor SE may have difficulty delivering appropriate asthma treatment, resulting in insufficient patient evaluations and interventions. Lack of SE leads to inadequate treatment of asthma symptoms, heightened risk of exacerbations, and possibly elevated rates of emergency department visits or hospitalizations for patients (McCabe et al., 2019).

Cicutto et al. (2016) conducted a mixed-methods research study in Colorado, the United States of America, which revealed that SE scores among healthcare professionals have increased from 2.4 to 3.3 between pre- and post-assessments. Thirty-one participants included nurse practitioners, chronic disease school nurse specialists, and school nurses. Purposive sampling participants from smaller and rural school districts, ensuring geographic variety throughout the state. At the preliminary stage, there was limited self-confidence in identifying children with asthma at risk and in providing treatment and guidance to support the implementation of the Colorado School Asthma Treatment Plan. Post-workshop participation, statistically significant advancements were seen in the knowledge and confidence of the participants, as well as inhaler technique proficiency. Limited workshops or training in asthma management among nurses may result in a lack of SE. Hence, nurses who lack asthma education and training are unable to recognize asthma signs, symptoms, and patient needs.

Recent research has highlighted the importance of focused educational interventions in strengthening nurses' SE regarding asthma care management. According to Salahi et al. (2019), in the quasi-experimental study, the effect of an educational workshop or training on the SE of emergency department nurses in inpatient training was evaluated. The results indicated a notable enhancement in SE scores following the workshop, implying that educational programs can improve nurses' confidence in patient education and care.

McCabe et al. (2019) conducted a descriptive cross-sectional study among 231 registered school nurses in Pennsylvania. The mean self-efficacy score for asthma treatment in this research was 66.61, which indicates that the school nurses demonstrated good SE. Multiple regression analysis revealed that school nurses operating under more favourable environmental conditions, such as reduced student-nurse ratio and availability of support personnel, did not show a statistically significant improvement in confidence in providing care to asthma patients. Even with improved working conditions for school nurses, including a reduced student-to-nurse ratio and increased staff support, these conditions did not significantly improve their confidence in managing asthma care. Thus, improved environmental conditions alone may not affect their confidence in delivering asthma care.

Another study by McCabe et al. (2021) examined the variables or factors affecting school nurses' SE in treating asthma and implementing asthma management behaviours (AMBs). The research showed a significant relationship between elevated confidence in asthma treatment and enhanced implementation of asthma management behaviours. Environmental factors, such as the student-nurse ratio, did not demonstrate a significant correlation with SE, which was aligned with the findings of McCabe et al. (2019).

Moreover, Choi (2020) conducted a quasi-experimental study at the Department of Nursing Science, Andong National University, Republic of Korea. The sample consisted of 46 nursing students, divided into two groups: 23 were assigned to the control group and 23 to the experimental group in the study. Thus, 46 nursing students were randomly selected into two groups. Participants in the control group exhibited an average SE score of 71.26 before the video education program and an average score of 74.09 after an increase of 2.83. The experimental group showed an average self-efficacy score of 72.18 before the simulation-based training, which increased to an average score of 78.59, reflecting a rise of

6.41. A statistically significant difference in SE ratings was noticed between the two different groups ($t = 3.08, p < .004$), supporting the study's hypothesis. This study's results suggested that nurse simulation education enhances nursing students' SE in managing asthma episodes in children.

Similarly, Muhammad et al. (2023) conducted a quasi-experimental study at Yenepoya Nursing College, Mangaluru, Karnataka, India. The study was about SE and learner satisfaction in managing respiratory emergencies, including asthma, among 100 undergraduate nursing students. The pretest findings found that most students (98.0%) exhibited mild confidence, while only 2% showed moderate confidence. Conversely, post-test data found that most students (79.0%) displayed high confidence, with a minority (21.0%) showing moderate confidence in managing acute bronchial asthma. The results indicated that the simulation is a practical educational approach and enhances confidence. The high-fidelity simulation significantly enhanced self-efficacy and satisfaction.

Hence, both studies by Choi (2020) and Muhammad et al. (2023) highlighted the importance of simulation-based education in nursing programs, as it effectively improves self-efficacy and confidence in managing asthma and respiratory emergencies, suggesting that simulation should be implemented in nursing curricula to enhance nursing students' clinical skills and preparedness for real-world situations.

2.3 Relationship between Asthma Management Knowledge and Self-Efficacy among Nursing Students

Research on the relationship between asthma management knowledge and SE in nursing students is insufficient. Seger (2018) indicated that research examining the

relationship between knowledge and SE of asthma among healthcare providers or nursing students is perhaps limited.

The study conducted by Seger (2018) examined the correlation between asthma knowledge, SE, and demographic characteristics among school nurses. A descriptive, quantitative, and correlational study design has been used to gather information. Nurses were selected through a method of purposive sampling from a single state organization representing professional school nurses in the United States of America. The associations between the SE and asthma knowledge of 121 school nurses, the demographic characteristics of educational attainment, years of experience, school type, and geographic location were investigated.

The relationship between knowledge and SE was positive, moderate, and statistically significant [$r(121) = .45, p < .01$]. The variables included the type of school, location of the school, years of service, and type of degree. Significant differences were not seen in the perception of self-efficacy between private and public-school nurses [$p = 0.14, p > 0.05$]. Nonetheless, private school nurses exhibited significantly lower knowledge levels than their public counterparts. Results in knowledge and SE were comparable among the three groups of nurses from rural, suburban, and urban school locations. Significant differences were not observed in knowledge ($p = .22$) and SE ($p = .49$) based on the location of the school ($p > .05$). Results in both knowledge and SE were comparable among the three groups of nurses categorized by experience (1-5 years, 6-10 years, and over 10 years). No significant differences were observed in knowledge ($p = .29$) and SE ($p = .10$) concerning the independent variable ($p > .05$). However, significant differences in knowledge of asthma and SE were obtained [$p < .01$] across the various degrees held by school nurses (LPN licensed practical nurse, RN/associate degree, RN/BSN degree, RN/MSN degree). The

enhancement of school nurses' education correlated with a notable increase in knowledge scores and improved views of SE.

Significant predictors of knowledge were degree type and geographic region (rural). The type of degree (LPN and RN) was a significant predictor of SE. Despite identifying important variables and creating significant regression equations, the variation seen in knowledge and SE was minimal (below 30%). This indicated that the need for enhanced knowledge and education in school nursing is a legitimate problem. Therefore, Seger's (2018) study indicated that school nurses' asthma knowledge and SE were not significantly impacted by the school's location, years of experience, or type of school, but that both were greatly enhanced by higher educational attainment. This research emphasised the importance of ongoing education in enhancing the SE of school nurses in providing asthma treatment. Nursing schools must include asthma management training in the curriculum, and ongoing education is vital for enhancing existing understanding and reinforcing healthy practices (McCabe et al., 2021).

Furthermore, Quaranta and Spencer (2015) conducted a descriptive-correlational study at Binghamton University in the United States. Five hundred thirty-one school nurses were recruited to participate in the study via e-mail in the research study. Higher scores on the knowledge and SE questionnaire indicated a higher knowledge level of asthma and SE. A weak positive association was identified between asthma knowledge and SE with correlation coefficients of $r_s = .157$ and $r_s = .178$, respectively, and p -values less than 0.01.

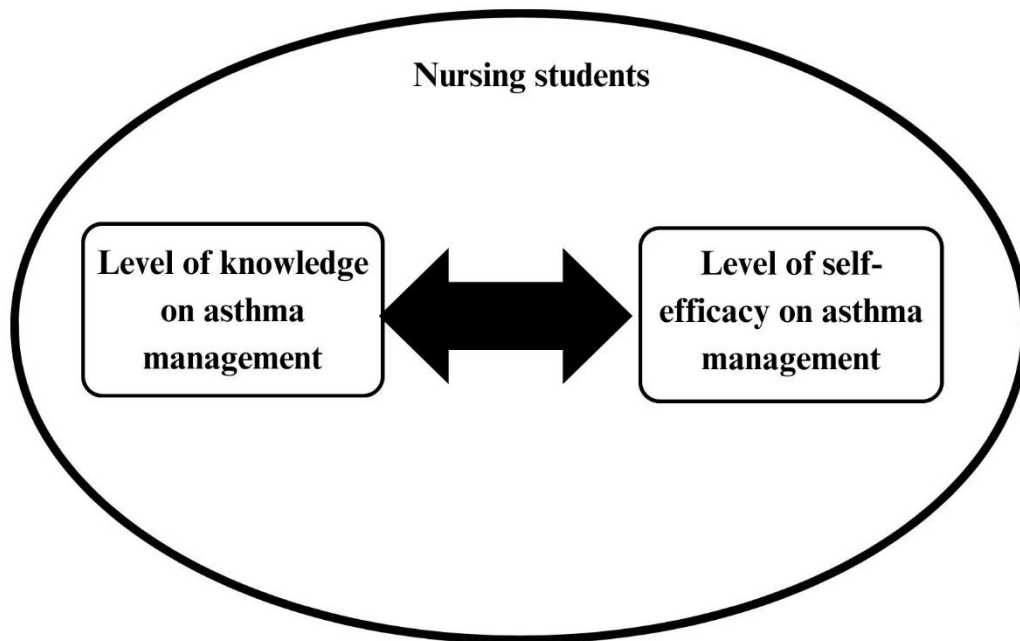
In contrast, a study by Al Kindi (2023) showed a strong positive association between school nurses' asthma knowledge and their degrees of SE. Moreover, school nurses with enhanced knowledge exhibited an elevated degree of SE. This outcome aligns with other

research, showing a moderate positive association between asthma knowledge and SE in school nurses (Quaranta & Spencer, 2015; Seger, 2018).

2.4 Conceptual Framework

Nursing students are crucial in managing asthma, a chronic condition requiring sufficient knowledge and confidence for adequate care provision (Rawas & Yasmeen, 2019). The framework illustrates a reciprocal relationship, suggesting that nursing students' level of knowledge about asthma management influences their SE in managing asthma and vice versa. Proactive involvement in managing asthma patients enhances understanding of triggers, treatment protocols, and patient education, thereby linking theoretical knowledge with practical application (Global Initiative for Asthma, 2023). Knowledge directly impacts self-efficacy, particularly regarding students' confidence in effectively managing asthma. This relationship is substantiated by Bandura's SE theory, which asserts that knowledge acquisition forms a foundation for confidence in task performance (Bandura, 1977). Students with elevated SE tend to apply evidence-based practices, handle emergencies, and provide adequate patient education. Conversely, those with lower self-efficacy may experience hesitation and deliver suboptimal care (Hayat et al., 2020). Nursing programs must integrate asthma education with clinical training, mentorship, and simulation-based learning to enhance knowledge and confidence. These interventions equip nursing students to deliver high-quality care, alleviate the burden of asthma, and enhance patient outcomes (Foronda et al., 2021).

Figure 2.1 shows the conceptual framework



2.5 Summary

The third chapter emphasizes an overview of the literature on knowledge, SE, and the relationship between knowledge and SE in asthma management among nursing students. However, limited studies focus on SE and the relationship among nursing students in Malaysia, specifically in Sarawak. There is a minimal understanding of the study of SE, and no study has been found on the relationship between knowledge and SE in asthma management among nursing students. Quantitative and quasi-experimental research is the most widely used literature review in this literature. Nursing students' knowledge and SE in managing asthma are essential to ensure their strong intellectual ability to provide holistic asthma care, prevent risk factors and complications, and improve patient outcomes. Thus, asthma knowledge equips students with essential skills to recognize symptoms, manage

triggers, and educate patients on proper medication usage. Self-efficacy boosts the confidence level of nursing students to use the information, manage crises, and communicate effectively with patients and healthcare staff. These competencies allow nursing students to treat asthma professionally, increase patient safety, and contribute to better health outcomes. Thus, this limitation suggests that further research should be carried out to determine knowledge and SE on asthma management among undergraduate nursing students in UNIMAS. The subsequent chapter will overview the methodologies and how to conduct this research.

CHAPTER 3

METHODOLOGY

3.0 Introduction

The third chapter explains the overall methodology for the research, divided into several sections; the research design, which is to be implemented, the research setting where the research will be conducted, the inclusion and exclusion criteria for choosing the participants, the sampling method and sample size of the research, the study instrument, ethical considerations for conducting research, the data collection procedure, the data analysis method, limitations, and a summary.

3.1 Research Design

The research utilised the quantitative technique, a descriptive cross-sectional study, to assess knowledge, SE, and the relationships between knowledge and SE on asthma management among UNIMAS undergraduate nursing students. Quantitative research emphasizes collecting and analysing data to develop logical reasoning by examining phenomena within the target population (Watson, 2015). The quantitative technique was selected due to its emphasis on exact measurements and collecting and analysing statistical, mathematical, or numerical data via surveys, questionnaires, and polls (Labaree, 2023). It also minimizes individual bias (Savela, 2018).

A cross-sectional study design was used in this quantitative research. A cross-sectional research strategy was employed since it analyses data from a cohort at a singular

moment in time (Thomas, 2022). In addition, relative to other research methodologies, a cross-sectional study may provide findings more rapidly and at a reduced expense (Thomas, 2022). Thus, the descriptive cross-sectional study was chosen as the research design due to its appropriateness and efficiency within the constraints of the study's timeline. This study was focused on assessing the knowledge and SE of asthma management among UNIMAS undergraduate nursing students and the relationship of both variables.

3.2 Research Setting

The research was conducted in the Faculty of Medicine and Health Sciences (FMHS) at UNIMAS, situated in Kota Samarahan, Sarawak. UNIMAS is around 25 km from Kuching, the capital of Sarawak, Malaysia. The Faculty of Medicine and Health Science at UNIMAS offers two programs: a Doctor of Medicine and a Bachelor of Nursing with Honours. This research focused on nursing students in their second, third, and fourth years. The overall enrolment of undergraduate or bachelor's degree nursing students in the Faculty of Medicine and Health Sciences, UNIMAS, was about 184.

3.3 Inclusion and Exclusion Criteria

3.3.1 Inclusion criteria:

1. UNIMAS undergraduate nursing students which including year 2, year 3, and year 4, who were actively and officially enrolled in the nursing program at the time of collection.
2. Undergraduate nursing students who were willing to participate in this study.
3. Participants who provided an informed consent form.

3.3.2 Exclusion criteria:

1. First-year undergraduate nursing students because are likely to lack foundational knowledge and clinical exposure to asthma management.
2. Undergraduate nursing students who were reluctant to participate in the study.
3. Those who were included in the pilot study.
4. Post-registration nursing students.

3.4 Sampling Method and Sample Size

Sampling is choosing a subset of an interested population for a study. Simple random sampling was utilised in this study as the methodology for sampling in the data collection procedure. Simple random sampling is classified as probability sampling (Hayes, 2023). A simple random sampling approach will randomly select the complete data set of the overall population. This strategy ensures that every individual in the target population has a similar probability of selection (Thomas, 2020). In addition, this strategy was used because of the accessibility of the selected population and the availability of a comprehensive list of its members (Thomas, 2020). The sampling process has six steps: defining populations, choosing a sample frame, selecting a sample method, determining sample size, collecting data, and analysing data (Taherdoost, 2016). Simple random sampling is often used in quantitative research (Rahi, 2017). A simple random sample ensures equal selection probability, allowing the researcher to eliminate bias via the sampling method (Horton, 2022). The researcher generates a population list for this study using a computer program to produce random numbers, building a numerical list that encompasses the complete sample size (Rahi, 2017). The overall total number of nursing students from

the second to the final year is 184. The participants' names were selected through a simple, random selection procedure. Random numbers were then produced via Excel. To randomise numbers in Excel, select the cell where the random number will be generated. Subsequently, input the formula = RAND. Subsequently, click on the "Enter" key to generate a random number (Kallner, 2015).

The sample size was determined with a 95% confidence level, implementing Taro Yamane's (Yamane, 1973) formula. This sample size calculation determines the study's minimum required population sample size.

The Yamane formula is computed as follows:

$$n = \frac{N}{1 + N(e)^2}$$

Where:

n = sample size required

N = number of individuals in the population.

e = the acceptable sampling error

By implementing the Yamane formula, the allowed sampling error, e , is 0.05 with the total population size, N , of 184. The example computation is as follows:

Year 2: 63 students **Year 3:** 57 students **Year 4:** 64 students

$$n = \frac{184}{1 + 184(0.05)^2} = 126$$

An addition of 10% attrition rate, hence:

$$n + 10\% n$$

$$= 126 + (0.1 \times 126) = 126 + 13 = 139 \text{ students}$$

After adding 10% of the attrition rate, the final sample size is 139.

Thus, the sample size, including the 10% attrition rate for this study, would be about 139 respondents. Nevertheless, the researcher must account for participant remuneration, even those who decline to participate; hence, an additional 10% should be included in the sample size (Das et al., 2016). An extra 10% attrition was included to account for the missing data in the sample size. Thus, the total sample size was rounded up to 140.

3.5 Study Instrument

The researcher uses the study instrument to gather the necessary data for the investigation. The survey was administered in English. The online survey questionnaire has three components. The instrument will be divided into three sections: Section A, Section B, and Section C. Demographic data about the participants will be gathered in Section A, which comprises nine (9) questions about the socio-demographic characteristics of the participants, including matric number, gender, age, year of study, ethnicity, religion, academic performance, clinical experience in the care of asthma patients, and clinical attachment weeks. This section has multiple-choice questions and fill-in-the-blank items. This survey was adapted from prior work by Ahmed and Mohammed (2019). The questionnaire is publicly accessible; hence, no permission is required.

In Section B, the questionnaire assessing the knowledge of asthma management among UNIMAS undergraduate nursing students will be evaluated using the Asthma Knowledge Questionnaire, adapted from Demilaray (2004). The reliability of the Asthma Knowledge Questionnaire by Demilaray (2004) was not reported in the literature. Thus, the instruments in this section will be pretested using a pilot study to determine their reliability. The questionnaire consisted of 24 questions covering asthma diagnosis, pathophysiology, aetiology, precipitating factors, symptoms, prognosis, asthma pharmacotherapy, adverse effects of inhaled drugs, and inquiries regarding the pMDI (pressurised metered-dose inhaler) device. The participants had the Yes, No, or Not Sure options. The correct answers will be scored as 1, and not sure and wrong answers will be scored as 0 (Demilaray, 2004). Thus, a higher score indicates more excellent knowledge among nursing students.

Section C consists of 16 items in the Asthma Self-efficacy Questionnaire, which assesses the self-efficacy level in asthma management among UNIMAS undergraduate nursing students, adapted from Quaranta (2013). A Cronbach's alpha in the study was 0.85, showing good reliability. A Cronbach's alpha of 0.7 indicates acceptable reliability (Thorndike, 1995). Glen (2021) stated that the reliability coefficient of Cronbach's Alpha should be 0.7 or greater. Cronbach's Alpha values of 0.7 or greater indicate an acceptable or good level of internal consistency (Taber, 2018). This instrument has a 4-point Likert-type scale, which is not relevant (1), somewhat relevant (2), quite relevant (3), highly relevant and concise (4). The score ranged from a minimum of 16 to 64. A higher score reflects a higher self-efficacy.

3.6 Ethical Considerations

Ethical permission to conduct this research project was acquired from the Research Ethics Committee, Faculty of Medicine and Health Science, Universiti Malaysia Sarawak (UNIMAS). Each questionnaire used for data collection was accompanied by an informed consent detailing the research, the study's objectives, an explanation of the confidentiality of the data collection, and the participant's agreement, since all information employed only for research purposes. Every participant in this research was provided with an informed consent (refer to Appendix D). All information acquired from participants were maintained under absolute confidentiality, and participants can withdraw at any time from the research. Permission to use, adopt and adapt the instrument for this research were obtained by emailing the authors.

3.7 Data Collection Procedure

3.7.1 Pilot Study

A pilot study is necessary before the full data collection for the research. A pilot study is a preliminary feasibility investigation used to assess several facets of research methods. A pilot study, or "feasibility study," is a small-scale exploratory investigation conducted before extensive quantitative research to evaluate the potential for a subsequent comprehensive project (Simkus, 2022) and to ascertain the validity and reliability of the instruments used for measurement (Hammond & Wellington, 2012). Webb (2018) supported that the purpose of the pilot study is to assess the instrument's validity and facilitate the researcher's understanding of the study's specific aims and inquiries. Hence, the pilot study is vital to boosting the primary study's quality and efficiency.

A pilot study was performed on 10% of the total sample size, equivalent to 14 nursing students, once the clearance from the Research Ethics Committee at the Faculty of Medicine and Health Sciences, UNIMAS, is received (Whitehead et al., 2016). Participants who agreed to participate in the pilot study were excluded from the actual phase of the study. The researcher applied the inclusion and exclusion criteria to recruit participants who met the requirements. The results were then analysed with Cronbach's alpha to evaluate the instrument's consistency and reliability. Azhar et al. (2018) indicated that the Cronbach Alpha score ranges from 0.60 to 0.80, demonstrating acceptable to good reliability. This indicates that the instrument reliably measures its intended variable. Scores under 0.60 indicate inadequate reliability, whereas scores exceeding 0.80 reflect good or excellent reliability.

Therefore, face validity was utilised in the pilot study. According to Taherdoost (2016), face validity is the extent to which a measure seems associated with a specific construct, as perceived by non-experts, such as test-takers. Face validity is defined as the extent to which test-takers assess the relevance of the content and items in the questionnaire to the context of the test administration (Webb, 2022). Face validity can be evaluated by executing a pilot study, which allows for collecting feedback regarding the extent to which the questionnaire accurately reflects the research objectives (Bhandari, 2022). This pilot study assessed the face validity of both questionnaires, which was subsequently discussed with the supervisor before their distribution to the pilot study participants. This pilot study yielded feedback from participants concerning the clarity of the questionnaire, indicating areas for further improvement. The participants noted that the questionnaires were user-friendly, systematic, structured, and utilised clear English. The pilot study demonstrated significant face validity. Hence, the pilot study had high face validity.

The data from 14 participants from the pilot study were entered and analysed using SPSS version 27 to test the questionnaire items' reliability. Hence, to assess the internal consistency and reliability of the research instruments, reliability tests were conducted using Cronbach's alpha for Likert-scale items and the Kuder-Richardson 20 (KR-20) coefficient for dichotomous items. In conducting a pilot study to assess undergraduate nursing students' knowledge and self-efficacy in asthma management, a psychometric evaluation of the instruments was undertaken to ensure reliability and appropriateness for the target population. The Asthma Knowledge Questionnaire initially consisted of 24 items. However, five items were automatically excluded during analysis due to zero variance, indicating that all participants ($n = 14$) answered uniformly to these items. The excluded items were: "Is asthma an inflammatory disease of the airways?", "Does active or passive smoking precipitate asthma?", "Can asthmatic patients become pregnant?", "Could asthma be completely controlled with continuous and regular treatment?", and "Can these patients continue a normal life?". The uniformity in responses suggested that these items were too general or universally accepted facts, thus failing to differentiate knowledge levels among participants.

After the removal of these five items, the total questionnaire for knowledge had been reduced to 19 items, generating a KR-20 of 0.620, which is slightly satisfactory but suggests potential for enhancement in internal consistency. To enhance the instrument's reliability, two additional items were scrutinised and removed based on item-total statistics: "Are there any harmful side effects of inhaled medications?" and "MDI devices are used with a spacer in children and elderly patients". The reason for the removal is that the items may introduce ambiguity due to variations in medication types and the perception that the other item is less relevant to adult-focused nursing education, as it explicitly references

paediatric and geriatric populations. After these removals, the final version comprised 17 items and yielded an improved KR-20 reliability coefficient of 0.709, indicating acceptable internal consistency for use in the main study.

In contrast, the Asthma Self-Efficacy Questionnaire, which comprises 16 items, demonstrated strong internal reliability from the outset, with a Cronbach's alpha of 0.867. Therefore, there were no single item was removed since the items used a 5-point Likert scale, thus forming variances. This high level of consistency validates the scale's suitability for assessing students' confidence in managing asthma-related situations. Therefore, the revised 17-item knowledge questionnaire and the 16-item self-efficacy questionnaire on asthma management are both methodologically sound and appropriate for further use in assessing undergraduate nursing students' preparedness in asthma management in the actual study.

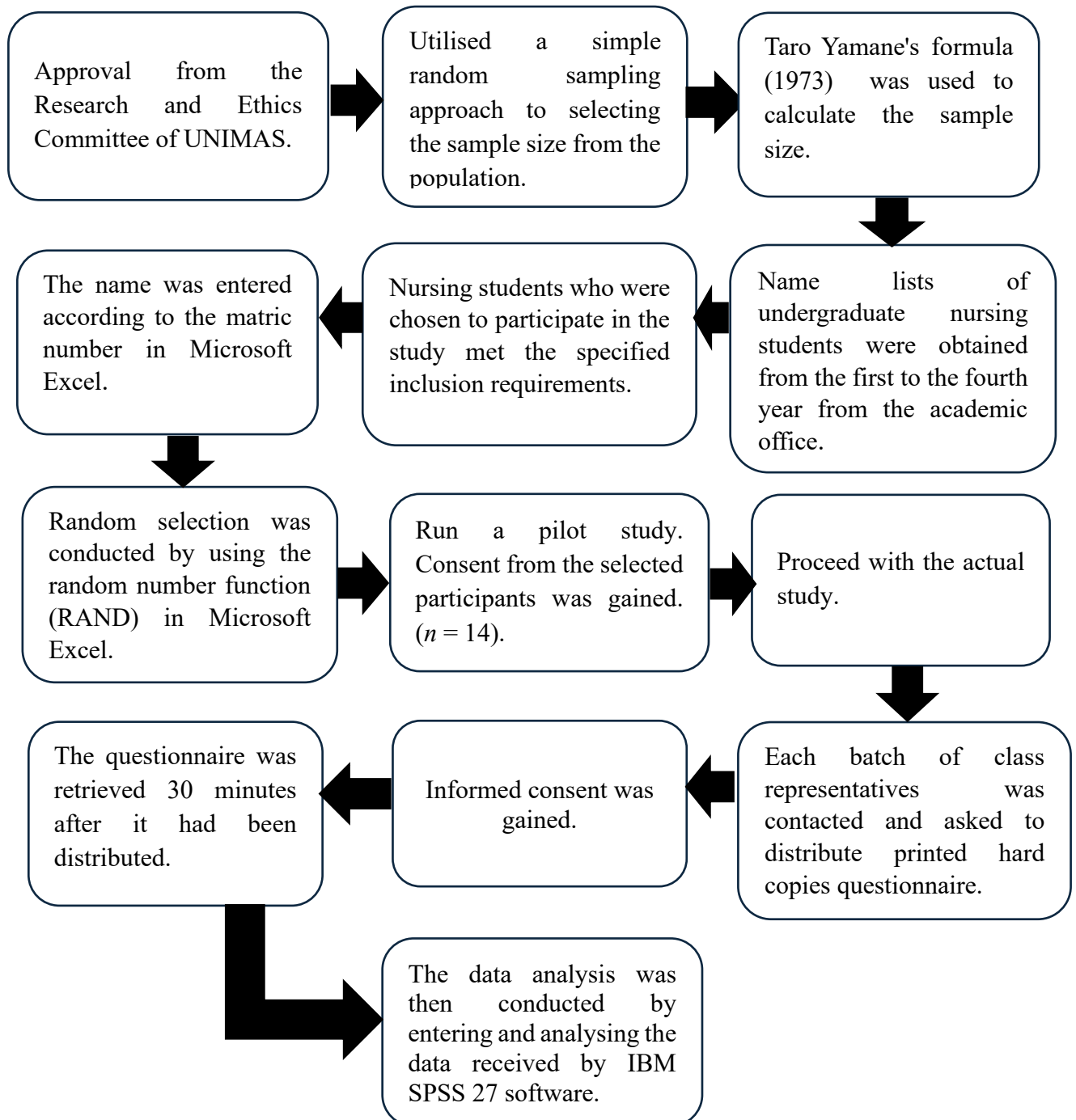
3.7.2 Data Collection

Data were collected after clearance from the Research Ethics Committee, Faculty of Medicine and Health Sciences. The list, including information about the students, will be acquired from the administration of the Department of Nursing. This research will use a pretested questionnaire consisting of three parts for data collection using printed hard copies prepared in English. International Survey Associates (2016) indicated that paper self-administered surveys provide significantly better response rates in a short timeframe. Data will be distributed to nursing students in printed hard copies in the second, third, and fourth academic years. The sample size was 139 after using the Taro Yamane Formula (1973). Round up to 140 sample size.

The names of UNIMAS undergraduate nursing students were acquired from the academic office using Microsoft Excel and RAND functions. Selected names were assigned

from a number from 1 to 140. The printed hard-copy questionnaires were then distributed to the participants and collected after 30 minutes. Before the data collection, the researcher will explain the study, and consent will be obtained. A reluctance or withdrawal from this study will be considered. The duration for each participant to answer the questionnaire is around 10 to 15 minutes. The researcher's contact number was included in the permission form, allowing participants to reach out with any inquiries about the questionnaire.

Figure 3.1 shows the data collection procedure from the pilot study to the actual study



3.8 Data Analysis

IBM SPSS Statistics version 27 was utilised for analysis after obtaining the data. The findings were systematically arranged and presented descriptively according to the parts of the hard copy survey questionnaire. Frequencies were used to analyse the demographic data due to the predominance of categorical variables, whereas descriptive statistics were utilised to assess age as a continuous variable. Categorical data was presented as frequency or percentage and shown in a bar chart. Continuous data that are normally distributed will be expressed in mean and standard deviation. Continuous data that are not normally distributed will be shown as the median and interquartile range.

The mean, standard deviation, and range for Sections B (Asthma Knowledge Questionnaire) and C (Asthma Self-Efficacy Questionnaire) were calculated using descriptive statistics since both variables are continuous. A normality test was performed to examine the data distribution and ascertain the inferential statistics. Spearman's rank correlation coefficient was implemented for correlation analysis if the data is not normally distributed. The Kolmogorov-Smirnov test is also used to assess the normality of the continuous data (Aslam, 2020). The Kolmogorov-Smirnov test was used to assess the normality of the constant data, given that the sample size of this research exceeded 50. A *p*-value under 0.05 indicates that it is statistically significant and suggests a non-normal distribution. If the *p*-value exceeds 0.05, it will be considered not statistically significant and generally distributed. The relationship between knowledge and SE in asthma management among UNIMAS undergraduate nursing students was analysed using the Spearman Correlation Coefficient since the data type was categorical and numerical.

3.9 Summary

This study used a cross-sectional quantitative research design and was conducted among undergraduate nursing students at UNIMAS. The research participants were selected according to the inclusion and exclusion criteria. The sample size included 140 participants, accounting for the attrition rate and actual data collection, with the sample size determined using the Yamane formula. The data in this research were analysed using IBM SPSS version 27, followed by descriptive and inferential statistics.

CHAPTER 4

RESULTS / FINDINGS

4.0 Introduction

This chapter presents the study's findings about the knowledge and self-efficacy of asthma management obtained among UNIMAS undergraduate nursing students. The results were obtained in alignment with the study's research objectives, which included assessing the level of knowledge of asthma management and evaluating the level of self-efficacy toward asthma management among UNIMAS undergraduate nursing students, which are shown in this chapter. This section even covers the relationship between knowledge and self-efficacy toward asthma management among UNIMAS undergraduate nursing students. Section 4.1 presents the socio-demographic characteristics of 140 undergraduate nursing students at UNIMAS who participated in this study. Section 4.2 presents the level of knowledge on asthma management among UNIMAS undergraduate nursing students. Section 4.3 presents the level of self-efficacy in asthma management among UNIMAS undergraduate nursing students. Section 4.4 presents the relationship between knowledge and self-efficacy toward asthma management among UNIMAS undergraduate nursing students. Meanwhile, Section 4.5 presents the summary of this chapter 4.

4.1 Socio-demographic Characteristics of UNIMAS Undergraduate Nursing Students

A total of 140 undergraduate nursing students consented to participate in UNIMAS, with a mean age of 22.32, ranging from 20 to 26 years old. In this study, there were 115 females (82.1%) and 25 males (17.9%) (refer to Figure 4.1). Most participants were Year 2, 32.9% ($n = 46$), followed by Year 4 students, 35% ($n = 49$). Based on race, most of the participants were Malay 42.1% ($n = 59$), followed by Bumiputera Sarawak 32.1% ($n = 45$), Bumiputera Sabah 21.5% ($n = 30$) and Chinese 4.3% ($n = 6$) (refer to Figure 4.2). Most of the participants were Islam, 56.4% ($n=79$), followed by Christian, 42.2% ($n = 59$) and Buddhist, 1.4% ($n = 2$). No outliers or extreme values were noted in the box plot for age. A Kolmogorov-Smirnov test showed that the data were not normally distributed, $D(140) = .198, p < .001$. The median age among the participants is 22 years (IQR = 2 years). The maximum age is 26, while the minimum age is 20 years. Moreover, for CGPA among participants, there were no outliers, but extreme values were noted from the boxplot for the CGPA. A Kolmogorov-Smirnov test showed a significant departure from normality, $D(140) = .095, p = .003$. The median CGPA among the participants was 3.38/4.00 (IQR = 0.28). The maximum CGPA achieved is 3.84, while the minimum is 2.56 out of 4.00. The range is 1.28. Meanwhile, for weeks of clinical experience, A Kolmogorov-Smirnov test showed a significant departure from normality, $D(140) = .238, p < .001$. The median of weeks of clinical experience among the participants is 28 weeks (IQR = 44 weeks). The maximum clinical experience is 52 weeks, while the minimum is 8 weeks. The range is 44 weeks.

Figure 4.1 Frequency distribution of participants by gender and year of study

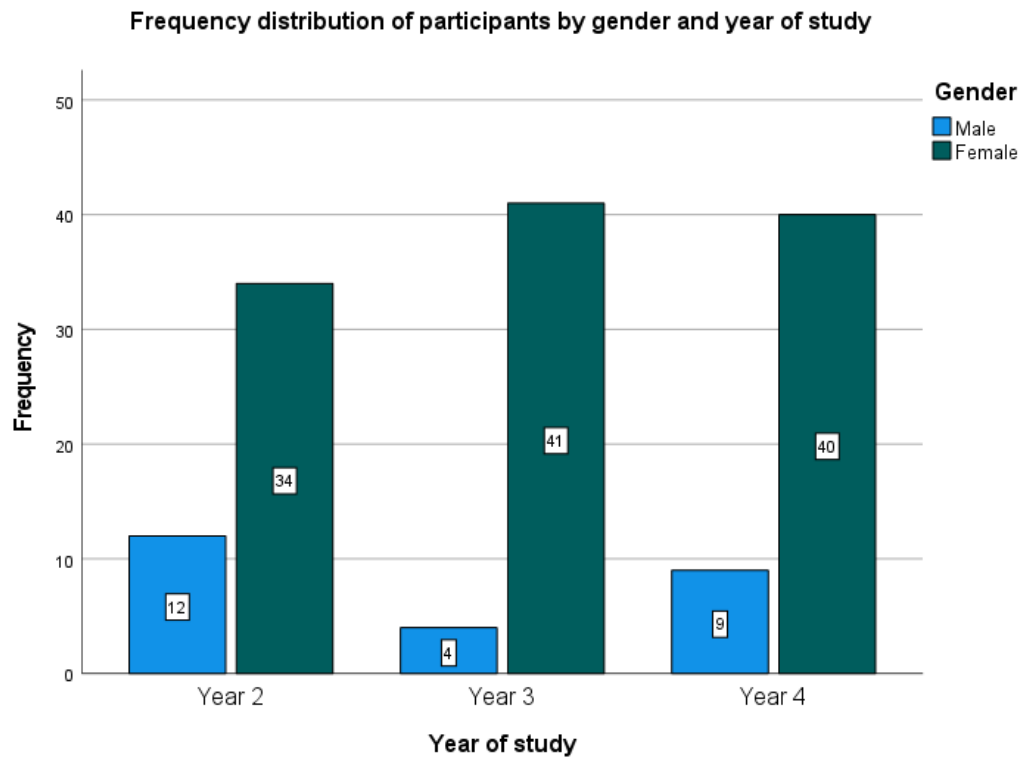


Figure 4.2 Percentage distribution of participants by race

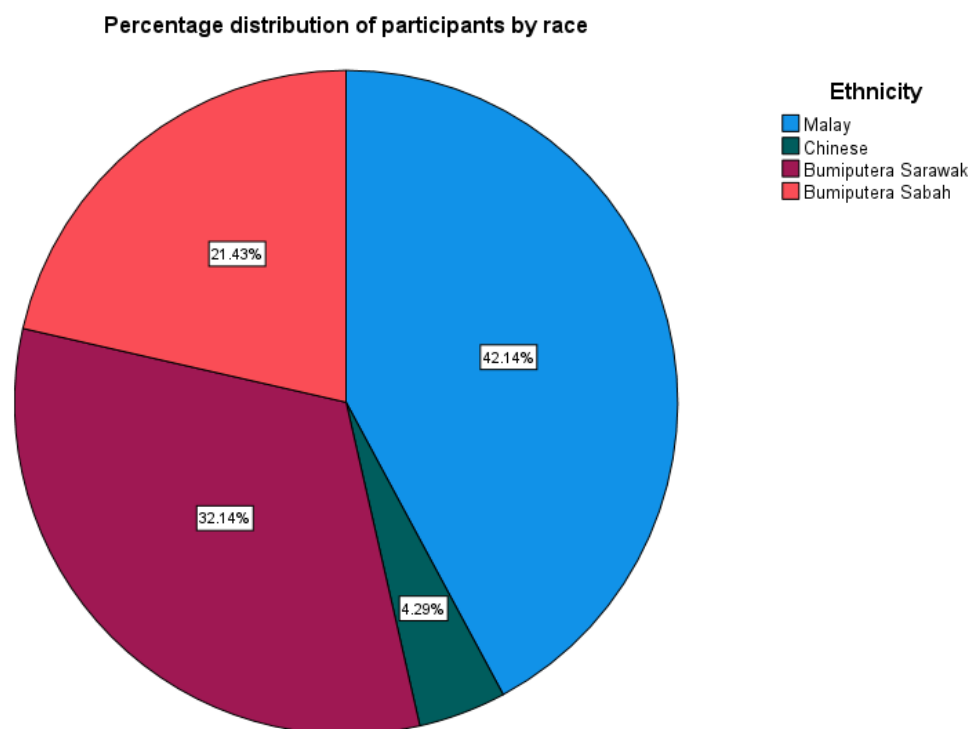


Table 4.1 *Socio-demographic characteristics of UNIMAS undergraduate nursing students*

Demographic Characteristic	Participants (n=140)	Frequency (n)	Percentage (%)	Median	IQR
Age				22	2
CGPA				3.38	0.28
Weeks of clinical experience	≤ 20 weeks	46	32.9	28	44
	20 - 40 weeks	45	32.1		
	41 - 60 weeks	49	35		
Gender	Male	25	17.9		
	Female	115	82.1		
Year of study	Year 2	46	32.9		
	Year 3	45	32.1		
	Year 4	49	35.0		
Ethnicity	Malay	59	42.1		
	Chinese	6	4.3		
	Bumiputera Sarawak	45	32.1		
	Bumiputera Sabah	30	21.5		
Religion	Islam	79	56.4		
	Christian	59	42.2		
	Buddhist	2	1.4		
Have you experienced taking care of patients with asthma before?	No	11	7.9		
	Yes	129	92.1		

Note: n: frequency, %: percentages

4.2 Knowledge on Asthma Management among UNIMAS Undergraduate Nursing Students

A Kolmogorov-Smirnov test was performed, and there was a significant departure from normality for the total score of knowledge, $D(140) = .118, p < .001$. The scores were categorised into three groups: poor (1–10), Moderate (11–14), and High (15–17). This study utilises visual binning to categorise each participant's total score as either good or poor, utilising SPSS. Visual binning is used to classify data values or examine data distributions (Setlur, 2022). This method is typically used to transform continuous data into manageable discrete categories (Lin & Wen, 2022). The mean score and standard deviation in this 17-item question on asthma knowledge were 12.99 ± 2.22 , with a minimum-maximum score between 7 to 17. Among the participants, 57.9% demonstrated moderate asthma knowledge, while 30% achieved a high knowledge level. Meanwhile, 12.1%, a lower percentage, demonstrated inadequate knowledge (refer to Figure 4.3).

Table 4.2 *Level of knowledge on asthma management among the UNIMAS undergraduate nursing students*

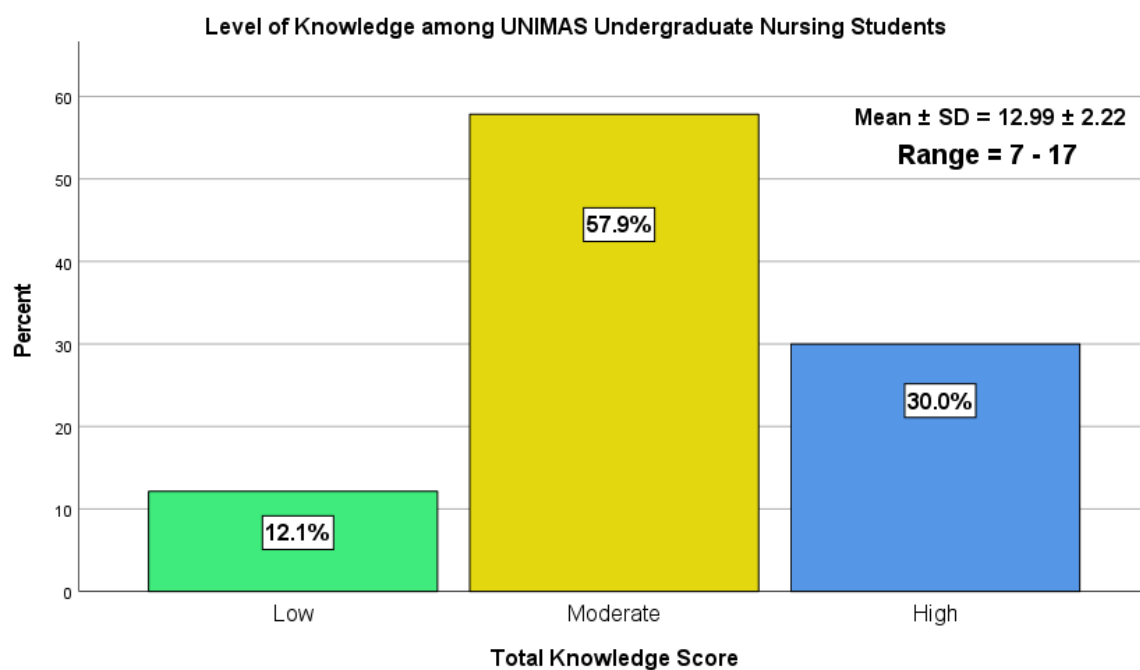
<i>Asthma Knowledge Score (n = 140)</i>		Frequency (n)	Percentage (%)
1. Is asthma a hereditary disease?	Incorrect/Not Sure	28	20.0%
	Correct	112	80.0%
2. Does asthma inflammation cause constriction in the airways?	Incorrect/Not Sure	11	7.9%
	Correct	129	92.1%
3. Is asthma a contagious disease?	Incorrect/Not Sure	27	19.3%
	Correct	113	80.7%
	Incorrect/Not Sure	72	51.4%

4. Do aspirin and some anti-hypertensive drugs cause asthma symptoms?	Correct	68	48.6%
5. Do respiratory infections precipitate asthma?	Incorrect/Not Sure Correct	16 124	11.4% 88.6%
6. Asthma attacks are more common in cold weather.	Incorrect/Not Sure Correct	14 126	10.0% 90.0%
7. Are symptoms such as cough, wheezing, dyspnoea, and chest tightness seen in asthmatic patients?	Incorrect/Not Sure Correct	3 137	2.1% 97.9%
8. Can asthmatic patients take part in sports?	Incorrect/Not Sure Correct	52 88	37.1% 62.9%
9. Do inhaled medications cause addiction?	Incorrect/Not Sure Correct	60 80	42.9% 57.1%
10. Is asthma a disease that cannot be cured but can be controlled?	Incorrect/Not Sure Correct	26 114	18.6% 81.4%
11. If an asthmatic patient does not use the treatment regularly, do asthma attacks threaten life?	Incorrect/Not Sure Correct	6 134	4.3% 95.7%
12. Are inhaled medications the most effective delivery method for the treatment of asthma?	Incorrect/Not Sure Correct	15 125	10.7% 89.3%
13. Do inhaled drugs reach the airways directly?	Incorrect/Not Sure Correct	11 129	7.9% 92.1%
14. Do the effects of inhaled drugs disappear quickly?	Incorrect/Not Sure Correct	91 49	65.0% 35.0%
15. Do the inhaled drugs enter the systemic circulation in small amounts?	Incorrect/Not Sure Correct	65 75	46.4% 53.6%
16. Can these side effects be avoided?	Incorrect/Not Sure Correct	47 93	33.6% 66.4%

17. MDI devices should be cleaned at least once a week.	Incorrect/Not Sure	19	13.6%
	Correct	121	86.4%

Note: n: frequency, %: percentages

Figure 4.3 Level of knowledge among UNIMAS undergraduate nursing students



4.3 Self-efficacy on Asthma Management among UNIMAS Undergraduate Nursing Students

A Kolmogorov-Smirnov test was performed, and there was a significant departure from normality for the total self-efficacy score, $D(140) = .096, p = .003$. This study applies visual binning for categorising each participant's total self-efficacy into low (scores 16-35), moderate (scores 36-50), and high (scores 51-64) based on the total self-efficacy. Visual binning is a technique employed to categorise data values or analyse data distributions (Setlur, 2022). This method is commonly employed to convert continuous data into manageable discrete categories (Lin & Wen, 2022). The mean score and standard deviation of the 16-item questions on asthma self-efficacy were 46.89 ± 6.40 , with 26 as the minimum score and 63 as the maximum score. Most of the participants, 73.5%, exhibit a moderate level of self-efficacy. Meanwhile, 23.6% demonstrated a high level of self-efficacy, and only 2.9% of the students fell into the poor self-efficacy category (refer to Figure 4.4).

Table 4.3 Level of self-efficacy on asthma management among the UNIMAS undergraduate nursing students

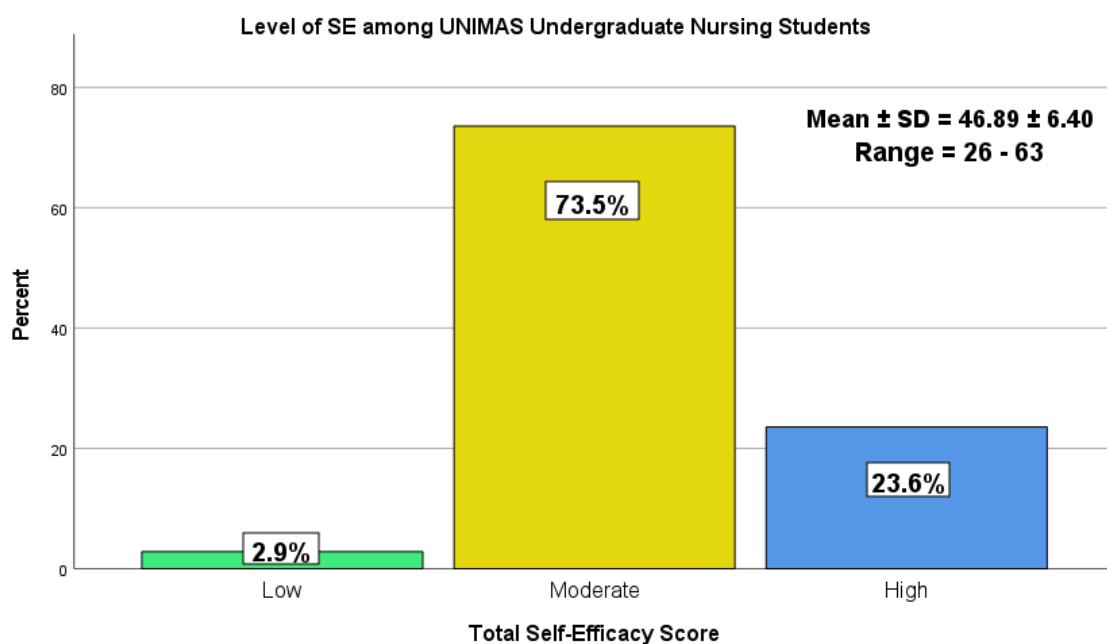
<i>Asthma Self-efficacy Score (n=140)</i>	Not relevant	Somewhat relevant	Quite relevant	Highly relevant and concise
<i>Items</i>	<i>n (%)</i>	<i>n (%)</i>	<i>n (%)</i>	<i>n (%)</i>
1. When I have concerns or questions about my asthma management, I feel comfortable contacting my primary healthcare provider and discussing my concerns.	15 (10.7)	22 (15.7)	68 (48.6)	35 (25)

2. When I have concerns or questions about a patient's asthma management, I feel comfortable approaching the patient and discussing my concerns.	2 (1.4)	36 (25.7)	75 (53.6)	27 (19.3)
3. I can correctly assess the needs of patients with asthma.	1 (0.7)	35 (25)	88 (62.9)	16 (11.4)
4. I can correctly demonstrate how to use a metered-dose inhaler to a patient.	0 (0)	12 (8.6)	77 (55)	51 (36.4)
5. I can correctly demonstrate how to use a peak flow meter.	0 (0)	15 (10.7)	82 (58.6)	43 (30.7)
6. I can evaluate the effectiveness of the self-management efforts of a patient with asthma.	0 (0)	28 (20)	90 (64.3)	22 (15.7)
7. I can correctly choose which asthma medication to give, depending on the symptoms the patient is experiencing.	4 (2.9)	73 (52.1)	57 (40.7)	6 (4.3)
8. I can influence patients with asthma and their families to reduce asthma triggers at home by teaching asthma environmental control.	0 (0)	16 (11.4)	91 (65)	33 (23.6)
9. I can confidently teach patients how to manage their asthma correctly, aligning with globally recommended guidelines, such as the Global Initiative for Asthma (GINA).	2 (1.4)	41 (29.3)	81 (57.9)	16 (11.4)
10. I can determine when to administer asthma medication when a patient with asthma is having symptoms.	2 (1.4)	50 (3.7)	73 (52.1)	15 (10.7)

11. I can determine when to administer asthma medication when a patient with asthma is having symptoms	1 (0.7)	17 (12.1)	88 (62.9)	34 (24.3)
12. I can determine whether the asthma medication is working for a patient having an asthma exacerbation.	1 (0.7)	42 (30)	75 (53.6)	22 (15.7)
13. I can determine the severity of an asthma attack based on the symptoms	2 (1.4)	34 (24.3)	88 (62.6)	16 (11.4)
14. I can help patients with asthma avoid asthma symptoms.	2 (1.4)	19 (13.6)	90 (64.3)	29 (20.7)
15. I can take the necessary steps to avoid or manage an asthma attack effectively.	0 (0)	24 (17.1)	88 (62.9)	28 (20)
16. I have a lot of confidence in my ability to detect the early warning signs of asthma.	2 (1.4)	37 (26.4)	80 (50.7)	21 (15)

Note: n: frequency, %: percentages

Figure 4.4 Level of self-efficacy among UNIMAS undergraduate nursing students



4.4 The Relationships between Knowledge and Self-efficacy on Asthma Management among the UNIMAS Undergraduate Nursing Students

The normality test revealed that the distribution of data was not normally distributed (refer to sections 4.2 and 4.3). Thus, a non-parametric test was used for this test. The relationship between knowledge and self-efficacy was examined using the Spearman correlation coefficient (refer to Table 4.4). Preliminary analyses were performed, and there was a violation of the assumptions of the normality test for both the total score, knowledge, $D(140) = .118, p < .001$, and self-efficacy, $D(140) = .096, p = .003$. No outliers or extreme values were detected from the box plot. Leclezio et al. (2015) outlined that a correlation strength of $r_s = 0.01-0.19$ signifies a negligible relationship, $0.20-0.29$ indicates a weak relationship, $0.30-0.39$ reflects a moderate relationship, and $0.40-0.69$ denotes a strong relationship. Values greater than 0.70 represent a very strong relationship. Spearman correlation test analysis revealed a significant, weak positive correlation between knowledge and self-efficacy, with $r_s = 0.225 (n = 140), p < 0.05$, indicating that as the knowledge level increases, the self-efficacy of the participants is likely to increase as well.

Table 4.4 *The relationship between knowledge and self-efficacy on asthma management among UNIMAS undergraduate nursing students*

Correlations

			Total Knowledge Score	Total Self-Efficacy Score
Spearman's rho	Total Knowledge Score	Correlation Coefficient	1.000	.225**
		Sig. (2-tailed)	.	.007
		N	140	140
	Total Self-Efficacy Score	Correlation Coefficient	.225**	1.000
		Sig. (2-tailed)	.007	.
		N	140	140

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

4.5 Summary

Chapter 4 presents the findings of a study assessing the knowledge and self-efficacy in asthma management among 140 UNIMAS undergraduate nursing students. Socio-demographic analysis indicated that most participants were female (82.1%), with the largest representation from Year 2 (32.9%) and Year 4 (35%) nursing students, predominantly Malay (42.1%) and Muslim (56.4%). The median age was 22 years, and the median CGPA was 3.38. In terms of knowledge, 57.9% of students demonstrated a moderate level. In comparison, 30% exhibited a high level of knowledge, with notable gaps identified in areas such as medication triggers and the effects of inhaled drugs. Regarding self-efficacy, 73.6% of students showed moderate confidence, particularly in communication and device usage, whereas lower confidence was observed in pharmacological decision-making. A weak but

statistically significant correlation was found between knowledge and self-efficacy ($r_s = 0.225$, $p < .05$). These findings suggest that, although students possess reasonable competency, targeted educational interventions could further strengthen their skills and confidence in asthma management.

CHAPTER 5

DISCUSSION AND CONCLUSION

5.0 Introduction

This chapter presents the findings of the study, organised according to the research objectives. It provides a detailed discussion of the level of knowledge on asthma management, self-efficacy on asthma management, and the relationship between the two variables among UNIMAS undergraduate nursing students. Additionally, the key results are summarised, and recommendations for future research are offered based on the study's implications. The chapter also addresses the limitations encountered during the research and concludes with a summary. The primary aim of this study was to examine the relationship between nursing students' knowledge of asthma management and their SE towards the asthma management, as these variables play a crucial role in identifying knowledge confidence gaps in taking care of patients with asthma.

5.1 Knowledge on Asthma Management among UNIMAS Undergraduate Nursing Students

The study reveals that a majority of UNIMAS undergraduate nursing students possess moderate knowledge regarding asthma management, with 57.9% of participants scoring within the intermediate range, as illustrated in the relevant bar chart (refer to Figure 4.3). This distribution highlights that while most students demonstrate a foundational understanding of asthma, fewer exhibit either high or low levels of comprehension.

UNIMAS nursing students generally exhibit a strong awareness of asthma symptoms and standard treatment practices, with an impressive 97.9% accurately identifying common

clinical manifestations such as cough, wheezing, dyspnoea, and chest tightness. However, notable knowledge gaps persist, particularly concerning the use of inhalers and the adverse effects associated with asthma therapy. For instance, a considerable proportion of participants (42.9%) were uncertain or incorrect about the potential for addiction to inhaled medications. In comparison, 65% mistakenly believed that the effects of inhaled treatments dissipate rapidly from the body. These findings underscore a disconnect between students' theoretical understanding and their practical application of asthma management principles.

Further analysis, as presented in Table 4.2, indicates that most students are well-informed about the hereditary nature of asthma (80.0%) and the role of airway inflammation in symptom development (92.1%). Nonetheless, less than half (48.6%) recognised that certain medications, such as aspirin and specific antihypertensives, can trigger asthma. Misconceptions were also evident regarding physical activity, with 37.1% of participants unsure or incorrect about the ability of asthmatic patients to participate in sports. In terms of treatment, while most students (89.3%) identified inhalation as the most effective delivery method, only 86.4% knew to clean metered-dose inhalers weekly. However, only 35.0% correctly understood the duration of inhaled drug effects, and 53.6% were aware of minimal systemic absorption. These results collectively indicate that, despite generally solid foundational knowledge, targeted education is needed to address persistent gaps in students' understanding of asthma management.

A significant study conducted by Yari et al. (2024) at Sekolah Tinggi Ilmu Kesehatan Rumah Sakit Husada in Indonesia specifically examined the relationship between nursing students' knowledge about asthma management and their inhaler usage skills. This study involved 104 undergraduate nursing students who had received instruction on the respiratory system and inhaler usage in asthma patients. The research findings showed that most nursing

students demonstrated a moderate level of knowledge, with a mean score of 42.26 out of a possible range of 30 to 54, reflecting varying levels of knowledge among students. The study found that while most students demonstrated adequate knowledge about asthma, significant gaps remained in their understanding of the topic. The researchers noted that this knowledge level was essential for nursing students as it directly related to their ability to provide effective patient care. The findings emphasised that most students had sufficient knowledge about asthma, which could support the enhancement of their clinical skills.

Halemaneyavaradanagowda and Gowda (2024) reported that 55.0% of the total 60 nursing students demonstrated a moderate level of knowledge regarding asthma management, particularly in pulmonary function tests (PFTs), indicating that they only partially understood how to interpret and utilise them in a clinical setting, suggesting a partial grasp of key concepts but gaps in comprehensive understanding and clinical application. This moderate knowledge level reflects inconsistencies in asthma-related education within nursing curricula, where theoretical content may be presented without adequate reinforcement through clinical practice or simulation. Students may understand the basic pathophysiology and general treatment approaches, such as the use of bronchodilators or inhaled corticosteroids, but struggle with more complex aspects, including stepwise management, patient education, and the use of peak expiratory flow meters. Due to time constraints and a small sample size, the results from this study cannot be generalised to other nursing institutions, and long-term follow-up could not be carried out. Also, asthma is episodic, and students may not have had enough clinical experience with acute asthma cases, which could make them less confident and familiar with guideline-based management. Therefore, these results emphasise the need for more structured, hands-on asthma instruction

in nursing school to help students transition from understanding asthma to effectively managing it.

However, Harder (2023) found that 92% of nursing students who participated in hands-on training demonstrated a high level of knowledge in asthma management, highlighting the effectiveness of experiential learning methods in nursing education. This result is justifiable through Kolb's Experiential Learning Theory (1948), which emphasises learning as a process where knowledge is created through the transformation of experience (Kolb, 1984). Hands-on training allows students to actively apply theoretical concepts in realistic clinical simulations, thereby reinforcing their understanding of asthma pathophysiology, assessment techniques, and treatment protocols. By engaging multiple senses and promoting active problem-solving, practical training enhances cognitive processing and long-term knowledge retention. Additionally, it fosters clinical reasoning and confidence, which are essential in managing complex chronic conditions such as asthma. This supports the growing emphasis on integrating simulation and practical exposure into nursing curricula to improve clinical competence and patient care outcomes.

Similarly, Osmancevic et al. (2021) found that 92% of nursing students who participated in monthly refresher workshops demonstrated a high level of knowledge in asthma management, emphasising the value of continuous, structured reinforcement in nursing education. This result can be justified through the principles of Spaced Repetition Theory (Ebbinghaus, 1885) and Adult Learning Theory (Knowles, 1968), which suggest that learning is more effective when information is reviewed at regular intervals rather than in a single exposure. Spaced Repetition Theory (1885) is an educational method designed to enhance long-term information retention through the strategic process of timed practice (Ow, 2023). Meanwhile, Adult Learning Theory (1968) refers to the concept of studying adult

learning processes (O'Neill, 2019). Hence, monthly workshops likely enabled students to revisit core asthma concepts, practice clinical skills, and clarify misunderstandings, thereby enhancing knowledge retention and clinical readiness. Moreover, frequent engagement in asthma-related content may have improved their confidence and clinical reasoning, both essential for managing chronic respiratory conditions. The study supports the integration of ongoing educational interventions within nursing programs to ensure sustained competency in high-priority areas such as asthma care.

According to a study by Alobaidi (2021), while healthcare students, including nursing students, could recognise asthma symptoms, there were noticeable gaps in their understanding of asthma guidelines and effective treatment strategies and practice. These results align with previous research suggesting that nursing students often develop a general grasp of asthma but face challenges when applying specialised or practical knowledge (Zhao et al., 2024). This moderate level of knowledge may arise from an education system that prioritises theoretical learning, with limited exposure to clinical simulations or hands-on training. The knowledge of nursing students regarding asthma management is essential for delivering good care. Research indicated that a thorough understanding of asthma, encompassing its symptoms, causes, and treatment modalities, is crucial for nurses to educate and manage patients proficiently (Islam et al., 2024).

The mean score of asthma knowledge among nursing students was 12.99, with a standard deviation of 2.22. A wide range of scores, from 7 to 17, indicated a wide variety of knowledge levels, from inadequate to high. Although most students have a moderate understanding of asthma, based on these statistical findings, there are substantial differences in the academic performance of individuals. This distribution is graphically supported by the bar chart (refer to Figure 4.3), which shows that the most significant percentage of students

falls within the moderate knowledge group (57.9%). In contrast, 30% of students have scored high, and 12.1% have demonstrated poor knowledge.

The findings of this study are consistent with prior research, including Felemban (2024), which indicated that nursing students typically had knowledge of asthma symptoms but encountered difficulties with more specialised subjects, such as inhaler usage and associated side effects. This identified knowledge gap is consistent among nursing students in UNIMAS regarding inhaler technique, and teaching and understanding of pharmaceutical side effects are concerning. A comprehensive understanding by nursing students of asthma medications, encompassing their mechanisms of action, potential side effects, and proper administration techniques, as outlined in hospital policy, equips healthcare providers to deliver optimal and holistic treatment and care, thereby preventing medication errors to the highest level and enhancing patient outcomes.

A study by McClure et al. (2019) aligned with the findings from UNIMAS undergraduate nursing students regarding pharmaceutical aspects. The results indicated that comprehension of drug classifications, appropriate administration procedures, and probable drug interactions was insufficient among several undergraduate nursing students. The study noted gaps in knowledge of complex asthma pharmacotherapy details, particularly in differentiating between controller and reliever medications, which require a comprehensive understanding that extends beyond fundamental pharmacological concepts. Research indicated that cooperative learning strategies, including think-pair-share activities centred on asthma medications, facilitate students' ability to identify and rectify common medication errors while enhancing their comprehension of drug-drug interactions (McClure et al., 2019).

Additionally, research by Alexandre-Sousa et al. (2024) highlighted that nursing students acquire knowledge more effectively when educational approaches combine theoretical lessons with clinical practice, particularly for complex conditions such as asthma. This highlights the importance of incorporating experiential learning opportunities, such as simulations, into the curriculum to ensure that students gain a more comprehensive understanding of asthma treatment. Therefore, the findings of this study aligned with the previous research conducted by Roopavathy et al. (2016), which focused on assessing the impact of educational interventions on nursing students' knowledge of asthma management, aiming to equip the students with specific skills in this area. Roopavathy et al. (2016) revealed a 22.5% improvement in asthma management interventions and symptoms, with a particular focus on pharmacotherapy and the side effects of inhaled medication. The findings of this study supported the notion that participants in UNIMAS demonstrated improved knowledge of asthma symptoms and treatment approaches to be implemented during nursing care.

Ünal (2023) conducted a significant study demonstrating that simulation-based learning successfully improves nursing students' knowledge retention in asthma management. For example, the study addresses simulation training, identifying the knowledge gaps among nursing students, particularly regarding proper inhaler technique and comprehension of medication side effects. Besides simulation-based learning, Ünal (2023) stated that limitations in clinical exposure constitute a substantial obstacle to the practical education of nursing students in asthma management. A significant number of students encounter fewer chances to observe or engage in asthma care during clinical rotations, especially concerning acute episodes or specialised management strategies. The limited exposure prevents students from developing the capacity to integrate theoretical knowledge

into real-world practical experience in healthcare facilities, which may lead to insufficient preparation for clinical practice among nursing students. The dependence on lecture, clinical simulation, and alternative learning methods indicates efforts to minimise exposure limitations; however, these approaches may not entirely replace actual clinical experience. Simulation-based learning enables students to apply theoretical knowledge in a structured, practical setting, thereby enhancing cognitive comprehension and psychomotor skills.

Despite the positive results, several important questions should be highlighted, and solid reasoning and judgment must be the core to improve nursing students' understanding of asthma management. The study reveals a notable discrepancy between UNIMAS nursing students' general knowledge of asthma symptoms and their comprehension of specialised elements such as inhaler usage and associated side effects. The findings include that 42.9% of students were not sure about the potential for addiction to asthma inhaled medications, and that 65% wrongly thought that the effects of these medications disappear rapidly, which raises significant concerns.

Prior research has highlighted the necessity for enhanced practical training to mitigate these knowledge deficiencies. Kimel (2022) highlighted that, despite possessing a strong foundation and theoretical knowledge on asthma, most nursing students encounter difficulties with proper inhaler techniques and medication administration. This suggests that although classroom instruction provides a fundamental basis, it may be insufficient for acquiring practical skills. Deficiencies in practical knowledge may stem from inadequate simulation training or insufficient clinical practice in nursing education, or students lacking attention to learn and practising. Additionally, students may encounter asthma care protocols; however, they often lack the practical experience necessary to grasp the complexities of medication administration. Integrating more simulation-based training into the curriculum is

essential, as it has been proven to enhance theoretical knowledge and practical skills (Grissa et al., 2023).

A significant number of participants (57.1%) were unaware of the potential side effects of asthma medications, and only 35% knew that inhaled drugs enter systemic circulation in small amounts. These knowledge gaps reflect a lack of exposure to evidence-based asthma management guidelines, such as those from the Global Initiative for Asthma (GINA). Cho and Hwang (2020) highlighted that nursing students often fail to integrate evidence-based guidelines, such as GINA, into their practice. To add on, the weak consensus from Chichi and Foluso's (2023) findings indicated that only 36.5% of nurses originally adhered to the rules and aligned with Felemban (2024) on GINA recommendations (mean score: 4.04/10)

This finding is consistent with those results, which showed that a considerable percentage of students demonstrated a poor understanding of GINA guidelines and asthma medication protocols. The lack of integration of GINA guidelines could be due to insufficient emphasis on evidence-based practice in nursing curricula. Confirming that nursing students are aware of asthma guidelines and trained to intervene in real-world scenarios is crucial for improving asthma management outcomes for real patients. Exposure of nursing students to these guidelines should be a core component of nursing education, as they provide structured, up-to-date recommendations for managing asthma, preparing them to be effective future healthcare providers.

The study revealed variability in asthma knowledge, with 12.1% of participants displaying inadequate knowledge, while 30% achieved high knowledge scores. This raises the question of what factors contribute to this variability in knowledge levels. Felemban

(2024) suggested that personal experience with asthma significantly enhances knowledge of asthma management. Hence, nursing students who have personally experienced asthma or cared for family members with asthma tend to have a deeper understanding of the asthma condition compared to those with limited exposure to taking care of asthma patients or not been diagnosed with asthma. Each nursing student must have different exposure, thus providing a unique perspective on asthma management, which can influence students' knowledge and self-efficacy in handling asthma-related issues. Meanwhile, clinical training offers theoretical knowledge and real-life exposure to asthma cases, which can enhance empathy and practical skills through personal or family experiences.

Additionally, Felemban's study found that students demonstrated significant improvements in knowledge after theoretical training; however, they still exhibited knowledge gaps in certain areas, such as the side effects of asthma medications. Simulation training has been proven to address such gaps by providing a more immersive and hands-on learning experience. Grissa et al. (2023) and Ünal (2023) found that simulation-based training improved long-term knowledge retention and clinical competency among nursing students. This is particularly important in fields like asthma management, where nursing students must be able to apply knowledge into skills and practice quickly. The results suggest that while theoretical knowledge can be imparted through lectures, simulation training offers a more dynamic and effective way to develop practical skills. Simulations replicate real-life scenarios, allowing students to visualise real-life situations and practice asthma management in a safe, controlled environment. This approach could significantly enhance their confidence and competency in handling asthma attacks, making them more prepared for clinical practice.

In contrast, a study by Hinds et al. (2018) found that healthcare providers, particularly nurses, with a strong foundation in pharmacology were more likely to administer asthma medications correctly, leading to better disease control and fewer hospitalisations due to asthma exacerbations. Similarly, a study by Bignall et al. (2017) highlighted that when nursing students were trained in the pharmacokinetics and pharmacodynamics of asthma medications, they became more confident in educating patients about proper inhaler technique and medication adherence, which are critical for effective asthma care. For instance, Felemban (2024) found that nursing students experienced uncertainty regarding inhaler technique and medication side effects due to inadequate exposure and training. This gap highlights a significant area that necessitates increased focus in nursing training, as it directly impacts the ability of future healthcare professionals to deliver effective asthma care. Therefore, nursing students must be proactive in self-learning on the pharmaceutical aspects of asthma medication, and nursing schools must enhance pharmaceutical knowledge in nursing education.

5.2 Self-Efficacy of Asthma Management among Nursing Students

This study assessed the self-efficacy level of undergraduate nursing students at the University of Malaysia Sarawak (UNIMAS) in managing asthma. Results reveal that most students display moderate (73.5%) to high self-efficacy (refer to Figure 4.4), particularly in skills-based competencies, such as demonstrating the use of asthma devices. Over 91% were confident in demonstrating the metered-dose inhaler, and 89% could confidently use the peak flow meter. Additionally, 80% felt capable of evaluating the effectiveness of patients' self-management efforts. Most students also reported strong confidence in communication and assessment, with 73.6% feeling quite or highly relevant in contacting healthcare providers for personal concerns and 74.3% believing they could correctly assess the needs of asthma patients.

While self-efficacy was generally high in practical and educational competencies, there was notable variation in clinical decision-making. For example, only 45% of students felt confident in selecting the correct asthma medication based on symptoms. However, 88.6% believed they could educate patients about reducing asthma triggers, and 69.3% were confident in teaching asthma care according to GINA guidelines. In managing acute episodes, 77.9% indicated that students could take necessary steps to manage asthma attacks, and 72.1% were confident in detecting early warning signs. These findings suggest that while UNIMAS nursing students are generally well-prepared in device use, communication, and education, targeted training could enhance their confidence in clinical decision-making and pharmacology.

Furthermore, a large majority expressed confidence in communicating with healthcare providers and patients regarding asthma care, aligning with the conclusions of similar studies that emphasise the critical role of self-efficacy in healthcare professionals'

ability to manage asthma effectively (McCabe et al., 2019; Zulkarnain et al., 2023). However, several areas requiring attention emerged, particularly in pharmacological decision-making and guideline-based asthma education. These areas were marked by lower levels of self-efficacy, suggesting that additional training and support may be needed. Specifically, the question “I can correctly choose which asthma medication to give, depending on the symptoms the patient is experiencing” had one of the lowest confidence responses. This points to a need for further clinical education and practice in making pharmacological decisions. Choi (2020) and McCabe et al. (2021) also emphasised the significance of targeted training in medication management to improve healthcare professionals’ confidence in providing evidence-based asthma care.

Furthermore, the study by Salahi et al. (2019) highlights that workshops and focused education can boost self-efficacy, particularly in technical aspects like medication administration and guideline application. Effective educational strategies that enhance nursing student self-efficacy encompass delivering positive and constructive feedback, establishing opportunities for gradual skill acquisition, promoting peer learning experiences, and employing reflective practices that enable students to acknowledge their increasing competence (Karabacak et al., 2019). These approaches align with Bandura's theoretical framework, addressing the various challenges and possibilities encountered in nursing education (Bandura, 1997).

To support the study's findings, a comprehensive study by Muhammad et al. (2023) examining the impact of simulation-based asthma education revealed that 79% of nursing students showed moderate enhancement of their self-efficacy after participating in a simulated asthma emergency scenario in a clinical laboratory. The research by Muhammad et al. (2023) utilised high-fidelity patient simulators to create an experience like real clinical

experiences, allowing students to refine their assessment skills, drug administration techniques, and emergency response protocols within a secure educational environment. Post-simulation debriefing sessions offered opportunities for reflection, feedback from the institution, and skill reinforcement, thereby augmenting the learning experience. The efficacy of simulation-based learning appears to stem from its alignment with Bandura's sources of self-efficacy growth. Students achieve mastery through the effective execution of simulated situations, see peer performance in collaborative learning activities, receive prompt feedback and support from instructors, and learn to interpret physiological reactions accurately.

According to Choi (2020), Hung et al. (2021), and Ünal (2023), studies comparing different approaches to learning have repeatedly shown that simulation-based interventions are more effective than traditional lecture techniques in enhancing self-efficacy for asthma management among nursing students. A study by Kim (2024) reinforces this, showing simulation training increased self-efficacy scores from 3.51 to 3.80 by allowing progressive skill mastery and social persuasion via instructor feedback. Moreover, research reported that high-fidelity simulations improve knowledge retention, clinical reasoning, and confidence, particularly in acute scenarios such as asthma exacerbations (Hung et al., 2021). The findings indicate significant improvements in the knowledge, understanding, and practical abilities of nursing students involved, with students sustaining elevated confidence levels in follow-up evaluations conducted months after the initial training. The enduring nature of these enhancements indicates that simulation-based education fosters permanent alterations in student self-efficacy beliefs that transcend immediate training outcomes.

Then, Haerling and Prion (2019) reported that 89% of nursing students participating in simulation training expressed high confidence in their ability to manage asthma. This

demonstrated the effectiveness of simulated clinical experiences in enhancing individuals' confidence in their professional competencies. Bandura's Social Cognitive Theory suggested that mastery experiences serve as a fundamental source of self-efficacy, thereby defining this outcome. Simulation-based learning provides students with a secure and controlled environment to repeatedly practise asthma care evaluation, decision-making, and intervention strategies without risking harm to actual patients. Students can apply their theoretical knowledge in practical clinical settings, receive immediate feedback, and reflect on their performance, all of which enhance their confidence and skills. Students who repeatedly practice asthma-related scenarios during clinical become more confident with asthma tools, such as peak flow meters and inhalers. The results indicate that simulation is a crucial component of nursing education, enhancing students' skills and confidence in managing chronic diseases.

Similarly, Tassemeyer et al. (2021) found that 81% of nursing students with over 50 clinical hours in respiratory care reported high confidence in their abilities. This outcome aligns with the principles of Bandura's theory, which suggests that repeated engagement in real-life activities enhances self-efficacy through mastery and observational learning. Students can observe, practice, and refine essential respiratory care skills, such as administering nebulized medications, assessing breath sounds, and educating patients with asthma in clinical environments under the guidance of experienced professionals. This long-term immersion enhances technical skills while fostering critical thinking, decision-making, and a deeper understanding of clinical procedures, thereby increasing nursing students' sense of capability. The study supports the assertion that nursing students must attend a specific number of significant clinical hours to apply their knowledge and skills, thereby boosting their confidence level and preparedness in managing complex conditions, such as asthma.

However, according to Toumas-Shehata et al. (2018), interventions enhance short-term self-efficacy; however, their long-term retention is inconsistent. A subsequent investigation into asthma management training revealed that merely 13% of students engaged in skill practice following the workshop, particularly in inhaler technique. Thus, self-efficacy and the technique deteriorated two months after the educational intervention, which means they diminished over time in the absence of reinforcement. Similarly, a study by McCabe et al. (2019) revealed that school nurses with less than one year of experience showed decreased confidence in medication administration compared to their more experienced counterparts. This highlights the necessity for continuous training and clinical exposure to uphold competency. This underscores the necessity of periodic retraining on proper inhaler technique to ensure effective patient education and indicates that competency in inhaler technique should be evaluated and rectified at regular intervals post-education to sustain optimal technique.

Moreover, specific questions should be highlighted to gain further insights into the students' preparedness. For instance, the question "I can confidently teach patients how to manage their asthma correctly, aligning with globally recommended guidelines, such as the Global Initiative for Asthma (GINA)" is crucial because it assesses the students' ability to apply international guidelines, which are fundamental in managing asthma effectively. Cho and Hwang (2020) emphasised that nursing students frequently fail to incorporate evidence-based guidelines, such as GINA, into their practice. The limited consensus from Chichi and Foluso (2023), which revealed that merely 36.5% of nurses initially complied with the guidelines, corresponds with Felemban's (2024) findings about GINA recommendations (mean score: 4.04/10). Meanwhile, most participants in this study felt confident in teaching

asthma care based on these guidelines (69.3%); there is still a notable opportunity to improve the overall understanding and confidence in following such protocols.

The data also show a significant departure from normality in the total self-efficacy scores (Kolmogorov-Smirnov test, $p = .003$), which indicates variability in the students' self-assessments. This variability is important as it reveals that while most students show moderate to high self-efficacy, a smaller portion falls into the poor category. A detailed analysis of the scores reveals that the mean self-efficacy score was 46.89, with a standard deviation of 6.40. The range of scores (26 to 63) demonstrated a diverse distribution of confidence levels, with most students falling into the moderate self-efficacy category (73.5%). This distribution is illustrated in the bar chart (refer to Figure 4.4), where the tallest bar corresponds to the moderate category, indicating that most students rated themselves as moderately confident. In contrast, the smaller bars correspond to the poor and high categories, suggesting that fewer students were either less confident or highly confident in managing asthma-related tasks. This variability suggests that, while most students strongly believe in their ability to manage asthma, there is room for improvement, particularly in areas such as pharmacological decision-making.

These findings resonate with previous studies that have also demonstrated variability in self-efficacy among healthcare professionals. For instance, Cicutto et al. (2016) observed similar trends where healthcare workers showed improved self-efficacy following focused training; the confidence levels varied depending on their prior knowledge and experience. This variability indicates that while educational interventions are beneficial, they must be tailored to address individual learning needs, particularly in areas where students feel less confident.

Therefore, the study reveals that while most UNIMAS nursing students exhibit a moderate to high self-efficacy in asthma management, key areas, such as pharmacological decision-making and guideline-based education, remain underdeveloped. Further educational interventions, particularly simulation-based training and focused workshops, must address these gaps and enhance students' confidence and competence in asthma care. Also, the findings suggest that while most UNIMAS nursing students hold a reasonably strong belief in their ability to manage asthma-related tasks, a significant percentage have not attained high self-efficacy, indicating a potential for additional skill development and confidence-building interventions. By addressing these areas, nursing programs can better prepare students for the challenges of asthma management in clinical settings.

5.3 Relationship between Asthma Management Knowledge and Self-Efficacy among Nursing Students

The relationship between asthma management knowledge and SE among nursing students has been a focus of limited research, and the findings of the current study conducted on undergraduate nursing students at UNIMAS reveal a significant but weak positive correlation between these two variables. The Spearman correlation coefficient ($r_s = 0.225, p < 0.05$) indicates that as the participants' knowledge of asthma management increases, their self-efficacy in managing asthma cases tends to improve. This finding is consistent with previous studies, such as those by Al Kindi (2023), Quaranta and Spencer (2015), Saied et al. (2017), and Seger (2018), who also examined varying degrees or strengths of positive associations between knowledge and SE among nursing students and healthcare providers.

Cha et al. (2015) identified a significant positive correlation between knowledge and performance confidence in the nursing treatment of paediatric asthma patients among nursing students. Following engagement in simulation-based learning, students reported enhanced knowledge and increased self-assurance in their ability to administer asthma therapy. This suggests that augmenting knowledge through simulation may significantly enhance nursing students' self-efficacy, thereby reinforcing their clinical experience in paediatric nursing.

Knowledge is widely acknowledged in the literature as a key factor in enhancing self-efficacy, particularly in clinical practice, where the belief in one's ability to handle health conditions like asthma is crucial for effective patient management. Bandura's (1997) work on self-efficacy emphasised that increased knowledge boosts confidence in one's abilities, thereby enhancing self-efficacy, a concept highly relevant to nursing practice. This is further supported by McCabe et al. (2021), who found that nursing students with greater

asthma management knowledge reported higher self-efficacy in theoretical and clinical settings, underlining the importance of integrating comprehensive asthma education into nursing curricula.

Seger's (2018) study of school nurses showed a moderate and statistically significant positive correlation ($r_s = 0.45, p < 0.01$) between asthma knowledge and SE, with nurses holding higher academic qualifications demonstrating better knowledge and higher SE scores. This finding aligns with the current study, which found that nursing students with greater asthma management knowledge also exhibited higher self-efficacy. However, Seger (2018) also found that factors such as years of experience and the type of school did not significantly influence SE, while the level of education played a crucial role. This aligns with the current study, suggesting that while knowledge is important, other variables, such as hands-on clinical experience, could also contribute to self-efficacy.

The weak correlation found in this study ($r_s = 0.225$) contrasts with the stronger associations observed in other research, such as a finding by Al Kindi (2023), where a strong positive correlation ($r_s = 0.7$) was found between asthma knowledge and SE. The findings could be due to differences in study populations, as Al Kindi's research involved practising nurses with more real-world experience. In contrast, nursing students in this study may have limited exposure to actual asthma management scenarios. As a result, limited clinical exposure hindered nursing students' ability to gain confidence and apply asthma management knowledge effectively.

Another research finding by Saied et al. (2017) revealed varying correlation patterns between knowledge and self-efficacy among nursing students in the context of asthma management. A study examining paediatric nursing students found positive correlations

between post-simulation self-efficacy and satisfaction ($r_s = 0.46, p = 0.001$) and between self-efficacy and knowledge ($r_s = 0.50, p = 0.001$). These correlations suggest that knowledge acquisition, self-efficacy development, and overall learning satisfaction are interrelated components of the learning process. As each component increases, another component also tends to increase. Thus, these components mutually reinforce one another within the context of asthma management.

Saied et al. (2017) highlighted that the relationship between prior knowledge and self-efficacy is not as straightforward as commonly assumed. While one might expect students with stronger academic backgrounds to exhibit higher levels of self-confidence in clinical tasks, the evidence suggests otherwise. Several studies have reported only weak or statistically nonsignificant associations between baseline knowledge and self-efficacy scores (Saied et al., 2017). This indicates that possessing factual or theoretical knowledge does not necessarily translate into confidence when performing clinical procedures or making patient care decisions.

These findings carry significant implications for nursing education. Relying solely on academic performance as a predictor of clinical readiness may overlook students who, despite achieving high grades, lack the self-assurance needed in real-world healthcare settings. Therefore, educational strategies should not only focus on improving cognitive knowledge but should also include targeted interventions, such as simulation training, reflective practice, and mentoring, that aim to build self-efficacy. This dual approach may be more effective in preparing nursing students to transition confidently and competently into professional practice.

Similarly, Quaranta and Spencer (2015) reported weak to moderate correlations between asthma knowledge and SE ($r_s = 0.157$ and $r_s = 0.178$, respectively), supporting the findings of this study. These weak correlations may be due to the lack of clinical exposure among nursing students, which could prevent the direct application of knowledge to practice and, in turn, limit the impact on self-efficacy. The current study emphasises the importance of education and training in boosting knowledge and self-efficacy. McCabe et al. (2021) emphasised the importance of structured programs that integrate theoretical learning with practical application, including simulations and clinical placements, which have been demonstrated to enhance knowledge and self-efficacy.

This notion is further supported by Seger (2018), who found that nurses with higher educational attainment were more knowledgeable and confident in managing asthma. Nurse-led interventions emphasising education and empowerment have been beneficial in enhancing knowledge and self-management abilities in patients, suggesting a comparable potential advantage for nursing students (Kalam et. al., 2024). These interventions typically involve providing patients with critical information about their condition, treatment options, and self-management strategies. Additionally, they emphasise building patients' confidence in managing their health independently. This approach empowers patients to take an active role in their care, enhancing their self-efficacy, which is a key factor in better health outcomes. As such, nurse-led education and empowerment have substantial implications for patients and nursing students, who are future healthcare providers. This highlights the need for nursing programs to provide comprehensive asthma management training, incorporating knowledge acquisition and practical skills.

In the context of UNIMAS, the current study suggests that while enhancing knowledge of asthma management can improve self-efficacy, the weak correlation observed

indicates that practical experience is also crucial in fostering greater confidence in asthma management. Alsulami et al. (2025) also noted a positive relationship between knowledge and clinical self-efficacy, which can be strengthened through more hands-on experience. Therefore, it is vital for nursing education programs to offer more clinical exposure and opportunities for students to apply their knowledge in real-life settings. Bosnic-Anticevich et al. (2018) showed that training programs that focus on practical application, such as workshops on asthma management techniques, significantly improve self-efficacy in nursing students. This finding suggests that providing nursing students with greater exposure to asthma management in clinical settings could help bridge the gap between knowledge and self-efficacy.

The current study's findings contribute to the existing literature on the relationship between asthma management knowledge and self-efficacy in nursing students. Although the weak positive correlation observed suggests that knowledge is an important factor, it also indicates that other elements, such as practical experience, play a role in enhancing self-efficacy. Therefore, nursing programs should aim to integrate theoretical and practical aspects of asthma management into their curricula, ensuring that students have the knowledge and skills necessary to manage asthma effectively in clinical practice. Further research is needed to explore the factors influencing the strength of the relationship between knowledge and self-efficacy and the impact of clinical experience and training on nursing students' ability to manage asthma effectively.

5.4 Summary of the Findings

The study on asthma management knowledge and self-efficacy among nursing students at UNIMAS revealed a moderate level of asthma management knowledge, with most students showing a solid understanding of asthma symptoms but facing challenges in specialised aspects, such as inhaler technique and the side effects of medications. This aligns with previous studies, including Alobaidi (2021), which found gaps in nursing students' knowledge, especially in understanding asthma treatment guidelines and medications. The study found that while 97.9% of students identified common asthma symptoms, knowledge gaps existed regarding the use of inhalers and potential side effects of asthma medications, with 42.9% of students unsure about the risk of addiction to inhaled medications and 65% misinformed about the transient effects of inhaled treatments. This highlights the need for improved pharmaceutical knowledge among nursing students to enhance their ability to administer medications correctly and safely. Simulation-based training, shown to improve knowledge retention and clinical competency in asthma management, was recommended to address these gaps. Moreover, the study found a weak positive correlation ($r_s = 0.225$, $p < 0.05$) between asthma knowledge and self-efficacy, indicating that as students' knowledge of asthma management increased, their confidence in managing asthma cases also improved. However, the correlation was weaker than in other studies, such as Seger (2018), where a moderate correlation was observed. The findings also emphasised the importance of practical exposure, as students with limited clinical experience struggled with translating theoretical knowledge into practice. Most students showed moderate to high self-efficacy, particularly in tasks like demonstrating the use of asthma devices, pharmacological decision-making, and guideline-based education, which were areas of lower confidence. These results align with research by McCabe et al. (2021), which highlighted the importance of combining

theoretical knowledge with practical experience to enhance SE. The study calls for more simulation-based training and targeted workshops to improve nursing students' self-efficacy, especially in pharmacological decision-making and adherence to evidence-based asthma management guidelines like GINA. Overall, the findings underline the necessity for nursing programs to integrate theoretical learning and clinical practice, using strategies like simulation to enhance knowledge and self-efficacy in asthma management, ensuring that future healthcare professionals are well-prepared to manage asthma effectively and safely in clinical settings.

5.5 Implications and Recommendations

5.5.1 Implications and Recommendations for Nursing Practice

The moderate knowledge and self-efficacy scores among nursing students highlighted by this study suggest that similar competency gaps may exist among registered nurses and nursing students, especially those who have not undergone recent continuing education in asthma management. Therefore, insufficient asthma knowledge and competency among nurses may lead to delayed identification of asthma symptoms and severity, including exacerbations, incorrect medication administration, and inadequate patient education, thereby compromising patient safety and outcomes. As asthma remains a chronic disease requiring long-term management, both nursing students and licensed practitioners must stay updated on the best and latest evidence-based guidelines on asthma management practices among healthcare providers. This can be achieved through continuous professional development, such as attending workshops, participating in clinical simulations, subscribing

to reputable medical journals, and engaging in institutional training programs that focus on current asthma management guidelines.

To enhance nursing practice in asthma management, healthcare institutions should prioritise ongoing professional development. Registered nurses should be encouraged, or mandated, to participate in structured asthma workshops, case-based clinical simulations, or certified asthma educator programs at least once every two years. These programs should emphasise updates on Global Initiative for Asthma (GINA) guidelines, inhaler techniques, emergency response, and patient self-management education. Furthermore, all healthcare facilities, including those in urban or suburban areas, should integrate routine in-service training and clinical audits that focus on asthma-related competencies to ensure sustained proficiency among nursing staff. These efforts will not only holistically boost the quality of care but also serve as role models and mentorship support for undergraduate students during clinical attachments.

5.5.2 Implications and Recommendations to Nursing Education

The implications of this study underscore the critical need for nursing programs to enhance both the theoretical and practical aspects of asthma management education, thereby bridging the knowledge gaps observed among nursing students. As shown in the study, despite a solid understanding of asthma symptoms, nursing students faced difficulties with specialised aspects, such as inhaler technique and the side effects of medications, which are essential for safe and effective asthma care. Previous research, such as that by Alobaidi (2021), showed that healthcare students, including nursing students, often struggle with asthma knowledge, particularly treatment guidelines and medication administration. To

address these gaps, McCabe et al. (2021) emphasise the importance of integrating simulation-based learning into nursing curricula, which has significantly improved knowledge retention and clinical skills. The outcomes of this study highlight the need for additional educational interventions to close the knowledge gap observed among UNIMAS undergraduate nursing students. Simulation-based training is particularly successful. This type of training has been shown to improve both cognitive knowledge and practical competence in the management of asthma.

Furthermore, Grissa et al. (2023) and Ünal (2023) support the notion that simulation-based training enhances students' practical competence, particularly in managing complex conditions such as asthma. Additionally, Al Kindi (2023) and Seger (2018) have demonstrated that higher levels of education are correlated with better asthma knowledge and self-efficacy, suggesting that nursing programs should offer more comprehensive asthma education that includes both theoretical instruction and hands-on experience. By incorporating these educational strategies, nursing schools, especially academicians, should revise the curriculum to include in-depth modules on asthma management aligned with national and international guidelines. Interactive teaching strategies, such as problem-based learning (PBL), simulation-based education, and video-assisted case studies, should be expanded to enable students to apply theoretical knowledge in a safe and controlled environment. Institutions are advised to increase credit hours for Medical-Surgical Nursing courses and embed asthma-focused competencies in assessments such as the Objective Structured Clinical Examination (OSCE). Establishing partnerships with healthcare institutions to provide students with exposure to asthma clinics or pulmonary rehabilitation units during clinical placements may further bridge the theory-practice gap.

5.5.3 Implications and Recommendations for Future Research

This study contributes to the limited body of research in Malaysia, particularly in Sarawak, regarding nursing students' readiness to manage asthma. The weak but significant positive correlation between knowledge and self-efficacy suggests that improving one may positively influence the other, but further exploration is required. There remains a need for deeper insights into the factors influencing asthma competency, such as prior clinical exposure, access to educational resources, and the quality of mentorship. Moreover, there is insufficient evidence about the long-term impact of asthma-focused educational interventions on clinical outcomes in Malaysian healthcare settings.

Future research should aim to conduct longitudinal studies that track changes in knowledge and self-efficacy over time, particularly before and after educational interventions, such as simulations or workshops, among nursing students and registered nurses, to assess their preparedness in managing asthma. Future research should emphasise exploring the role of personal experience through a qualitative study in shaping students' knowledge, which could help tailor more individualised training strategies for nursing students. Researchers are also encouraged to examine the differences between registered nurses and nursing students to identify gaps in the transition from academic learning to clinical practice. Additionally, qualitative studies involving interviews or focus groups should be implemented to explore and deepen the perspectives of nursing students and practising nurses on asthma care, perceived challenges, and training needs in depth. Multi-centre or cross-regional studies can offer comparative data to inform national education policies and nursing standards, ensuring asthma care remains consistent, evidence-based, and effective across Malaysia.

5.6 Limitations of the Findings

This study presents several limitations. Data obtained from the participants in this study were collected via a self-administered questionnaire. Therefore, evaluating the participant's honesty and dedication in answering the questionnaire presents difficulties in response validation, as there is a possibility that the participant may have a friend or relative complete it on their behalf. The financial resources could be a limitation to the study, as it is entirely self-funded and requires printing for the self-administered questionnaire. In addition, a time constraint impacts the study due to the limited course duration, which is occupied with theoretical instruction and practical sessions. This study uses a cross-sectional study design method because it captures data at a single point in time, making it difficult to determine cause-and-effect relationships or track changes in knowledge and self-efficacy. Also, the findings will be based on data collected simultaneously, providing insights about only that specific group during that period. This study's population is limited to UNIMAS undergraduate nursing students, which restricts the generalizability of the findings to other nursing populations or institutions with different educational backgrounds and clinical exposures. Consequently, the research's findings might not apply to all nursing students in Malaysia, as students from different institutions may exhibit different results.

5.7 Conclusions

This study found that the knowledge and self-efficacy levels of UNIMAS undergraduate nursing students regarding asthma management are moderate, respectively. Additionally, this study examined the relationship between asthma management knowledge and self-efficacy among UNIMAS undergraduate nursing students and found a weak positive correlation between these variables. Increased knowledge was associated with better self-efficacy, although the strength of the correlations was weak. While students demonstrated a solid understanding of asthma symptoms, significant knowledge gaps were identified in specialised areas, such as inhaler technique and the side effects of medications, as well as self-efficacy in managing asthma medication, which are crucial for effective asthma care. These findings align with previous research suggesting that nursing students often struggle to translate theoretical knowledge into practical skills. The study emphasises the integration of simulation-based learning into nursing curricula to address these gaps and enhance cognitive and practical competencies, as well as self-efficacy. Furthermore, it highlights the need for targeted educational interventions, particularly in pharmacological decision-making and adherence to evidence-based guidelines, such as the GINA. By enhancing asthma management education and offering more hands-on training, nursing programs can better prepare students to manage asthma effectively in clinical settings, ultimately improving patient care outcomes. The study's implications highlight the need for a more comprehensive approach to asthma education in nursing, one that incorporates both theoretical learning and experiential practice.

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APPENDIX A: COVER LETTER FOR ETHICAL APPLICATION

Javier Anak Joseph,

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.

15th 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: Javier Anak Joseph

Matrix number: 78079

IC No.: 020714-13-0383

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: Knowledge and Self-Efficacy on Asthma Management among Universiti Malaysia Sarawak (UNIMAS) Undergraduate Nursing Students: A Quantitative Study

Supervisor's name: Madam Azylina Anak Gunggu

Email address: gazylina@unimas.my

Supervisor's HP number: +6019-468 3120

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

Thank you.

Yours sincerely,



(Javier Anak Joseph)

APPENDIX B: RESEARCH APPROVAL LETTER

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

UNIVERSITI MALAYSIA
SARAWAK
94300 Kota Samarahan

MEMORANDUM

Reference : UNIMAS/NC-21.05/03-03 Jld. 8(137)

To : Javier Anak Joseph (78079)
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: Knowledge and Self-Efficacy on Asthma Management among Universiti Malaysia Sarawak (UNIMAS) Undergraduate Nursing Students: A Survey-based (Quantitative) Study**

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 : **Javier Anak Joseph**

Student ID : **78079**

Programme : **Bachelor of Nursing with Honours**

Research Title : *Knowledge and Self-Efficacy on Asthma Management among Universiti Malaysia Sarawak (UNIMAS) Undergraduate Nursing Students: A Survey-based (Quantitative) Study*

Supervisor Name : **Madam Azylina Anak Gunggu**

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 C: PARTICIPANTS INFORMATION SHEET

PROTOCOL TITLE: Knowledge and Self-Efficacy of Asthma Management among Universiti Malaysia Sarawak (UNIMAS) Undergraduate Nursing Students: A Survey-Based (Quantitative) Study

PROTOCOL IDENTIFIER: Javier Anak Joseph (78079)

SPONSOR: Self-funded

INSTITUTION ADDRESS: Faculty of Medicine and Health Science, Universiti Malaysia Sarawak, 94300 Kota Samarahan, Malaysia.

THE NATURE AND PURPOSE OF THE STUDY

The quantitative study aimed to assess the level of knowledge and self-efficacy in asthma management among undergraduate nursing students at the University of Malaysia, Sarawak. This study aims to determine the relationship between knowledge and self-efficacy in asthma management among undergraduate nursing students at the University of Malaysia, Sarawak.

STUDY DESCRIPTION

This study is cross-sectional, and the participants are selected via a simple random sampling method. This study will use a self-administered questionnaire separated into three sections, sociodemographic data questions, 24-item questions to assess the level of knowledge on

asthma management and 17-item questions to assess the self-efficacy of asthma management among undergraduate nursing students UNIMAS. The time allocated for participants to answer the questions is within 10 to 15 minutes for them to complete the questionnaire.

RISKS OF STUDY PARTICIPATION

There is no risk of study participants identified.

POSSIBLE BENEFITS OF STUDY PARTICIPATION

The study's findings can be used as baseline data regarding the knowledge and self-efficacy of asthma management among undergraduate nursing students. The findings of this study will be used to identify the knowledge gaps, which would aid in identifying important educational highlights and allow modification of the curriculum to provide students with knowledge on asthma. This will help the university determine what curriculum can be tailored to implement better knowledge and promote confidence or self-efficacy. It supports your personal and professional growth, enhances your readiness for clinical practice, and strengthens your understanding of asthma care.

VOLUNTARY PARTICIPATION

Respondent's participation in this study is voluntary and willing to answer the questionnaire.

CONFIDENTIALITY

Respondents will be informed beforehand that all personal information is classified and anonymous. The data collected will be kept between the researcher and supervisor, and the respondent's identity will not be revealed.

WITHDRAWAL FROM STUDY

Respondents can withdraw from any point of study at any time without penalty.

TO OBTAIN FURTHER INFORMATION

For further information, the researcher can be contacted directly via email at javierjoseph1472@gmail.com or through phone number, +601114034013.

Thank you,

A handwritten signature in black ink, appearing to read 'Javier', with a horizontal line extending to the right.

Javier Anak Joseph (78079)

APPENDIX D: PARTICIPANT'S INFORMED CONSENT



CONSENT TO PARTICIPATE IN THIS STUDY

I have read, or have been read to me, in language understandable to me, the above information. The content and meaning of this information have been fully explained to me. I have had time and opportunity to ask any questions that I have about the study and this form, and all my questions have been answered. I have read, or have been read to me, all pages of this consent form and the risks described. I voluntarily consent and offer to take part in this study. By signing this consent form, I certify that all information I have given, including my medical history, is true and correct to the best of my knowledge. I understand that I will receive a copy of this signed consent form.

Participant

Printed name of participant

Signature of participant

IC No.

Date

Thumbprint of subject (if applicable)

Witness

Printed name of witness

IC No.

Signature of witness

Date

Representative (if applicable)

Printed name of legally authorized
Representative (if applicable)

IC No.

Signature of legally authorized

Date

Representative

Relationship to the participant: _____

Research assistant / designated investigator

Printed name of person explaining consent

IC No.

Signature of person explaining consent

Date

APPENDIX E: DATA COLLECTION INSTRUMENTS

Section A: Sociodemographic Information

Instruction: Tick (✓) one in any box and write an appropriate answer in the space provided.

1. Matric Number: _____

2. Gender:

a) Male ☐

b) Female ☐

3. Age: _____ years old

4. Year of study:

a) Year 2 ☐

b) Year 3 ☐

c) Year 4 ☐

5. Ethnicity:

a) Malay ☐

b) Chinese ☐

c) India ☐

d) Bumiputera Sarawak ☐

e) Bumiputera Sabah ☐

6. Religion:

a) Islam ☐

b) Christian ☐

c) Hindu ☐

d) Buddhist ☐

e) Others: _____

7. CGPA: _____/4.00

8. Have you experienced taking care of patients with asthma before?

Yes

☐

No

☐

9. Weeks of clinical experience: _____ weeks

Section B: Asthma Knowledge Questionnaire

To determine the level of knowledge of asthma management among UNIMAS undergraduate nursing students.

Please tick (✓) in a box under the suitable option for you and fill in the question below.

No.	Questions on Asthma Knowledge	Yes	No	Not Sure
1	Is asthma a hereditary disease?			
2	Does asthma inflammation cause constriction in the airways?			
3	Is asthma a contagious disease?			
4	Do aspirin and some anti-hypertensive drugs cause asthma symptoms?			
5	Do respiratory infections precipitate asthma?			
6	Asthma attacks are more common in cold weather.			
7	Are symptoms such as cough, wheezing, dyspnoea, and chest tightness seen in asthmatic patients?			
8	Can asthmatic patients take part in sports?			
9	Do inhaled medications cause addiction?			
10	Is asthma a disease that cannot be cured but can be controlled?			
11	If an asthmatic patient does not use the treatment regularly, do asthma attacks threaten life?			
12	Are inhaled medications the most effective delivery method for the treatment of asthma?			
13	Do inhaled drugs reach the airways directly?			
14	Do the effects of inhaled drugs disappear quickly?			

15	Do the inhaled drugs enter the systemic circulation in small amounts?			
16	Can these side effects be avoided?			
17	MDI devices should be cleaned at least once a week.			

Section C: Asthma Self-Efficacy Questionnaire

To investigate the level of self-efficacy towards asthma management among UNIMAS undergraduate nursing students.

Please tick (✓) only one for each question in a box under the suitable option for you.

No.	Questions on self-efficacy of asthma management	Not relevant	Somewhat relevant	Quite relevant	Highly relevant and concise
1	When I have concerns or questions about my asthma management, I feel comfortable contacting my primary healthcare provider and discussing my concerns.				
2	When I have concerns or questions about a patient's asthma management, I feel comfortable approaching the patient and discussing my concerns.				
3	I can correctly assess the needs of patients with asthma.				
4	I can correctly demonstrate how to use a metered-dose inhaler to a patient.				
5	I can correctly demonstrate how to use a peak flow meter.				

6	I can evaluate the effectiveness of the self-management efforts of a patient with asthma.				
7	I can correctly choose which asthma medication to give depending on the symptoms the patient is experiencing.				
8	I can influence patients with asthma and their families to reduce asthma triggers at home by teaching asthma environmental control.				
9	I can confidently teach patients how to manage their asthma correctly, aligning with globally recommended guidelines, such as the Global Initiative for Asthma (GINA).				
10	I can determine when to administer asthma medication when a patient with asthma is having symptoms				
11	I can provide asthma instructions that the patient can understand.				

12	I can determine whether the asthma medication is working for a patient having an asthma exacerbation.				
13	I can determine the severity of an asthma attack based on the symptoms.				
14	I can help patients with asthma avoid asthma symptoms.				
15	I can take the necessary steps to avoid or manage an asthma attack effectively.				
16	I have a lot of confidence in my ability to detect the early warning signs of asthma.				

APPENDIX F: PERMISSION TO USE TOOLS

Asthma Knowledge Questionnaire

1/22/25, 6:52 PM

Mail - JAVIER ANAK JOSEPH - Outlook



Request to Use Asthma Knowledge Questionnaire for Research for Undergraduate Nursing Program

From JAVIER ANAK JOSEPH <78079@siswa.unimas.my>
Date Tue 2024-11-05 6:35 PM
To rezandemiralay@sdu.edu.tr <rezandemiralay@sdu.edu.tr>

Dear Assoc. Prof. Dr. Rezan DEMIRALAY,

Kindly allow me to introduce myself, I am Javier anak Joseph, a final year Bachelor of Nursing Student at the University of Malaysia Sarawak (UNIMAS). I will be conducting a research entitled 'Knowledge and Self-efficacy on Asthma Management among University Malaysia Sarawak (UNIMAS) undergraduate nursing students' for my Final Year Project (FYP). I am writing to ask written permission to use the Asthma Knowledge Questionnaire in my research study. I would like to use the whole instrument to examine the knowledge among UNIMAS undergraduate nursing students. My research would be conducted quantitatively with a sample size of around 150+ UNIMAS undergraduate nursing students.

I plan to utilize the research instruments in my study as they are suitable for measuring my research questions. Physical copies of the survey will be distributed among the students, and statistical analysis will be conducted using IBM SPSS Statistics 27.

I would also appreciate receiving copies of

- (1) The test questionnaires/questions list,
- (2) Scoring procedures, and
- (3) Total Scores for the Asthma Knowledge Questionnaire and their ranges and indications.

I would like to use [and reproduce] your research instrument under the following conditions:

- I will use the instrument only for my research study and will not sell or use it for any other purposes.
- I will include a statement of attribution and copyright on all copies of the instrument. If you have a specific statement of attribution that you would like for me to include, please provide it in your response.

If these are acceptable terms and conditions, please indicate so by replying to me through e-mail: 78079@siswa.unimas.my

Sincerely,
Javier

Asthma Self-Efficacy Questionnaire

1/22/25, 6:51 PM

Mail - JAVIER ANAK JOSEPH - Outlook



Request to Use Questionnaire for Research for an Undergraduate Nursing Students

From JAVIER ANAK JOSEPH <78079@siswa.unimas.my>
Date Mon 2024-11-25 11:41 PM
To jquarant@binghamton.edu <jquarant@binghamton.edu>

Respected Associate Professor Dr. Judith E. Quaranta,

I hope this message finds you well.

Kindly allow me to introduce myself, I am Javier anak Joseph, a final year Bachelor of Nursing Student at the University of Malaysia Sarawak (UNIMAS). I will be conducting a research entitled 'Knowledge and Self-Efficacy on Asthma Management among University Malaysia Sarawak (UNIMAS) Undergraduate Nursing Students' for my Final Year Project (FYP). I am writing to ask written permission to use the School Nurses Asthma Self-Efficacy Questionnaire. I would like to use the whole instrument to examine self-efficacy among UNIMAS undergraduate nursing students. My research would be conducted quantitatively with a sample size of around 160+ UNIMAS undergraduate nursing students.

I plan to utilize the research instruments in my study as they are suitable for measuring my research questions. Physical copies of the survey will be distributed among the students, and statistical analysis will be conducted using IBM SPSS Statistics 27.

I would also appreciate receiving copies of

- (1) The test questionnaires/questions list,
- (2) Scoring procedures, and
- (3) Total Scores for the Asthma Knowledge Questionnaire and their ranges and indications.

I would like to use [and reproduce] your research instrument under the following conditions:

- I will use the instrument only for my research study and will not sell or use it for any other purposes.
- I will include a statement of attribution and copyright on all copies of the instrument. If you have a specific statement of attribution that you would like for me to include, please provide it in your response.

If these are acceptable terms and conditions, please indicate so by replying to me through e-mail: 78079@siswa.unimas.my

Sincerely,
Javier

APPENDIX G: GANTT CHART

ACTIVITIES	YEARS/MONTHS									
	2024			2025						
	OCT	NOV	DEC	JAN	FEB	MAC	APR	MAY	JUNE	JULY
Determination of the research title										
Literature review										
Meeting with the supervisor										
Submit oral defence slides										
Ethical approval										
Submission of the FYP I first draft										
FYP I: Submission of research proposal										

Data collection										
Data analysis										
Writing report										
Submission of the FYP II first draft										
Poster Presentation										
FYP II: Submission of the final report										

APPENDIX H: EXPENDITURE

Expenditures of study

EXPENDITURE			
Project Title	Knowledge and Self-Efficacy on Asthma Management among UNIMAS Undergraduate Nursing Students: A Survey-Based (Quantitative) Study		
Duration of Project	October 2024 – July 2025		
Nature of Expenditure/Item	Unit price (RM)	Quantity	Amount (RM)
Material and supplies			
Notebook	RM2.60	1	RM2.60
Pen	RM1.20	1	RM1.20
Ink printer 790BK (Canon G2010)	RM40.00	1	RM40.0
A4 80GSM	RM15.20	2	RM30.40
Publication/Reports			
Binding service	RM5.00	1	RM5.00
SPSS Version 27 software	RM5.00	1	RM5.00
Transportation	1	RM30.00	RM30.00
Fuel			
Poster Presentation	1	RM40.00	RM40.00
A1 size poster			
GRAND TOTAL (RM)			RM154.20

APPENDIX I: TURNITIN SIMILARITY INDEX REPORT

FYP11_FINAL DRAFT 78079

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STUDENT PAPERS

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