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**KNOWLEDGE, ATTITUDE AND PRACTICE ON RABIES AMONG UNIMAS
UNDERGRADUATE NURSING STUDENTS**

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**This project is presented as part of the fulfilment of the requirements for the Bachelor
of Nursing with Honours degree.**

Faculty of Medicine and Health Sciences

UNIVERSITI MALAYSIA SARAWAK

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DECLARATION

I affirm that the research project titled ‘Knowledge, Attitude and Practice on Rabies among UNIMAS Undergraduate Nursing Students’ is my own original work. It was conducted at the Faculty of Medicine and Health Sciences (FMHS), Universiti Malaysia Sarawak (UNIMAS) between the years 2024 and 2025. I confirm that all citations and references used have been duly acknowledged in the text. I hereby affirm that this research has not been previously submitted for any evaluated qualification.

Signature

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ABSTRACT

Knowledge, attitude and practice on rabies is considered a vital aspect in nursing that is needed to be considered to be included into the education syllabus. This is due to nurses are the frontliner or the first person who is responsible in educating the community on how to decrease the spreading of the virus along with the measures taken in preventing rabies. It is very important to include rabies topic as one of the nursing educations in helping the nursing students to enhance their level of knowledge, attitude and practice regarding rabies. Thus, a cross-sectional study was carried out in assessing the level of knowledge, attitude and practice on rabies among the UNIMAS undergraduate nursing students. 170 nursing students from Faculty of Medicine and Health Sciences who has fulfilled the inclusion criteria, has been involved in the overall study. The participants were chosen through simple random sampling and all the data obtained was analysed by using a software called Statistical Package of Social Sciences (SPSS), version 27.0. Moreover, this study has shown that the UNIMAS undergraduate nursing students have both poor knowledge ($M: 7.25, SD: 2.48$) and poor attitude ($M: 6.70, SD: 1.381$), as well as poor practice on rabies ($M: 29.46, SD: 3.77$). Furthermore, there were a weak positive correlation between level of knowledge and practice ($r_s = .216, n = 164, p = .004$), along with level of knowledge and attitude ($r_s = .221, n = 164, p < .001$). However, there was a moderate positive correlation between level of attitude and practice ($r_s = .347, n = 164, p < .006$). In conclusion, this study has found that there is a relationship between level of knowledge, attitude and practice on rabies among UNIMAS undergraduate nursing students.

Keywords: knowledge, attitude, practice, rabies disease and nursing students

*Pengetahuan, Sikap dan Amalan terhadap Rabies dalam Kalangan Pelajar Ijazah Sarjana
Muda Kejururawatan UNIMAS*

ABSTRAK

Pengetahuan, sikap dan amalan terhadap penyakit rabies dianggap sebagai aspek penting dalam bidang kejururawatan yang perlu dipertimbangkan untuk dimasukkan ke dalam silibus pendidikan. Hal ini kerana jururawat merupakan barisan hadapan atau individu pertama yang bertanggungjawab dalam mendidik masyarakat tentang langkah-langkah pencegahan terhadap penyakit rabies. Sehubungan dengan itu, satu kajian keratan rentas telah dijalankan bagi menilai tahap pengetahuan, sikap dan amalan terhadap penyakit rabies dalam kalangan pelajar kejururawatan prasiswazah di UNIMAS. Seramai 164 orang pelajar kejururawatan dari Fakulti Perubatan dan Sains Kesihatan yang memenuhi kriteria inklusi telah terlibat dalam kajian ini secara keseluruhan. Peserta telah dipilih melalui kaedah persampelan rawak mudah dan semua data yang diperolehi telah dianalisis menggunakan perisian Statistical Package of Social Sciences (SPSS) versi 27.0. Hasil kajian ini menunjukkan bahawa pelajar kejururawatan prasiswazah UNIMAS mempunyai tahap pengetahuan yang rendah (Min: 7.25 , SP: 2.483), sikap yang rendah (Min: 6.70 , SP: 1.381), serta amalan yang rendah terhadap rabies (Min: 29.46 , SP: 3.775). Tambahan pula, terdapat hubungan korelasi positif yang lemah antara tahap pengetahuan dan amalan ($r_s = .216$, $n = 164$, $p = .004$), serta antara tahap pengetahuan dan sikap ($r_s = .221$, $n = 164$, $p < .001$). Namun begitu, terdapat hubungan korelasi positif yang sederhana antara tahap sikap dan amalan ($r_s = .347$, $n = 164$, $p < .006$). Kesimpulannya, kajian ini telah mendapati bahawa terdapat hubungan antara tahap pengetahuan, sikap dan amalan terhadap penyakit rabies dalam kalangan pelajar kejururawatan prasiswazah UNIMAS.

Kata kunci: pengetahuan, sikap, amalan, penyakit rabies dan pelajar kejururawatan

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LISTS OF ABBREVIATIONS AND SYMBOLS

LISTS OF ABBREVIATIONS

UNIMAS	Universiti Malaysia Sarawak
M	Mean
SD	Standard Deviation
WHO	World Health Organization
SPSS	Statistical Package of Social Sciences
KAP	Knowledge, Attitude and Practice

LISTS OF SYMBOLS

p	Coefficient symbol of Spearman's Correlation Test
%	Percentage
CI	Correlation Coefficient of Correlation test
D	Coefficient symbol of Kolmogorov-Smirnov test
SD	Coefficient symbol of Standard Deviation
IQR	Coefficient symbol of Interquartile Range

CHAPTER 1

INTRODUCTION

1.0 Introduction

This chapter consists of eight subsections in which the researcher will elaborate on background of the study, problem statement, research questions, general research objective, specific research objectives and hypotheses. Other than that, the significance of the study is one of the subsections in this chapter including the definition of terms that consists of both conceptual and operational definitions.

1.1 Background of Study

Rabies is an infectious tropical disease, and it is considered as a significant threat to the country's public health. This disease has been considered as endemic in developing countries especially in the Asia region such as Malaysia (WHO, 2024) as it has been under controlled with medications that can prevent the disease from developing, however, rabies outbreaks are still occurring until these days (Rupprecht et al., 2022). Based on the World Health Organization, the prevalence of rabies outbreaks that causes fatalities to human populations leads up to 95% and has been present in over 150 countries and territories especially Africa and Asia regions. It has affected over 59,000 human deaths annually, with 99% fatality cases (World Health Organization, 2024) Other than that, Malaysia has reported of its first confirmed cases of rabies back then during 2017, which has totaled of 76 cases and out of the 72 were confirmed cases that resulted to death (World Health Organization, 2024) It was also reported that rabies cases has calculated in about 995 confirmed case of rabies in animals with Sarawak accounting 97.99% of these cases from 2015-2023. Furthermore, human rabies case had a fatality

rate around 90.28% in Sarawak all through 2015-2023 (Wada et.al., 2024) Moreover, based on Sarawak Weekly Epid News (SWEN) from Sarawak Health Department, on the epidemiological week 41 of 2024, it was reported that approximately of 14,623 animal bites notified with 6 confirmed human rabies case which all resulted to death. Therefore, in combating the fatality rate caused by rabies, the World Health Organization has initiated a global campaign of “United Against Rabies” with the aim in eliminating fatalities caused by rabies by 2030. This campaign will holistically approach human health, animal health and environmental consideration.

1.2 Problem Statement

Rabies remains a critical public health concern in almost every country. Nevertheless, there exists an insubstantial of thorough study that focuses on investigating nursing students’ understanding of the disease, their attitudes towards it along with on how the students handle the disease once encountering it. As future frontliners in healthcare, nursing students play a pivotal role in managing viral diseases, including rabies. Nursing students are always actively involved in patient care and are likely to encounter rabies cases requiring urgent intervention. In view of the high fatality rate caused by rabies, a solid foundational knowledge, positive attitude and effective practice regarding rabies are essential for ensuring readiness to address this zoonotic disease effectively (Kim et al., 2022). However, existing literature indicates a concerning gap in the knowledge and attitudes of nursing students towards rabies management. For instance, a study conducted in Puducherry, India revealed that nursing students exhibited poor knowledge and negative attitudes regarding critical aspects of rabies management (Anand et al., 2017). Similarly, research from Central India highlighted that final-year nursing students demonstrated inadequate practical skills related to rabies prevention and management (Dixit et al., 2012).

Based on Dixit et al. on a study conducted in 2012, formal academic curricula often do not cover specific viral diseases like rabies, leading to insufficient knowledge among nursing students. This gap in education and exposure can limit their ability to take initiatives and plan interventions effectively towards rabies cases. For example, insufficient knowledge about the transmission routes, symptoms and management of rabies can lead to delayed or inappropriate care, increasing the risk of poor patient outcomes. There is a wide range of research available worldwide that investigates and examines the knowledge, attitude and practice of nursing students towards rabies incidents and cases. Thus, it is crucial to consider that there are limited studies based in Malaysia that covers in investigating this particular subject. Therefore, the primary objective of this study is to assess the knowledge, attitude and practice of UNIMAS undergraduate nursing students towards rabies incidents, with the aim of fulfilling current research gaps.

1.3 Research Questions, General and Specific Research Objectives

1.3.1 Research Questions

1.3.1.1 What is the level of knowledge about rabies among UNIMAS undergraduate nursing students?

1.3.1.2 What is the level of attitude on rabies in animals among UNIMAS undergraduate nursing students?

1.3.1.3 What is the level of practice on towards rabies prevention among UNIMAS undergraduate nursing students?

1.3.1.4 What is the relationship between level of knowledge, attitude and practice on rabies among UNIMAS undergraduate nursing students?

1.3.2 General Research Objectives

This research study will be conducted to assess the level of knowledge, attitude and practice on rabies among UNIMAS undergraduate nursing students.

1.3.3 Specific Research Objectives

1.4.3.1 To assess the level of knowledge on rabies among UNIMAS undergraduate nursing students.

1.4.3.2 To evaluate the attitude of UNIMAS undergraduate nursing students towards rabies.

1.4.3.3 To assess the level of practice of UNIMAS undergraduate nursing students towards rabies prevention.

1.4.3.4 To examine the relationship between the level of knowledge, attitude and practice of rabies among UNIMAS undergraduate nursing students.

1.3.4 Hypothesis

1.3.4.1 Null Hypothesis (H_0)

There is no relationship between level of knowledge, attitude and practice on rabies among UNIMAS undergraduate nursing students.

1.3.4.2 Alternate Hypothesis (H_A)

There is a relationship between level of knowledge, attitude and practice on rabies among UNIMAS undergraduate nursing students.

1.4 Significance of Study

This study focuses on contributing towards the implementation of educational intervention within the nursing curriculum. Through assessing the level of knowledge, attitude and practice towards rabies, this study can highlight specific areas whereby an enhanced educational intervention may help in shaping better forms of nursing students. For instance, targeted workshops or curricular

enhancements can be developed in order to eliminate the gaps between the level of knowledge, attitude and practice among the nursing students. Other than that, this study will contribute to increasing the urgency and readiness of the nursing students regarding the rabies management as future nurses. As future healthcare frontliners, it is very important to be well-prepared to address viral disease cases especially rabies effectively. By possessing a good understanding of rabies including its transmission, management and its prevention, the nursing students will be better equipped to respond to potential outbreaks and able to educate patients as well as the community on the preventive measures. Furthermore, Malaysia's public health authorities could benefit from the understandings this research presents. Through identifying the lack of knowledge, attitude and practice among the nursing students as the future frontliners, these can alert the policymakers of the country to implement and advocate for curricular reforms at educational institutions. This could lead to more effective public health training programs emphasizing viral diseases such as rabies and ultimately contributing to more emerged and capable healthcare workforce.

1.5 Operational Definition of Terms

1.5.1 Knowledge

Knowledge can be defined as the familiarity, awareness and understanding of facts and details of a certain subject that is acquired via experience or through education that may be possessed by individuals or by a group of individuals (Crooks and Alibali, 2014). In this study, knowledge refers to the understanding and awareness of rabies disease by the UNIMAS undergraduate nursing students. An assessment tool in regard to rabies disease's knowledge is adapted from Ba et al. (2021). This tool consists of a set of 16 items that are either true or false.

1.5.2 Attitude

Based on DeFleur and Westie (2011), attitude can be defined as a psychological tendency that manifests through an evaluation of a particular entity in which whether it be an object, person or a situation based on the degree of favor or disfavor. In this study, attitude can be defined as the level of agreement of the nursing students on rabies management and prevention. The attitude will be assessed using a questionnaire from Ba et al. (2021). This tool consists of a set of 9 items that consists of five-point Likert scale. Each item is assigned a score on a scale of 1 to 5, with each corresponding to a different scale, starting from strongly disagree with a score of 1 and ending with strongly agree as the highest score, which is 5.

1.5.3 Practice

Practice refers to the actual application or use of knowledge and skills in real-world situations. It also guides in the understanding that practice not only involves theoretical but also include in the execution of competencies in practical context (Garbett and McCormack, 2018). In this research, practice can be defined as an evaluation of the adherence towards rabies prevention and management through stray dogs handling and the post-exposure managements. The practice component will be assessed using the questionnaire adopted from Ba et al. (2024), in which it consists of 7 items that will be measured through a five-point Likert scale. Each item is assigned a score on a scale of 1 to 5, with each corresponding to a different scale, starting from strongly disagree with a score of 1 and ending with strongly agree as the highest score, which is 5.

1.5.4 Rabies

Rabies is defined as a disease that affects the body's nervous system and has the potential to cause fatalities. Dogs, cats, and other animals can transfer rabies to humans. (Cambridge Dictionary) Based on WHO (2024), rabies transmits between mammals through virus, and they attack and affects their brain as the primary nervous system of mammals while commonly transmitting the virus between animals such as dogs, cats, and livestock. Thus, the rabies virus spreads through saliva entering a victim's body from bites wounds, scratches, or mucosal contact with an infected animal. The disease ends in death for all confirmed cases. (WHO, 2024).

1.5.5 Undergraduate Nursing Students

Undergraduate nursing student is defined as an individual who is currently enrolled in a Bachelor's degree program in nursing, according to Dungen (2021). Crook et al. (2015) states that the nursing students represent a critical segment of future healthcare workforce, characterized by their role in bridging theoretical knowledge and practical application in patient care. In this study, the undergraduate nursing students referred to individuals who enrolled in Bachelor of Nursing with Honours at University of Malaysia Sarawak (UNIMAS).

1.6 Summary

In conclusion, the connection between knowledge, attitude and practice is presence, in which it holds an important role in the field of nursing especially in infectious disease control. However, there has been limited study examining and investigating between knowledge, attitude and practice on rabies among the nursing students. The purpose of this research is to examine the extent of knowledge, attitude and practice towards rabies disease among the UNIMAS undergraduate nursing students. The main purpose of this study is to close the gap between the nursing students towards rabies disease. Hence, this chapter defines the knowledge, attitude and practice of undergraduate nursing students at UNIMAS.

CHAPTER 2

LITERATURE REVIEW

2.0 Introduction

This section will comprise a brief outline of the most recent literature related to the study. Section 2.2 provides a summary of the level of knowledge about rabies disease. Section 2.3 will give an overview of the attitude towards rabies disease. Then, followed by Section 2.4 in which it will covers the level of practice towards rabies prevention and management. On the other hand, in section 2.5, this section will present the association between level of knowledge, attitude and practice towards rabies disease with demographic data, specifically gender and year of study. Then, section 2.6 will be concluded with a summary of the chapter. Moreover, the articles that were utilized in this literature review are sourced from a reputable platform including ResearchGate, Google Scholar, PubMed, Elsevier, Nursing Research and also Journal of Advanced Nursing. Furthermore, the articles are obtained from various platforms, also from the most recent literatures in which the studies are still within a ten-year period, spanning from 2013 to 2024. The keywords used for this literature review includes “knowledge”, “attitude”, “practice”, “rabies disease” and “nursing students”.

2.1 Knowledge about Rabies

Rabies is a deadly case of viral zoonosis and remains a significant public health issue worldwide and particularly in the developing nations’ region. It is important to understand how rabies is transmitted, its symptoms, and how it can be prevented and controlled.

Thus, a cross-sectional study conducted by Ahmad et al. (2024) was focused on the healthcare professionals in Peshawar Pakistan, and the study revealed a good level of knowledge from its respondents. The majority of participants (91%) recognized dogs as rabies carriers and also most of the respondents (81%) knew anti-rabies vaccine as the main treatment. Most healthcare providers understood that anti-rabies vaccine treatment is safe for pregnant and breastfeeding women. Seventy percent recognized cleaning bite wounds with soap and water as essential while all healthcare workers knew the correct length of time for wound washing. Most people knew the signs and outcome of rabies (92%) and trusted that Post-Exposure Prophylaxis (PEP) treatment can save people who were bitten by rabid animals (88%). This high level of knowledge points to the efficacy in the region of public health campaigns and professional training. Ahmad et al. (2024) also mentioned that healthcare providers have a great part to play in informing the public and managing cases of rabies exposure, therefore the study stresses the need for proper awareness. Hence, as Ahmad et al. (2024) suggests, the findings align with previous studies situated in India, where healthcare professionals displayed a solid foundational understanding of rabies but required enhanced training on specific protocols, such as immunoglobulin use and advanced wound care techniques.

Furthermore, a cross-sectional study by Tiwari (2018) also evaluated the knowledge of students of Medicine in an India's government medical college through a pre-tested questionnaire. Most students (83.1%) knew rabies came from a virus and recognized dogs (93.4%) as the main host where the virus lives. Over nine out of ten students understood rabies spreads from bites of infected animals. Survey results showed students were not fully informed about rabies details. Specifically, 45.9% knew how long the virus takes to develop and only 43.7% understood what vaccinations to take following exposure. Tiwari (2018)

suggests in his study that rabies education can be effectively integrated into medical curricula to train future healthcare professionals to handle rabies-related cases. Moreover, medical students are particularly important to possess a comprehensive information regarding rabies as medical students are expected to treat rabies cases in clinical and community settings. Thus, Tiwari (2018) states that this finding is also aligns with previous study in Pakistan, as good knowledge in rabies disease may lead to a decrease in rabies-related deaths and that a greater approach towards awareness to the community can be achieved.

However, Anand et al. (2017) has a different result. On the contrary, Anand et al. (2017), has conducted a cross-sectional study on nursing student's knowledge about rabies to test their ability pre and post educational intervention, and has found that the nursing students possess fair knowledge level on rabies disease during the pre-educational intervention. Overall, it was found that only 16.6% of nursing students had knowledge about modes of rabies transmission, while 53.4% had knowledge about preventive measures of rabies. Anand et al. (2017) suggest that nursing students lack initial knowledge about rabies and that this alarms the further implementation of rabies disease into education system or their nursing syllabus as this knowledge has serious implications for their ability to teach patients and prevent rabies transmission in clinical settings. According to Anand et al. (2017), educational interventions significantly improved the students' knowledge. Hence, Anand et al. (2017) also mentioned that the gap that was found in this study also aligns with a previous study that is also conducted within the nursing students in some institutions in India.

Furthermore, a cross-sectional study from Pervane et al. (2024) on Turkish medical students regarding their knowledge level on rabies, the study shows that most participants (96.9% and 87.4%) correctly identified dogs and cats as primary rabies vectors, but many

were unaware that farm animals posed a very limited risk for rabies with incorrect responses ranging from 61.8% to 72.1%. On the other hand, the study also mentioned that wound care practices as one of an essential component of post-exposure care, are also not well understood. For example, Pervane et al. (2024) stated that 64.3 percent of students in the Turkish study held incorrect opinion that wounds should not be touched until after medical attentions, and many endorsed harmful practices including cleaning wounds using saliva (24.4%) or extracting blood from the wound site (34.8%). In addition, the study revealed a gap in the knowledge on rabies vaccine administration regarding the most vulnerable groups, including pregnant women (45.2%) and immunosuppressed individuals (37.4%). For example, knowledge of rabies immunoglobulin indications was low, with correct responses ranging from 15.9 to 57.8%. Hence, Pervane et al. (2024) also mentioned that the results obtain in this study is aligned with studies that has been done before and this suggests that medical students lack sufficient awareness of rabies immunization schedules and exposure classifications. These knowledge gaps in general suggest there is an urgent requirement of improved educational interventions and curriculum improvements of current rabies courses to bust existing misconceptions and to prepare future health care providers with the appropriate skills needed to prevent and manage rabies.

2.2 Attitude towards Rabies

Rabies is a preventable, yet fatal viral disease and healthcare professionals must be proactive in its management and prevention. Attitudes to rabies management are a key determinant of healthcare practices in areas where rabies is endemic. Positive attitudes encourage proactive vaccination and provide timely intervention, whereas negative attitudes can cause delay in vaccination, poor uptake of vaccines, and less than optimal treatment of patients.

Several study projects have been conducted in investigating the attitude of specific personnels related in the medical field worldwide towards the rabies disease. One of them is a cross-sectional study that has been carried out by Sawai Man (2023) that includes medical interns. This study conducted by Sawai Man (2023) has resulted to the medical interns having a good attitude towards rabies disease. The medical interns in a medical college in India were probed in Sawai Man (2023) project to find out the attitudes of the interns, and resulting to 92% of the participants said they would take the rabies vaccinations. The medical interns also show a high support of 93% of all the participants towards medical professionals to take the rabies vaccination. In addition, 92% shows a great commitment in completing a full required and prescribed dose of the pre-exposure prophylaxis (PEP) vaccination. Furthermore, 85% of respondents were willing to attend awareness camps on PEP, demonstrating enthusiasm for engaging in educational initiatives and enhancing rabies prevention knowledge. The extent of this willingness is a positive attitude towards personal protection and more broadly rabies prevention efforts. Sawai Man (2018) also suggests that exposure to early medical training, as well as knowledge of how severe rabies can be, has formed a sense of responsibility and preparedness to protect themselves and their future patients. Therefore, Sawai Man (2018) mentioned that the findings that focusing on public knowledge and vaccination matches global plans to stop deaths from dog-transmitted rabies by 2030.

However, in contrast to the findings of Sawai Man (2023), a study from Rana et al. (2021), found negative attitudes regarding rabies among both healthcare professionals in Bangladesh. According to Rana et al. (2021), it shows that merely 28.68% of the healthcare professionals understand the importance of using soap and water to wash wounds during PEP procedures. Many healthcare professionals (35%) did not think they needed to see a

doctor after animal bites which shows they do not understand the need for quick medical help. Public opinion among all groups shows a shared negative attitude toward dogs because more than 90% of participants link stray dogs directly to rabies transmission.

A cross-sectional study by Monje et al. (2020) similarly discovered that 77% of human health providers in Uganda had bad attitudes towards rabies management and prevention. Monje et al. (2020) states that people with different levels of education have distinct views about these responses. Respondents with degrees were seven times more likely to display positive attitudes (OR = 7.23, 95% CI: 1. Respondents who completed degree programs demonstrated seven times more favourable attitudes than people who earned diplomas or certificates. The findings revealed educational attainment influenced significantly more than professional experience and job titles together. The findings match research from across the world that shows training healthcare workers helps fight rabies and backs worldwide efforts to stop rabies deaths by 2030.

The findings highlight the importance of attitude improvement strategies including improving educational curricula, overcoming systemic barriers, and promoting a supportive workplace environment. By prioritizing these efforts, healthcare systems help to create an empowered provider who can be actively involved in the prevention of rabies and contribute to the global rabies eradication goals.

2.3 Practice Towards Rabies Management and Prevention

An essential part of the process is the proper handling of exposure to rabies, including first aid treatment for the affected area and the administration of the post-exposure prophylaxis (PEP). This level of practice among healthcare professionals most definitely

determines the timeliness and effectiveness of intervention. Few studies have revealed the importance of practice of the post-exposure prophylaxis management in preventing rabies disease progression in one's individuals.

One of the studies by Mapatse et al. (2022) revealed that most of the healthcare professionals have possessed good practice towards rabies wound management. This cross-sectional study has involved 42 health practitioners from eight facilities in Massingir district of Mozambique. Thus, Mapatse et al. (2022) reported that 90.5% of healthcare practitioners in Mozambique demonstrated awareness of proper wound care after a dog bite, with the majority of in about 34 healthcare practitioners (89.4%) correctly stating that washing the wound with soapy water immediately after exposure is a critical step. This practice aligns with the World Health Organization (WHO) guidelines, which emphasize immediate wound cleansing as a primary measure to reduce the risk of rabies transmission. Moreover, Mapatse et al. (2022) also stated that 83.3% of the healthcare practitioners encourage the importance of dog's vaccination as one of the preventive measures of rabies disease. Hence, this high level of compliance among healthcare practitioners in Mozambique suggests that educational initiatives or practical training programs have successfully instilled the importance of proper wound care in rabies prevention.

In supporting the previous study, a quasi-experimental study by Patel et al. (2023) in which involves 119 nursing students from a university in Rajasthan, India also revealed that about 94.1% of the nursing students from India shows a union encouragement on the essentiality on receiving treatment prior to post-exposure of animal bites as one of the factors of rabies. Furthermore, Patel et al. (2023) mentioned that 105 out of 119 students (89.1%) shows that vaccination as the post-exposure prophylaxis (PEP) is necessary even though the case is yet to be confirmed as rabies case. Patel et al. (2023) has revealed that most of the

nursing students has possessed a proper practice for rabies prevention and management even before educational intervention during the study.

However, Dixit et al. (2012) possessed a different result from the two studies mentioned. A cross-sectional study that involves 100 final year nursing students in an institution in India found a contrast between two studies that resulting to poor practice of both healthcare practitioners and nursing students. Hence, Dixit et al. (2012) revealed that only 66% of the students has a poor self-awareness about first aid after an animal bite as well as knowledge on how to treat bitten wound and handling of stray dogs. Other than that, the study reported that only 21% (21 out of 100 students) possessed the awareness on the schedule for post-exposure prophylaxis, in which is the different outcome from research done by Patel et.al. (2023). Hence, Dixit et al. (2012) mentioned that the nursing students may receive an inadequate exposure on rabies management and prevention throughout their nursing syllabus.

The cross-sectional and descriptive study by Ba et al. (2021) in the Kaffrine district aimed to examine the rabies-related knowledge, attitudes, and practices of professionals working in both fields of healthcare in human and animal. A total of 95 participants from these two fields were included in the study. Ba et al. (2021) focuses on the animal bites handling related questions for the human health professionals. The study revealed that only a minority (45.3%) of healthcare professionals demonstrated adequate practice of handling suspected animal bites. Furthermore, the study reveals that only 23.7% of the human health professionals has collaborated with the veterinary services when managing a suspected rabies case.

2.4 Relationship Between Knowledge, Attitude and Practice on Rabies

The three variables which are knowledge, attitude and practice are crucial in rabies management since they predicate the success of the overall effort. Analyses conducted by various authors on different sample population help illustrate the dynamics of these three variables and identify the aspects that require further development to support better outcomes for the population in countries where rabies remains a significant threat.

Thus, Monje et al. (2020) has conducted a cross-sectional study that examines the level of knowledge, attitude and practice on rabies disease that involves professionals from both fields of human healthcare and animal that consisted of 147 professionals selected randomly. The study conducted by Monje et al. (2020) revealed a positive correlation between the level of knowledge of healthcare practitioners with their attitude towards rabies management ($p < .001$). Monje et al. (2020) claimed that the respondents who possessed sufficient knowledge on rabies management and prevention has 3.65 times higher chance to have a good attitude on rabies rather than those who possessed insufficient knowledge. (OR = 3.65; 95% CI: 1.60–8.31) On the other hand, Monje et al. (2020) also revealed that there was significant correlation between the attitudes and practices of rabies ($p = 0.04$) among the animal and human health practitioners. The study also claimed that respondents have a 2.22 times higher chance of having a good practice if and only if they possessed a positive attitude towards rabies management. However, Monje et al. (2020) reported that the knowledge level on rabies had no significant correlation with the level of practice on rabies ($p = 0.16$). Monje et al. (2020) states that this result implies that knowledge is not enough to guarantee internalisation of good rabies management practices as understood in the broader theory.

On the other hand, a cross-sectional, descriptive and analytical study by Ba et al. (2021) provided a more integrated overview of knowledge, attitude and practice level of the animal and human health professionals. A test which is called Hosmer-Lemeshow Test was used to analyse the association on the three models which are the knowledge, attitude and practice level. Thus, the test has showed a good strong correlation of all three variables altogether ($p = 0.06$; $p = 0.98$; $p = 0.81$). Ba et al. (2021) states that the analysis showed a positive correlation between the level of knowledge and attitude. The respondents especially those who received tertiary education possessed a sufficient knowledge on rabies, thus the study claimed that the respondents are expected to have more positive attitude towards rabies (AOR = 3.41; CI95% = [1.01–12.70]). Ba et al. (2021) also mentioned that the study has showed a positive correlation between level of attitude and practice. The respondents in which consists of the animal and human health professionals who possess positive attitude are expected to have a good practice on rabies management and prevention s (AOR = 3.23; 95% CI = [1.08–10.70]). This study supports the hypothesis that can influence each component of KAP can affect the others in a complementary way enhancing control and prevention of rabies.

In relation towards the positive significant correlation of KAP, a study carried out by Sivagurunathan et al. (2021) has revealed a strong association between knowledge, attitude and practice levels on rabies disease. This study is a cross-sectional study that analyses the knowledge, attitude and practice level among the community at the district of Tamil Nadu. Thus, the results of the correlations between the variables were obtained through Spearman Correlation test. Therefore, Sivagurunathan et al. (2021) claimed that a positive association is present between the knowledge and attitude level on rabies ($r = 0.7$, $P < .001$). Moreover, the study also found that a strong association of knowledge and practice is present

($r = 0.5, P < .001$). Furthermore, the study also claimed that a strong positive correlation is present between two variables which are attitude and practice ($r = 0.5, P < .001$). These findings emphasises that the association of the variables which are knowledge, attitude and practice influences each other in which when the knowledge level increases, the attitude and practice will then improve. This implies that the educational interventions and community awareness on rabies disease is very crucial in shaping the community attitudes and their practice towards this viral disease.

Hence, the study from Ali et al. (2014) aligns with the previous study. A cross-sectional study by Ali et al. (2014) in which the researchers analyse the residents from different households in Addis Ababa, Ethiopia also possessed a significant strong positive association between the knowledge, attitude and practice level on rabies disease. Ali et al. (2014) claimed in their study that a positive significant association between knowledge and attitude level on rabies is present ($r = 0.888, p < .001$). Plus, a significant correlation between knowledge and practice is present in which both of the variables showed a positive result as they influence each other ($r = 0.706, p < .001$). Next, the study also showed a strong positive correlation between attitude and practice level on rabies ($r = 0.775, p < .001$). Similar to the previous study, the results suggests that all three variables can influences each other as it is directly proportional to each variable. Thus, the results indicates that the higher the knowledge level, the higher the attitude and practice level. Therefore, this implies that the cruciality of possessing sufficient knowledge on rabies disease may influence the attitude of one's individual and their practice towards rabies management and prevention.

In summary, Ba et al. (2021), Sivagurunathan et al. (2021) and Ali et al. (2014) showed strong positive significant correlation between the knowledge, attitude and practice level on rabies disease. However, a study from Monje et al. (2020) claims that there was a

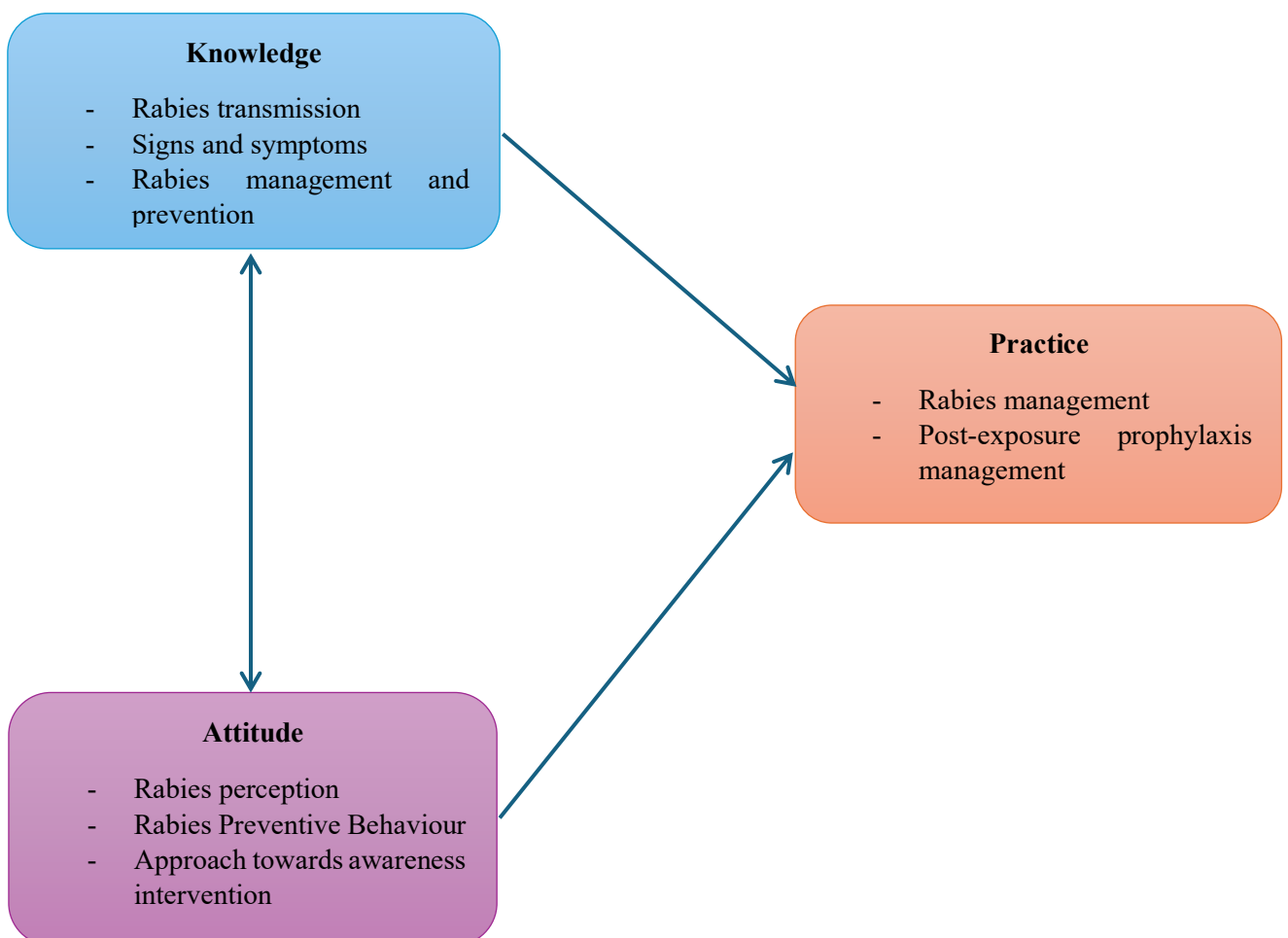
positive significant relationship between knowledge, attitude and practice, but the study suggests that the knowledge level does not influence any individuals practice level as there were no significant correlation found between knowledge and practice in their study. The reason we find that people's knowledge about rabies doesn't match their actions towards it likely stems from false beliefs, fear of the disease, or simply not knowing enough about rabies among those we studied. The studies show that when people learn more about rabies, they adopt better attitudes and change their actions to protect themselves and others against the disease. Making sure people have a good view on rabies helps them take the right actions to fight the disease more effectively.

2.5 Conceptual Framework

Figure 2.1 shows a framework that examines the relations between knowledge, attitude and practice on rabies among UNIMAS undergraduate nursing students. The conceptual framework gives an explanation that knowledge can influence by attitude and practice, meanwhile attitude can affect knowledge and practice and practice on the other hand can be influenced by knowledge and attitude. Based on Ng (2024), knowledge forms the foundation, shaping attitudes, which then influence behaviour or practice. Hence, undeniably good knowledge can improve attitude and practice of one's individual.

Figure 2.1

Conceptual Framework of Knowledge, Attitude and Practice on Rabies



2.6 Summary

In conclusion, this chapter reviewed how knowledge, attitude, and practice differed among people. Most studies we found focused on quantitative data. Most existing research on knowledge, attitude and practice comes from other countries, not Malaysia. This study could help in understanding the UNIMAS undergraduate nursing students' knowledge about rabies, how they feel about it, and to what extent to they can act in tackling the issues.

CHAPTER 3

METHODOLOGY

3.0 Introduction

This chapter will explain the methods that will be employed to achieve the research objectives, in which it will be divided into multiple sections. Section 3.2 will explain in detail the research design for this study, along with Section 3.3 explaining regarding the research setting and Section 3.4 on the other hand, will discuss the criteria for inclusion and exclusion of the participants for this study. Subsequently, in section 3.5, this part will provide a detailed description of the sampling method and the sample size and in section 3.6, the study instrument will be discussed. In section 3.7, ethical considerations will be considered for a detailed discussion along with section 3.8 that will focus on the process of collecting data. The researcher will also explain the data analysis technique that will be used in this study in Section 3.9. Lastly, the researcher will provide a conclusion for this chapter in Section 3.10.

3.1 Research Design

This study utilized a cross-sectional quantitative research design approach. Based on Ghanad (2023), quantitative research is primarily focused on gathering and analysing numerical data to uncover patterns, relationships and information within a specific defined population. As mentioned by Setia (2016), a cross-sectional study is designed to gather data from a significant number of individuals from a specific population simultaneously. Therefore, a cross-sectional study seeks to examine and analyse such variables at a single point of time. Thus, in this study, cross-sectional study was carried out to examine level of knowledge, attitude and practice regarding rabies among the UNIMAS undergraduate nursing students. Moreover, this study design is believed to be cost effective and efficient as mentioned by Setia (2016). Therefore, this study design is selected as the research design as

of for this study due to its relevance for this study as well as the feasibility in view of the limitations of time and resources.

3.2 Research Settings and Population

This study took place in Faculty of Medicine and Health Science (FMHS) at University of Malaysia Sarawak (UNIMAS). UNIMAS is one of the public universities that is situated in Jalan Datuk Muhammad Musa in Kota Samarahan, Sarawak, which is in Samarahan division which has been declared as rabies-infected area. The faculty on the other hand offers a full four-year degree nursing programme known as the Bachelor of Nursing with Honours. Therefore, this study will be involving the students from the nursing degree programme that consists of 4 groups of students based on year of study which is Year 1 to Year 4. The total accumulated number of students in this nursing programme as of this year is 237 students. Thus, this faculty is the best option for the research site due to it being where nursing education takes place.

3.3 Inclusion and Exclusion Criteria

3.3.1 Inclusion Criteria

This project involved the undergraduate nursing students from Year 1 to Year 4 at the University of Malaysia, Sarawak (UNIMAS) who are currently taking and officially enrolled in the nursing programme. The students were selected as participants for this study according to their voluntary participation. This project also involved two post registration students who are also currently taking the same course whilst working or taking time off from working.

3.3.2 Exclusion Criteria

This research project has excluded the postgraduate nursing students, the participants who have been chosen for the pilot study, and the students who are not willing to or decline to give consent to participate.

3.4 Sampling Method and Sample Size

As of this research project, the sample population consisted of the UNIMAS undergraduate nursing students from Year 1 to Year 4. This study used a simple random sampling as the sampling method. Based on Noor et al. (2022), simple random sampling is a method that is used to select a smaller sample from a larger sample population whereby all individuals have an equal number of chances of being chosen. This means that no one is favoured or left out on purpose, which helps make the results fairer and more accurate. Other than that, Noor et al. (2022) also mentioned that this technique ensures that the sample is the representation of the entire population, thus minimizing the bias in the selection process. The simple random sampling method for this study has utilized the randomizer formula from Microsoft Excel, then the questionnaires were administered accordingly to the numbers that has been assigned from the randomizer software whereby there were no bias in selecting the participants from their groups consisting of various year of study.

For the sample size calculation, the Taro Yamane formula was used in conjunction with the calculation of this study's sample size. This method is believed to be the most concise for calculating the required sample size for a study. Thus, the sample size calculation for this project will be determined by the total accumulated number of UNIMAS undergraduate nursing students, in which is $N=237$. Table 3.1 shows that the study needs a sample size of 149 participants to be exact, as per determined by the calculation. The final sample size for this research consisted of 164 participants, accounting for a 10% non-respond rate. This is calculated to provide compensation for the participants who decline to cooperate in the study. However, the sample size that has been determined was 170 participants to allow deletion of items during data clearance once data analysis has started.

Table 3.1

Sample size calculation for actual study

Taro Yamane formula:

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

Where, n = the sample size

N = the population size

e = the sampling error accepted

* 95% confidence level and p = 0.05

Calculation:

$$n = \frac{237}{1 + 237(0.05)^2}$$

$$= 148.82$$

$$= 149 \text{ participants}$$

Non-respond rate:

10% from sample size

= sample size + (calculated sample size x 10%)

$$= 149 + (149 \times 10/100)$$

$$= 149 + 14.9$$

$$= 163.9$$

$$= 164 \text{ participants}$$

$$\sim 170 \text{ participants}$$

3.5 Study Instrument

This study has utilized a self-administered questionnaire which were distributed according to the generated number for simple random sampling. Before utilizing the questionnaire, study consent from the original author has been obtained. In this study, the questionnaire is categorised into four sections: A, B, C and D.

Section A focused on the socio-demographic details of the participants, comprising information such as age, gender, ethnicity, religion and year of study, area of residence and also pets ownerships information.

Section B consisted of the knowledge items of the questionnaire adopted from a study by Ba et al. (2021). This section outlined the knowledge level of the nursing student's rabies awareness. There was a total of 16 questions presented in a multiple-choice answer. The statements include various aspects related to knowledge regarding rabies in a holistic approach whereby the statements conquered the cause of the rabies infection up until the management of rabies disease. Each statement presented with multiple answers. Each question that was correctly answered is worth 1 point, and the latter will be worth 0 point. However, for questions with multiple correct answers, 1 point was awarded only if all required options were selected; otherwise, the response received 0 point. Sufficient knowledge scores were considered when the scores from all 16 questions is added up, and the results must be more than the average score of the mean.

Section C has assessed the attitudes of the nursing students towards the rabies disease through the attitude scale which is adapted from the same questionnaire developed by Ba et al. (2021). This section consists of 9 items that encompasses statements that is focusing on the attitude on rabies disease such as rabies transmission mechanisms. These statements were followed by responses of a 5-point Likert scale that were classified as follows: "strongly

disagree” (1 point), “disagree” (2 points), “slightly disagree and agree” (3 points), “agree” (4 points) and “strongly agree” (5 points). However, the scale is defined as binary variable with options of “positive” or “negative” attitudes. Thus, it is stated that “strongly agree” and “agree” will have a score of 1 point and for the others as 0 points. Therefore, if the score reaches greater than 86% of 9 or 10 score for each statement, then positive attitude can be considered. Furthermore, there are no statements that were considered as negative statements thus reverse scoring method were not applicable.

Lastly, in section D, this section has been utilized in the evaluation of the nursing students on the practice of the management of animal bites or also known as post-exposure management. This section comprises of 7 questions. These statements were followed by responses of a 5-point Likert scale that were classified as follows: “strongly disagree” (1 point), “disagree” (2 points), “slightly disagree and agree” (3 points), “agree” (4 points) and “strongly agree” (5 points). In addition, the scale was defined into binary variables with options of “good” or “bad” practice. Greater practice towards rabies wound care and post exposure management were indicated by higher scores achieved by the respondents and must be greater than the average mean score. Furthermore, this section also consists of no negative statements thus reverse scoring method were not applicable.

3.6 Ethical Consideration

Ethical approval has been obtained from the Research and Ethics Committee of the Faculty of Medicine and Health Sciences upon commencement of the study. (Refer to Appendix A) Prior to the study, respondents were required to fill out the formal informed consent, for confirmation and indication of their willingness to participate in the study. The participants were informed of their autonomy in their withdrawal from the study at any moment beforehand whereby their right to refuse were also emphasised in the participant’s

informed consent. (Refer to Appendix D) Additionally, the author has provided with a formal email from the researcher requesting consent to adapt or utilise the questionnaire instruments that were utilized in the study. (Refer to Appendix C) Therefore, all information and materials obtained from the survey or investigation, has been kept discreetly and exclusively use for the purpose of the research project and the participant's anonymity and privacy were ensured. The access to the data from the survey is strictly confidential and only accessible for the researcher and their supervisor exclusively.

3.7 Validity and Reliability

3.7.1 Pilot Study

The main rationale of the first stage of the study protocol, also known as the pilot study, was to support the preparation and adjustment of the major investigation. Consequently, nursing students selected for the pilot study that fulfilled the inclusion criteria of the study were in total of 17 individuals of which is the 10% of the planned sample size in the study. Respondents in the pilot study were excluded in the actual study in order to minimize bias. Thus, the pilot study data that has been analysed were used to determine the reliability and internal consistency of the provided questionnaire. Cronbach's Alpha scores above 0.7 indicates good reliability and consistency (Mohsen, Tavakol and Dennick, 2011). As shown in Table 3.2, the questionnaire from Ba et al. (2021) has achieved an overall good reliability and consistency. ($\alpha = 0.901$)

Table 3.2*Cronbach Alpha value for Pilot Study*

Variables	Cronbach Alpha (α)
Knowledge	0.720
Attitude	0.769
Practice	0.879
Overall	0.901

3.8 Data Collection Procedure

The process of collecting data began when ethical clearance has been obtained from the UNIMAS Faculty of Medicine and Health Sciences Ethics Committee of the Research Committee. Before the large-scale investigation was conducted, smaller scale research or also known as pilot study, was being conducted. Then, questionnaires that had been developed and adapted from previous research had to undergo minor modifications prior to participants' feedback after pilot study testing and were administered to the respondents in printed format and participants were ought to answer the questionnaire physically. The questionnaires were administered to each of the respondents that were listed and chose through a randomiser to follow the simple random sampling rule along with the flexible time allowed to complete the questionnaires that ranges in between twenty to thirty minutes. Then, respondents can submit the self-completed questionnaire to the researcher at the Faculty of Medicine and Health Sciences, UNIMAS once they have completed the questionnaire within the given timeframe. Their phone numbers were retained so that the researcher can be updated on their progress. Lastly, the process of collecting data was considered as complete once data from 170 participants has been achieved.

3.9 Data Analysis Method

Data analysis was conducted using the IBM SPSS Version 27.0 software. Moreover, this study has been utilizing both descriptive and inferential statistics for data analysis. Data analysis for this study project started with entering physical data into digital through SPSS for easier analysis. Then, data clearance has been done to ensure that there were no missing values that can cause outliers or extreme values. Hence, data analysis started by analysing the frequency test and normality test through descriptive statistics. Once acquired, parametric tests from inferential statistics then can be utilized.

Descriptive statistics were used to analyse the data acquired from the specific sections in the questionnaire. Hence, in section A, it covered the sociodemographic variables such as the participants' gender, race, religion, year of study, pets' ownership and area of residences and these were considered as categorical data. The results were evaluated and monitored with statistical parameters that include frequency and percentages. Meanwhile, for age and also the total scores of the knowledge, attitude and practice levels were also considered as continuous data, thus, Kolmogorov-Smirnov test or also known as normality test were also utilized to decide if the data follows a normal distribution. The reason this test was selected is because the sample size used for this study is greater than 50 individuals and therefore is suitable for this investigation. Furthermore, as mentioned by Mishra et al. (2019), if a p-value is larger than 0.05, this suggests that the data is believed to have a normal distribution. However, the latter, is when a p-value is below than 0.05, the data is believed to not following a normal distribution.

Moreover, inferential statistics has been utilised to compare the statistical difference in the level of knowledge, attitude and practice on rabies among the nursing students. This study also aimed to investigate the relationship between the nursing students' knowledge,

attitude along with their practice towards the rabies disease at UNIMAS. The correlation coefficient was used in this study to assess the importance of the relationship between the variables, and that it will be based on the distribution of the data after normality test has been conducted. For if the data are regularly distributed, a parametric test referred to as the Pearson Correlation test would be conducted (Temizhan et al., 2022). However, Temizhan et al. (2021) also mentioned that in the case of non-normal distribution of data, Spearman correlation will be used for the testing. Hence, for this study Spearman correlation test was utilized due to level of knowledge, attitude and practice on rabies among the nursing students did not follow the normal distribution.

3.10 Summary

In summary, this quantitative cross-sectional study has been carried out at UNIMAS's Faculty of Medicine and Health Sciences. The cohort of UNIMAS undergraduate nursing students, ranging from their first to their fourth year along with the post-registration students, were included in this study. Simple random sampling will be calculated using the Taro Yamane formula. The study's sample size is 170 in total. The participants have been given a self-administered questionnaire, and the study instrument was divided into four portions. Ethical approval has been acquired before any data was collected. Lastly, IBM SPSS Software version 27.0 was used to analyse the data collected for this study using both descriptive and inferential statistical techniques.

CHAPTER 4

RESULTS

4.0 Introduction

This chapter outlines the findings of this study based on the data analysis done through SPSS version 27. The main objective is to obtain the result on the relationships between level of knowledge, attitude and practice on rabies among UNIMAS undergraduate nursing students. This chapter will show the findings on the sociodemographic data, level of knowledge, attitude and also level of practice on rabies among the participants. This chapter will also outline the result on the relationship between level of knowledge, attitude and practice concurrently. There were in total of 170 questionnaires that were distributed, and all the participants were selected through a randomizer formula from Excel, following the rules of simple random sampling. The participants were a mixed of participants varied on their year of study which are, from the first year until the fourth year along with the post-registration of the UNIMAS undergraduate nursing students.

4.1 Socio-demographic Data of UNIMAS undergraduate nursing students (n=164)

The overall respond rate for this study only reached 96% in which there were only 164 participants. 5 participants were deleted from this study due to presence of outliers in the results. Hence, the overall socio-demographic variables possessed no outliers and extreme values. As shown in Table 4.1, the study found that female participants were the majority population in the study. Other than that, most of the participants were Muslim with the majority ethnicity of Malay. The participants were mostly from the final year students, and most of the participants also noted to have owned a pet and also lives in urban areas.

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

Socio-demographic	Variables	Frequency	Percentage (%)
Gender	Male	26	15.9
	Female	138	84.1
Religion	Islam	97	59.1
	Christian	65	39.6
	Buddhism	2	1.2
	Hinduism	0	0.0
	Others	0	0.0
Race	Malay	75	45.7
	Chinese	8	4.9
	Iban	26	15.9
	Bidayuh	11	6.7
	Indian	0	0.0
	Others	44	26.8
Race (Others)	Bumiputera Sabah	26	15.9
	Bugis	2	1.2
	Kayan	1	0.6
	Kenyah	1	0.6
	Lunbawang	1	0.6
	Melanau	13	7.9
Year of Study	Year 1	30	18.3
	Year 2	46	28.0
	Year 3	40	24.4
	Year 4	48	29.3
Pet ownership	Yes	107	65.2
	No	57	34.8
Area of residence	Rural	54	32.9
	Urban	110	67.1

4.1.1 Socio-demographic variables: Age

There are no outliers noted from the box plot of the normality test on age variable. However, there is an extreme value noted from case number 135, and it was noted due to the participants are a post-registration student that has passed all the inclusion criteria. Hence, as shown in Table 4.2, a Kolmogorov-Smirnov test showed a normal distribution, $D(164) = .15$, $p = < .001$. The mean age among the participants is 22 years old. (SD : 1.62) The maximum age is 34 years old while the minimum age is 19 years old. The range is 15 years old. The mode is 23 years old.

Table 4.2

Descriptive Statistics for Age

Descriptive	Statistics
Mean	22.00
Standard Deviation	1.62
Maximum	34.00
Minimum	19.00
Range	15.00
Mode	23.00
Kolmogorov-Smirnov test	$D(164) = .15$, $p = < .001$.

4.2 Level of Knowledge on Rabies among UNIMAS Undergraduate Nursing Students

Level of knowledge on rabies has been computed into total score thus it was considered as continuous data thus, a Kolmogorov-Smirnov test has been conducted, and it did not follow the normal distribution, $D(164) = .14, p = < .001$. The median knowledge score among the participants was 7 points (*IQR*: 4 points). The maximum knowledge score is 15 points while the minimum score is 3 points. Meanwhile, the range of knowledge score is 4 points, and the mode score is 8 points, as shown in Table 4.3. On the other hand, the level of knowledge on rabies among UNIMAS undergraduate nursing students was outlined through two binary variables which are “poor” and “good”. The overall mean score of level of knowledge on rabies among the respondents are 7.25. The participants were considered to have sufficient knowledge if the total score is greater than 7.25. Thus, in this case, the total score was categorised by utilizing visual binning. Visual binning is a helpful tool in creating new variables based on the study’s continuous data into defined groups (Shoaib, 2017). Hence, after visual binning in SPSS, out of all 164 participants, it was found that 91 (55.5%) of the participants possessed a poor knowledge on rabies and 73 (44.5%) of the participants had good knowledge on rabies as shown in Figure 4.1. Moreover, in Table 4.3, the table shows the statistical parameters of the descriptive statistics done towards level of knowledge on rabies.

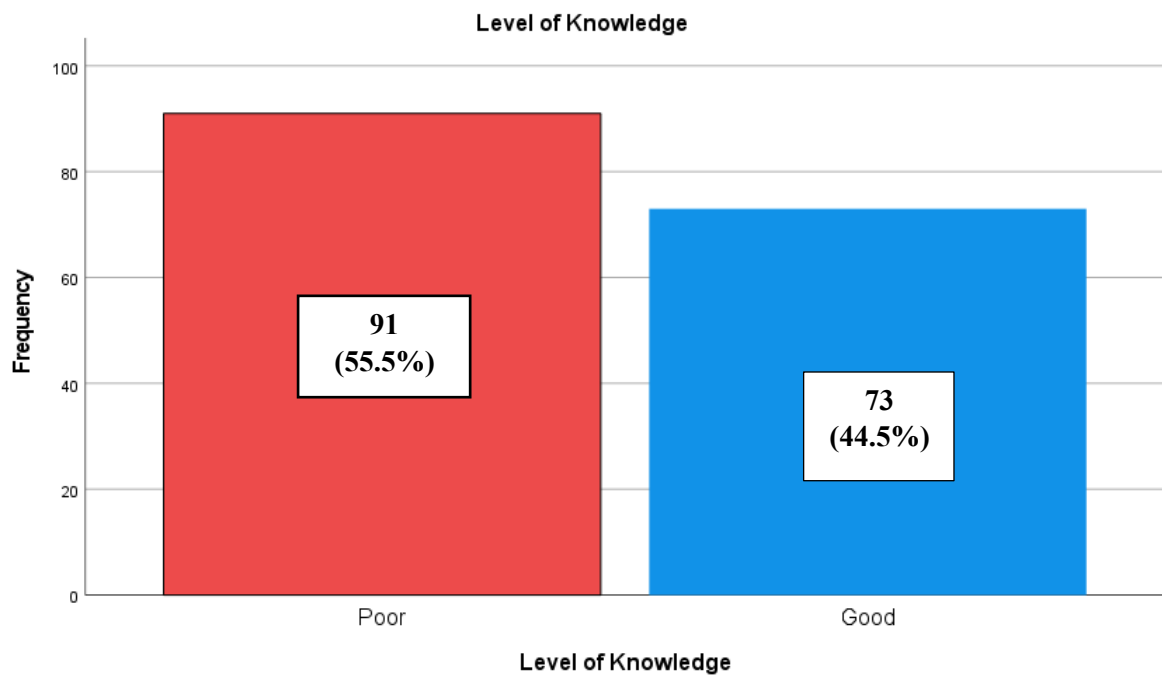
Table 4.3

Descriptive Statistics on Level of Knowledge on Rabies

Descriptive	Statistics
Mean	7.25
Median	7.00
Interquartile range	4.00
Maximum	15.00
Minimum	3.00
Range	4.00
Mode	8.00
Kolmogorov-Smirnov test	$D(164) = .14, p = < .001.$

Figure 4.1

Level of Knowledge on Rabies among UNIMAS Undergraduate Nursing Students



4.3 Level of Attitude on Rabies among UNIMAS Undergraduate Nursing Students

Level of attitude on rabies has been computed into total score thus it was considered as continuous data thus, a Kolmogorov-Smirnov test has been conducted, and it did not follow the normal distribution, $D(164) = .22, p = < .001$. The median knowledge score among the participants was 7 points ($IQR = 2$ points). The maximum knowledge score is 9 points while the minimum score is 0 points. Meanwhile, the range of knowledge score is 9 points, and the mode score is 7 points, as shown in Table 4.4. Level of attitude on rabies among UNIMAS undergraduate nursing students was defined as binary variables in which it has two categories, 'poor' and good'. Although this section utilized a 5 points Likert scale, it followed a scoring system whereby any 'strongly agree' or 'agree' options will be considered as 1 point, and the others will be considered as 0 point. Thus, it was determined that participants are considered to have a good attitude if 86% or more of participants scored 9 or 10 marks in this section. Thus, visual binning was utilized to categorize the binary variables with 9 marks as the cutoff point. Therefore, out of all 164 participants, 157 (95.7%) has poor attitude on rabies meanwhile 7 (4.3%) have a good attitude on rabies. The minimum score of knowledge on rabies among the participants was 0, meanwhile for the maximum score of knowledge on rabies was 9 out of 9 questions. Most of the participants scored 7 out of 9 questions on this section. Moreover, in Table 4.4, the table shows the statistical parameters of the descriptive statistics done towards level of attitude on rabies.

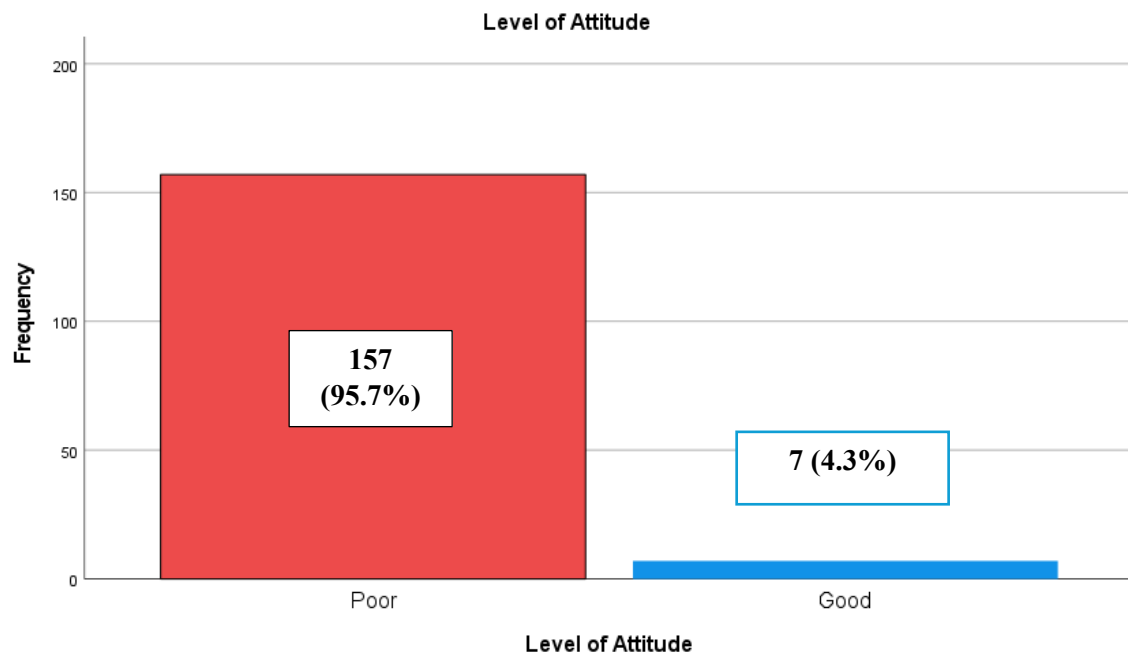
Table 4.4

Descriptive Statistics of Level of Attitude on Rabies

Descriptive	Statistics
Median	7
Interquartile range	2
Maximum	9
Minimum	0
Range	9
Mode	7
Kolmogorov-Smirnov test	$D(164) = .22, p = < .001$

Figure 4.2

Level of Attitude on Rabies among UNIMAS Undergraduate Nursing Students



4.4 Level of Practice on Rabies among UNIMAS Undergraduate Nursing Students

Level of practice on rabies has been computed into total score thus it was considered as continuous data thus, a Kolmogorov-Smirnov test has been conducted, and it did not follow the normal distribution, $D(164) = .19, p = < .001$. The median knowledge score among the participants was 28 points ($IQR = 6$ points). The maximum knowledge score is 35 points while the minimum score is 21 points. Meanwhile, the range of knowledge score is 14 points, and the mode score is 28 points, as shown in Table 4.5. The level of practice on rabies among UNIMAS undergraduate nursing students was outlined through binary variables which are “poor” and “ good”. The overall mean score of level of practice on rabies among the respondents are 29.46. The participants were considered to have adequate practice on rabies if the total score is greater than 29.46. Thus, in this case, the total score was categorised into its binary variables by utilizing visual binning. Hence, after visual binning in SPSS, out of all 164 participants, it was found that 95 (57.9%) of the participants possessed a poor practice on rabies and 69 (42.1%) of the participants had good practice on rabies. The minimum score of practice based on the 5-points Likert scale on rabies among the participants was 21, meanwhile for the maximum score of practice on rabies was 35. The mode score of level of practice on rabies among UNIMAS undergraduate nursing students was 28 points based on the 5-points Likert scale. Moreover, in Table 4.5, the table shows the statistical parameters of the descriptive statistics done towards level of practice on rabies.

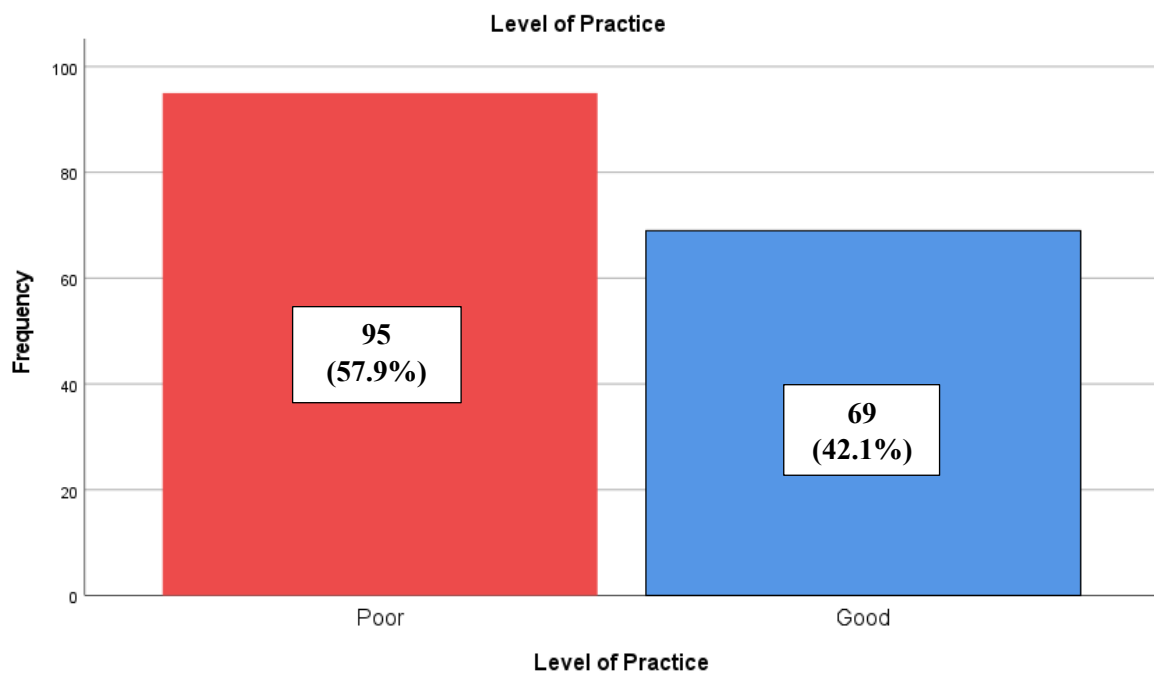
Table 4.5

Level of Practice on Rabies among UNIMAS Undergraduate Nursing Students

Descriptive	Statistics
Mean	29.46
Median	28.00
Interquartile range	6.00
Maximum	35.00
Minimum	21.00
Range	14.00
Mode	28.00
Kolmogorov-Smirnov test	$D(164) = .19, p = < .001$

Figure 4.3

Level of Practice on Rabies among UNIMAS Undergraduate Nursing Students



4.5 Relationship between Level of Knowledge and Attitude on Rabies among UNIMAS Undergraduate Nursing Students

4.5.1 Relationship between Knowledge and Attitude on Rabies among UNIMAS Undergraduate Nursing Students

The relationship between knowledge and attitude on rabies was investigated through Spearman correlation coefficient test. Preliminary analyses were performed and there was a violation of the assumptions of normality for knowledge on rabies, $D(164) = .14, p = < .001$ and attitude on rabies $D(164) = .22, p = < .001$. There were no outliers and extreme values noted from boxplots of both variables. Hence, there was a weak relationship between level of knowledge and level of attitude, $r_s(163) = .22, p = .004$, as shown in Table 4.6.

Table 4.6

Spearman correlation test on Knowledge and Attitude on Rabies

Correlations			level of knowledge	level of attitude
Spearman's rho	level of knowledge	Correlation Coefficient	1.000	.221**
		Sig. (2-tailed)	.	.004
		N	164	164
	level of attitude	Correlation Coefficient	.221**	1.000
		Sig. (2-tailed)	.004	.
		N	164	164

4.5.2 Relationship between Attitude and Practice on Rabies among UNIMAS Undergraduate Nursing Students

The relationship between attitude and practice on rabies was investigated through Spearman correlation coefficient test. Preliminary analyses were performed and there was a violation of the assumptions of normality for attitude on rabies, $D(164) = .22, p = < .001$ and practice on rabies $D(164) = .19, p = < .001$. There were no outliers and extreme values noted from boxplots of both variables. Hence, there was a moderate relationship between level of attitude and level of practice, $r_s(163) = .35, p = < .001$, as shown in Table 4.7.

Table 4.7

Spearman correlation test on Attitude and Practice on Rabies

Correlations			level of practice	level of attitude
Spearman's rho	level of practice	Correlation Coefficient	1.000	.347**
		Sig. (2-tailed)	.	< .001
		N	164	164
	level of attitude	Correlation Coefficient	.347**	1.000
		Sig. (2-tailed)	< .001	.
		N	164	164

4.5.3 Relationship between Knowledge and Practice on Rabies among UNIMAS Undergraduate Nursing Students

The relationship between knowledge and practice on rabies was investigated through Spearman correlation coefficient test. Preliminary analyses were performed and there was a violation of the assumptions of normality for knowledge on rabies, $D(164) = .14, p = < .001$ and practice on rabies $D(164) = .19, p = < .001$. There were no outliers and extreme values noted from boxplots of both variables. Hence, there was a weak relationship between level of knowledge and level of practice, $r_s(163) = .22, p = .006$, as shown in Table 4.8.

Table 4.8

Spearman correlation test on Knowledge and Practice on Rabies

Correlations			level of knowledge	level of practice
Spearman's rho	level of knowledge	Correlation Coefficient	1.000	.216**
		Sig. (2-tailed)	.	.006
		N	164	164
	level of practice	Correlation Coefficient	.216**	1.000
		Sig. (2-tailed)	.006	.
		N	164	164

4.6 Summary

Level of knowledge, attitude and practice has undergone data analysis, and the study had found that the participants possessed an inadequate level of knowledge, negative attitude and poor practice towards rabies transmission and management. However, the study acknowledged that there is a positive significant relationship between level of knowledge, attitude and practice towards rabies among UNIMAS undergraduate nursing students. This result alerts a need to implement an educational intervention in shaping better attitude, profound knowledge and also extensive skills in managing rabies disease among the nursing students.

CHAPTER 5

DISCUSSION

5.1 Introduction

This chapter outlines the further discussion on the result from this study. Discussion of the result is presented in different sections based on the study's research objectives which are the level of knowledge on rabies, level of attitude on rabies and level of practice on rabies among UNIMAS undergraduate nursing students. This chapter also includes a brief discussion on the relationship between level of knowledge, attitude and practice on rabies among the UNIMAS undergraduate nursing students. A summary of this chapter is presented in Section 5.3, while the implications and limitations of the study are presented in Section 5.4 and Section 5.5 respectively.

5.2 Level of Knowledge on Rabies among UNIMAS undergraduate nursing students

The study found that majority of the UNIMAS undergraduate nursing students (55.5%) possessed inadequate knowledge on rabies in which it aligns to studies from Anand et al., (2017), in India. This study has found that most of the participants (73.8%) possessed poor knowledge regarding the modes of rabies transmission in which this aligns with the result from a study from Anand et al., (2017). The researcher acknowledged whereby only 16.6% of nursing students had knowledge about modes of rabies transmission. Meanwhile, this study also found that a majority of the participants (62.8%) had an inadequate knowledge on preventive measures on rabies in human whereby most believed that suturing wound as post-exposure treatment is the best. Thus, this aligns with a result from the study from Anand et al., (2017) whereby most of the nursing students in India (53.4%) had poor knowledge about preventive measures of rabies. The possible reason of an inadequate knowledge was

due to the nursing curriculum that may not sufficiently provide and emphasize on zoonotic diseases, like rabies in which are very vital and critical for the nursing students to acknowledge as future frontliners.

This study has found out that a majority of the participants (89%) had a poor knowledge on the main reservoirs of rabies whereby only 11% of the nursing students had correctly acknowledged wild canids as the primary reservoir of rabies. This result aligns with a study by Pervane et al. (2024) where the study emphasizes that most participants were unaware that farm animals posed a very small risk to getting infected by rabies disease with incorrect responses ranging from 61.8% to 72.1%. Other than that, this study also found out that most of the nursing students (70.1%) also possessed a poor knowledge on the most susceptible population to rabies infection whereby only 29.9% correctly answered children as the most susceptible population in which this aligns with the study by Pervane et al. (2024) whereby The researcher mentioned that the participants possessed a low knowledge on the most vulnerable groups, including pregnant women (45.2%) and immunosuppressed individuals (37.4%). Thus, the potential cause from the result of both studies could be that the medical background students in both of the studies were not much aware in regard to rabies to compare to the latest study done in the same institution in India.

The finding regarding the level of knowledge of the participants in this study whereby a majority of the nursing students (86.6%) possessed poor knowledge on common signs and symptoms of rabies where most of them perceived delusion and convulsion are the common symptoms of rabies. This was similar to the study by Wangdi and Lhendup (2022) among the community in Bhutan where the participants also had poor knowledge on symptoms of rabies. Wangdi and Lhendup (2022) found that most of the respondents recognized symptoms such as lethargy/dullness (14.5%), consumption of non-food items

(20.0%), and uncoordinated movement (14.5%) were reported to be correctly answered less frequently. Prior to this result, the plausible factor that the participants may not possessed an inadequate knowledge may be due to insufficient awareness on rabies among the community and it is also plausible that the false knowledge and misconceptions regarding rabies could be originated from friends or relatives.

This study found that a majority of the participants (63%) had a good knowledge in regard to ways in preventing rabies in general whereby there was a union agreement towards anti-rabies vaccination as one of the best ways to prevent rabies in which was similar to the study from Ahmad et al. (2024) in Peshawar Pakistan where the study revealed that majority of participants (82%) knew anti-rabies vaccine as the main treatment. However, this study had found that most of the participants had an inadequate understanding in the transmission of rabies whereby only 26.2% of the participants correctly answered animal bites as the primary mode of transmission of rabies. This result contrasts with the study by Ahmad et al. (2024) whereby the researcher found that 82% of healthcare professionals possessed an accurate understanding of transmission via animal bites. The difference in results may be due to the variation in participant background and exposure to rabies-related information. While this study involved undergraduate nursing students who may not have received in-depth training specifically on rabies transmission, the study by Ahmad et al. (2024) focused on healthcare professionals who are more likely to have greater clinical experience and formal education on infectious diseases. Additionally, differences in curriculum content, public health awareness campaigns, and local exposure to rabies cases between Malaysia and Pakistan could also contribute to the variation in understanding, particularly on modes of transmission.

Other findings that differ from the result of this study is a study by Fazrul et al. (2025) that was conducted among the community in Kelantan, Malaysia. The researcher found that nearly half (53.0%) of dog owners in Kelantan possessed a good level of rabies knowledge where the majority (72%) of participant were aware of rabies transmission is through dog bites. However, this study had acknowledged that the nursing students had an inadequate knowledge on rabies whereby a majority of the participants (73.8%) believed that being in contact with a rabid animal is the primary mode of rabies transmission. The difference in results may be due to the varying levels of exposure and relevance of rabies information between the two groups. Additionally, differences in community-based awareness programs and educational focus may also contribute to the knowledge gap observed.

5.3 Level of Attitude on Rabies among UNIMAS Undergraduate Nursing Students

This study has revealed that most of the participants 157 (95.7%) have poor attitudes on rabies while the remaining of the participants 69 (42.1%) possessed a good attitude. The result of this study aligns with research by Rana et al. (2021) in which was conducted at Bangladesh. The study revealed that the participants exhibited negative attitude towards rabies, in which can be shown through the result of many healthcare professionals (35%) were against seeking for wound treatment after bite exposure in government facilities. Thus, the result from the study by Rana et al. (2021) aligns with this study whereby it was found that half of the participants possessed a negative attitude towards rabies whereby only 56.5% of the participants will advise a bitten person of a possible rabid animal to seek treatment. The similarity in findings between this study and the study by Rana et al. (2021) may be due to the lack of awareness or misconceptions about the seriousness of rabies and the importance of proper treatment. In both studies, participants whether healthcare students or

professionals showed hesitation or low motivation in promoting or seeking proper rabies management, such as wound care or vaccination. This could reflect gaps in education, limited exposure to rabies cases, or low prioritization of rabies in public health discussions, leading to a generally poor attitude towards its prevention and treatment.

Another study that is related to the result of poor attitude from participants is a study from Monje et al. (2020) in Uganda whereby the participants showed a negative attitude towards rabies. In the study, it was revealed majority of the respondents (75%) had negative attitude towards health-seeking behaviour post-exposure to rabid animals. Moreover, it was also revealed that most of the respondents that consisted of human health professionals and animal health worker had a negative attitude towards rabies as they believed that rabies was caused by bacteria. Similarly to this study, it was acknowledged that the nursing students also had a negative attitude towards rabies as a most of the participants (55.5%) believed that rabies is caused by bacteria and also half of the participants refuse to advice affected person to seek treatment. Hence, the possible factor that implements the negative attitude among the respondents is mainly due to poor awareness and educational intervention is needed to enable them to conduct surveillance and public control.

The result of the level of attitude of this study aligns with the study done by Khan et al. (2019) in which was conducted among the community member in Pakistan. The researcher stated that almost 30% of the respondents were considering killing possible freely roaming rabid dogs. Moreover, the result from the study by Khan et al. (2019) aligns with this study whereby it was found that almost half of the respondents (37%) agreed to euthanizing freely roaming dogs as one of the most effective preventive measures. Hence, the researcher suggests that the attitude on killing freely roaming rabid dogs without any authorisation from higher authority. Thus, the study underscores an urgent need for targeted

education and awareness programs to correct dangerous beliefs and promote timely, evidence-based responses to rabies exposure.

However, the outcome of this study contrasts with a study done by Sawai Man (2023) among the medical interns in India. The study found that 92% of the participants said they would take the rabies vaccinations and 93% of the participants are willing to get rabies vaccination. In addition, 85% of the participants are willing to take part on PEP awareness camp. This result indicates that the medical interns have possessed a positive attitude towards rabies. Hence, Sawai Man (2018) also suggests that exposure to early medical training as well as awareness on rabies has formed a sense of responsibility and preparedness to protect themselves and their future patients.

Furthermore, this study done by Bundalian et al. (2020) contrasts with the outcome of this study. The study that was conducted among the community in part of the district in Philippines and the participants showed to be having a positive attitude on rabies (75.3%). The study mentioned that 89% of the participants showed willingness to pay for vaccination for the pets. 92.1% of the participants agreed that proper care of pets can help in preventing rabies and 87.9% of the participants believed that slaughtering dogs are prohibited, and the action itself can be fine by the higher authority. Thus, the study suggests that the rabies awareness among the community in Philippines is believed to be effective in fighting against the fatality rate caused by rabies.

5.4 Level of Practice on Rabies among UNIMAS Undergraduate Nursing Students

The level of practice on this study has been found that the participants possessed a poor practice towards rabies, whereby 95 participants have a poor practice on rabies (57.9%) while only 69 participants possessed a good practice towards rabies (42.1%). This result aligns with a study done by Dixit et al. (2012) conducted in an institution in India. The study

has found that almost all of the participants possessed a poor practice on rabies whereby 66% of the participants that involves nursing students has a poor self-awareness about first aid after an animal bite as well as knowledge on how to treat bitten wound and handling of stray dogs. Other than that, the study reported that only 21% (21 out of 100 students) possessed the awareness on the schedule for post-exposure prophylaxis. The results from the study by Dixit et. al (2012) were similar to this study whereby it was acknowledged that only 42.1% believed that washing the wound with soap and water is a good practice for post-exposure rabies management meanwhile 42.7% of the participants also believed disinfecting wound antiseptic solution is another good practice for post-exposure wound management. The difference in practice levels between this study and ideal recommendations may be due to the lack of hands-on training and low practical exposure to rabies management among nursing students. Although they may have some theoretical knowledge, the absence of real-life experience or practical demonstrations could lead to poor application in actual situations. This is similar to the findings by Dixit et al. (2012), where students showed low self-awareness about proper wound care and post-exposure protocols. Furthermore, limited emphasis on rabies-related first aid and vaccination schedules in the nursing curriculum could contribute to the inadequate practice observed in both studies.

Another study that relates with this study's result is a study from Beresa and Beriso (2023), in which was conducted in Ethiopia. The study found that the participants have a poor practice on rabies whereby 283 of the participants (68%) claimed that they never washed their hands after touching their dogs. Other than that, 263 of the participants (63.2%) did not vaccinate their dogs against rabies while only 153 participants (36.8%) vaccinate their dogs against rabies. Moreover, half of the participants (52.9%, $n = 220$) considered killing stray dogs in their area as their measures in tackling the issue against rabies among

the stray dogs. Hence, the researcher suggested that this poor practice among the community in Ethiopia were mainly due to insufficient awareness and differences in the frequency of information dissemination among a community to another and also may be due to insufficient supply of vaccines or uncondusive condition among the community for information sharing.

The outcome of this study aligns with the result from a study done by Tegegn Dilbato Dinbiso et al. (2025), in which was conducted among the community in Ethiopia. The study revealed that 96 of the participants (22.75%) let their dogs roaming freely in fields and broad areas. Other than that, only 48 of the participants (11.4%) has vaccinated their dogs against rabies while 195 of the participants (46.2%) did not vaccinate their dogs against rabies. Hence, this shows that the participants actually possessed a poor practice and misconceptions regarding rabies. Thus, the researcher suggests that the reason behind the poor practice on rabies among the participants may be due to insufficient knowledge and attitude on rabies as both of these variables may take part in shaping level of practice among the participants and insufficient awareness, absence of veterinary clinics and also cost and availability of vaccines and treatment may be part of the possible reasons.

However, the outcome of this study contrasts with a study done by Patel et al. (2023) in India. The study revealed that 94.1% of the participants that involves nursing students from an institution in India shows a union encouragement on the essentiality on receiving treatment prior to post-exposure of animal bites as one of the factors of rabies. Furthermore, Patel et al. (2023) mentioned that majority of the students (89.1%) shows that vaccination as the post-exposure prophylaxis (PEP) is necessary even though the case is yet to be confirmed as rabies case. Moreover, Patel et al. (2023) also found that majority of the respondents (80%) will report the characteristics of the bites of post-exposure victims. However, the

findings from the study by Patel et al. (2023) differs from this study as it was found that majority of the respondents (57%) possessed a poor practice towards rabies management as they refuse to agree to giving post-exposure prophylaxis (PEP) to possible rabid animal bitten victim and only 45% believed that reporting the bite characteristics is a good practice towards post-exposure rabies management. Thus, the difference in practice between this study and the study by Patel et al. (2023) may be due to differences in education emphasis, clinical exposure, and awareness campaigns related to rabies. The nursing students in India may have received stronger training or more frequent exposure to rabies management protocols, which could explain their high support for post-exposure prophylaxis (PEP) even in suspected cases. In contrast, the participants in this study may have had limited emphasis on rabies management in their curriculum, leading to uncertainty or hesitation in recommending PEP. Cultural beliefs, local rabies prevalence, and differences in healthcare system guidelines may also influence how seriously students view rabies prevention practices.

Another study that contrasts with the outcome of this study is a study from Roy et al. (2023) in which was conducted in India. The study has found that the participants possessed a good practice on rabies whereby 93 of the participants (47.94%) claimed that they wash their hands after exposure with soap and running water. Other than that, 193 participants (99.48%) claimed that they will seek for treatment after exposure at healthcare facilities or visiting a doctor. Moreover, 186 of the participants (95.88) have received immunization of tetanus in which it will bring a greater measure against rabies. In contrast with the findings from the study by Roy et al. (2023), this study found that most of the respondents (60%) refused to believe that tetanus prophylaxis prior to wound bite victim of a possible rabid animal is a good practice. The contrasting results may be due to differences in public health

education, awareness campaigns, and local clinical practices. In the study by Roy et al. (2023), participants likely had better access to health information and stronger health-seeking behaviours, as shown by their high rates of handwashing, seeking medical care, and receiving tetanus immunization. On the other hand, participants in this study may have received less emphasis on the importance of tetanus prophylaxis in relation to animal bites, leading to misconceptions or underestimation of its role in rabies prevention. Additionally, differences in health education curriculum, personal experience with rabies cases, and exposure to practical training may also explain the lower level of good practices observed.

5.5 Relationship between Knowledge, Attitude and Practice on Rabies among UNIMAS Undergraduate Nursing Students

This study has found that there is a weak positive relationship between level of knowledge and attitude among UNIMAS undergraduate nursing students, $p_s(163) = .22$, $p = .004$. The outcome of this study aligns with a study by Monje et al. (2020) revealed a positive correlation between the level of knowledge of healthcare practitioners with their attitude towards rabies management ($p < .001$). The researchers also highlighted that enhancing knowledge could help participants develop the right attitudes and practices. They emphasized that primary healthcare providers, such as doctors, play a vital role as frontline workers frequently dealing with rabies cases. These physicians must be well-informed about local misconceptions to effectively provide preventive, promotive, and curative care.

Furthermore, this study also found that there is a moderate positive relationship between level of attitude and practice towards rabies among the participants $p_s(163) = .35$, $p = < .001$. This outcome aligns with a study by Sivagurunathan et al. (2021). The study claimed that a strong positive correlation is present between two variables which are attitude

and practice ($r = 0.5$, $p < .001$). These findings highlight that knowledge, attitude, and practice are interrelated, where an increase in knowledge leads to improved attitudes and practices. This underscores the importance of educational interventions and community awareness programs in shaping positive attitudes and practices toward rabies prevention and control.

Moreover, this study found that there is a moderate positive relationship between level of knowledge and practice towards rabies among the nursing students. $p_s(163) = .22$, $p = .006$. This outcome aligns with a study by Ali et al. (2014) whereby the study has found a positive correlation between knowledge and practice towards rabies ($r = 0.706$, $p < .001$). The researchers noted that knowledge has a direct influence on both attitude and practice. Therefore, enhancing knowledge can lead to improvements in attitude and practice among participants. They suggested that media platforms, such as radio, telephone, and newspapers, could be effective tools to raise community awareness about the severity of rabies and the availability of vaccines.

5.6 Implication of Findings

5.6.1 Educational Implications

The findings of this study highlight critical gaps in the knowledge, attitude, and practice of the nursing students concerning rabies. These weaknesses suggest the urgent need to strengthen the nursing curriculum by integrating comprehensive and practical rabies education.

The inadequate knowledge among students, especially regarding rabies transmission and prevention, indicates a need for enhanced theoretical approach through implementation of deeper theoretical exposure on zoonotic diseases like rabies that also includes updated

information on the modes of transmission, clinical signs, and prevention strategies such as pre- and post-exposure prophylaxis (PEP).

The negative attitude reflected by the participants towards rabies vaccination and management shows that there is a lack of emphasis on the importance of proactive healthcare roles. Educators should promote attitude-shaping activities, such as case-based discussions, ethical reasoning scenarios, and community outreach simulations to instil greater responsibility in rabies prevention.

Moreover, the poor practice alerts the need for critical and extensive practical exposure and skills-based learning. Institutions should consider including simulation labs, first aid drills, and clinical postings in areas with rabies awareness programs to allow students to translate their knowledge into action. Interdisciplinary learning with veterinary or public health departments could also be introduced to foster collaboration in zoonotic disease prevention.

By addressing these educational gaps, nursing students can be better equipped not only to understand rabies but also to serve as effective health educators and frontliners in preventing and controlling the spread of this fatal disease.

5.6.2 Implication towards Nursing Profession

Health education on community health issues, particularly rabies, should be provided to healthcare workers, especially nursing students as the future front liners. Educational sessions can cover topics such as the epidemiology of rabies, transmission routes, clinical presentations, diagnostic methods, post-exposure prophylaxis (PEP), and prevention strategies. Case studies and research findings related to rabies can also be shared to highlight the importance of effective rabies management.

To ensure public health safety, nurses must be well-prepared with accurate knowledge for early detection and control of rabies outbreaks. The information and awareness of a nurse in regard to rabies may help in reducing the risk of transmission in the community. For instance, nurses play a vital role in preventing further spread by promptly reporting suspected cases to the relevant authorities, tracing contacts, isolating patients, and identifying others who may have been exposed. These steps are critical for early detection, timely treatment, and effective prevention, ultimately reducing the spread of rabies.

Additionally, health talks can be conducted in communities located in rabies-endemic areas, led by healthcare professionals especially nurses, who may also act as an educator. The topics that should be included in the talk are recognizing signs and symptoms of rabies, preventive measures, vaccination, and the importance of seeking timely treatment. Through strengthening the community's KAP level towards rabies through this intervention, it will help in significantly reduce rabies cases. Since rabies is a fatal but preventable disease, increasing public awareness about its transmission, symptoms, and prevention is essential in saving lives of the people.

5.6.3 Implications towards Nursing Research

The insights from this research on KAP towards rabies can serve as baseline data for future studies that address issues beyond local contexts. This means that the findings could be used not only within the country but also internationally. Some data in this study enable comparative analyses towards other relatable research's data to identify global patterns and differences in KAP towards rabies as well as helping professionals understand the unique challenges and needs across various regions. Furthermore, this broader understanding supports the development of targeted interventions, allowing professionals to design

strategies that address specific gaps in knowledge, attitudes, or practices identified in different areas.

5.7 Study Limitations

This research has a few limitations. One notable challenge is the potential for response bias among participants in which despite the efforts to minimize the bias, it remains a possible limitation. Additionally, the risk of self-response bias cannot be completely ruled out. Another limitation is the sample population, as the study could have been expanded to include the medical students or the postgraduate students in which may differ in the result of KAP depends on their exposure and available knowledge regarding rabies. However, factors such as budget constraints and resource availability were the main factor that restricted this study's scope.

5.8 Recommendations

As for the recommendation towards future research on assessing level of knowledge, attitude and practice towards rabies, it would be helpful to involve more nursing students from different universities and backgrounds to get a more complete picture of how well students across the country understand and manage rabies. Other than that, including students from other healthcare fields, like medical or veterinary programs, can also offer useful comparisons and help identify which groups may need more support or education. It is also worth doing studies over a longer period so researchers can see if students' knowledge, attitude, and practice improve after learning more about rabies or being involved in specific training.

At the same time, future studies should try to explore the reasons behind why some students still have negative attitudes or poor practices when it comes to rabies. Quantitative research only provides data and factual explanation thus, approaching towards qualitative

research to assess the level of KAP by so using interviews or focus groups can help researchers understand what students are really thinking or struggling with. The student might have low self-esteem, or one might never encounter a rabies case throughout their clinical postings or maybe the students might never be exposed to an extensive theoretical approach towards rabies disease. Therefore, understanding these reasons is key to fixing the problem.

It is also important to look into whether the current nursing syllabus gives enough attention to rabies. If not, improvements can be made through adding more hands-on practice, case studies, or discussions about real-life scenarios. Lastly, future research can implement on ways of nursing students to be more involved in the community such as through joining rabies awareness campaigns or helping during health outreach programs. This kind of experience not only helps the community but also builds the students' confidence and prepares them for real-world challenges.

5.9 Conclusion

The study found that most UNIMAS undergraduate nursing students had inadequate knowledge, poor attitudes, and poor practices regarding rabies. This is similar to findings in several other countries, where limited awareness, lack of education, and misconceptions contribute to weak rabies prevention behaviours. However, in places where stronger health education and training were provided, better knowledge, attitudes, and practices were observed. The study also confirmed that knowledge, attitude, and practice are positively associated as improving knowledge can help shape better attitudes and practices toward rabies prevention and control. Therefore, educational interventions and awareness campaigns are essential.

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APPENDICES

APPENDIX A: Ethical 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(148)

To : Hajj Atthira Binti Brahim (78010)
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, Attitude and Practice on Rabies among Undergraduate UNIMAS Nursing Students**

The above matter is referred.

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

Student Name : Hajj Atthira Binti Brahim

Student ID : 78010

Programme : Bachelor of Nursing with Honours

Research Title : *Knowledge, Attitude and Practice on Rabies among Undergraduate UNIMAS Nursing Students*

Supervisor Name : Ms Feryante Rintika Anak Belansai

Supervisor H/P : +60 19-889 4780

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

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

Thank you with regards and well wishes.

Yours sincerely,



Professor Dr. Asri bin Said
Dean

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

APPENDIX B: Ethical Approval Application Letter

Hajj Atthira binti Brahim

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: Hajj Atthira binti Brahim

Matrix number: 78010

IC No.: 020220-13-0236

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, Attitude and Practice on Rabies among UNIMAS Undergraduate Nursing Students

Supervisor's name: Ms Feryante Rintika anak Belansai

Email address: bferyante@unimas.my

Supervisor's HP number: 019-8894780

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

Thank you.

Yours sincerely,

Hajjatthira

(Hajj Atthira binti Brahim)

APPENDIX C: Permission to Use Questionnaires

Request to Adapt Questionnaire for Final Year Project

 HAJJ ATTHIRA BINTI BRAHIM
To: falyba1@gmail.com
Wed 11/12/2024 01:47

Dear Dr. Mouhamadou Faly Ba,

I hope this message finds you well. My name is Hajj Atthira binti Brahim and I am currently pursuing a Bachelor of Nursing with Honours at Universiti Malaysia Sarawak (UNIMAS) and currently a final year student. As part of my research for my Final Year Project, I am investigating "**Knowledge, Attitude and Practice on Rabies among Undergraduate UNIMAS Nursing Students**".

I came across your study titled **Knowledge, Attitudes and Practices on Rabies among Human and Animal Health Professionals in Senegal** and I am interested in adapting your questionnaire for use in my research. I would like to request your permission to use the instrument, and if possible, I kindly ask if you could provide me with a copy of the questionnaire.

The questionnaire will be used under the following conditions:

- 1) It will be utilized solely for my research study and will not be used for any commercial or curriculum development activities.
- 2) I will include the appropriate copyright statement on all copies of the instrument.
- 3) Upon completion of my research, I will provide you with a copy of my completed study for your reference.

If these terms are acceptable, I would greatly appreciate it if you could kindly send the questionnaire to me.

You can reach me via email at 78010@siswa.unimas.my

Thank you for considering my request. I look forward to your response.

Best regards,
Hajj Atthira binti Brahim

 Mouhamadou Faly Ba <falyba1@gmail.com>
To:  HAJJ ATTHIRA BINTI BRAHIM
Wed 11/12/2024 17:32

 **Flagged**

 1-Questionnaire_Afrohun_Rag...
Saved to OneDrive

Dear Brahim,

Thanks for the appreciation of our article. I share you our questionnaire (in french) using for the survey. If you have any questions, feel free to ask.

Sincerely,
Faly

...

APPENDIX D: PIS and Informed Consent

Greetings, I am Hajj Atthira binti Brahim, fourth-year UNIMAS nursing student.

I am very delighted of your participation in my research study titled of “**Knowledge, Attitude and Practice regarding Rabies among UNIMAS Undergraduate Nursing Students**”. This study is supervised by Miss Feryante Rintika anak Belansai, a senior lecturer in UNIMAS.

PARTICIPANT INFORMATION SHEET

PROTOCOL TITLE: Knowledge, Attitude and Practice on Rabies among UNIMAS Undergraduate Nursing Students

PROTOCOL IDENTIFIER: Hajj Atthira binti Brahim

SPONSOR: None

INSTITUTION ADDRESS: Faculty of Medicine and Health Sciences, University of Malaysia Sarawak, 94300, Kota Samarahan, Sarawak.

THE NATURE AND PURPOSE OF THE STUDY:

The aim of the study is to assess the level of knowledge, attitude and practice regarding rabies among UNIMAS undergraduate nursing students and also its relationship between the level of knowledge, attitude and practice of rabies prevention among UNIMAS undergraduate nursing students.

STUDY DESCRIPTION:

This study will be conducted among the registered undergraduate nursing students. The study will be utilizing quantitative, descriptive cross-sectional study approach. The study will take 8 to 10 minutes to complete. The respondents have the autonomy to withdraw from the study at any time.

RISK OF STUDY PARTICIPATION:

There is no risk of study participation identified.

POSSIBLE BENEFITS OF STUDY PARTICIPANTS:

This study will focus on identifying the gaps in the knowledge, attitude and practice levels of nursing students. By focusing on enhancing knowledge, attitude, and practice related to rabies, the study aims to provide valuable insights into effective strategies for promoting optimal rabies management and prevention. Furthermore, the study may contribute to implementation for a detailed educational intervention. Lastly, the results obtained from this study can be used as a reference for future research related with knowledge, attitude and practice towards rabies among nursing student in Malaysia.

VOLUNTARY PARTICIPATION:

Participation in this study is voluntary, and no penalty will be charged if any of the study participants decide to withdraw from the study. Your cooperation and willingness to participate in the study are greatly appreciated.

CONFIDENTIALITY:

All given information will be kept anonymous and confidential and will never be connected with identifying information. The data will be used exclusively for this study. Only aggregated survey results will be reported.

WITHDRAWAL FROM STUDY:

Participants have the right to withdraw from the study at any time. No penalty will be charged upon the participants if they decide to withdraw from the study, The respondents' involvement in this study will be entirely voluntary, and they have the option to decline participation.

CONTACT INFORMATION

Any inquiries regarding the study, please contact me at:

Contact number: 011-11947065

Email: 78010@siswa.unimas.my



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.

Subject

Printed name of subject

Signature of subject

IC No.

Date

Witness

Printed name of witness

Signature of witness

IC No.

Date

Research assistant/designated investigator

Subject

Printed name of subject

Signature of subject

IC No.

Date

APPENDIX E: Data Collection Instruments

Section A

Socio-demographic data

Complete the information and respond appropriately to the questions below. Please mark (✓) the provided boxes or enter the relevant information in the blanks.

Age: _____

Gender:

☐ Male

☐ Female

Race:

☐ Malay

☐ Iban

☐ Chinese

☐ Bidayuh

☐ Indian

☐ Other:

Religion:

☐ Islam

☐ Christian

☐ Buddha

☐ Hindu

☐ Other:

Year of study:

☐ Year 1

☐ Year 2

☐ Year 3

☐ Year 4

Do you own a pet?

☐ Yes

☐ No

Area of residence?

☐ Rural

☐ Urban

Section B

Knowledge on Rabies disease among Undergraduate UNIMAS nursing students

There are a total of 16 questions for knowledge on rabies. Please tick (✓) your options at the boxes given.

1. Do you know about rabies?

☐ Yes ☐ No

2. What type of pathogen causes rabies?

☐ Bacteria ☐ Parasites ☐ Don't know

☐ Virus ☐ Mushrooms

3. What are the main reservoirs of rabies?

☐ Many wild and domestic canids and other mammals

☐ All animals ☐ Don't know

☐ Only domestic canines

☐ Only wild canids

4. What species does rabies affect?

☐ All mammals ☐ Dogs only

☐ Humans only ☐ Don't know

5. How is rabies transmitted?

- ☐ Bite from an infected animal
- ☐ Scratch of an infected animal
- ☐ Contact with the animal's skin
- ☐ Licking on a wound by an infected animal

6. Which groups of people that are most prone to animal bites?

- ☐ Children ☐ Adults
- ☐ Young people ☐ All groups

7. What is the incubation period for rabies in animals?

- ☐ 10 days or more ☐ 1-3 days
- ☐ 25 days or more ☐ Don't know

8. What are the signs of rabies in animals?

- ☐ Change in behaviour by hiding in dark corners ☐ Profuse salivation
- ☐ Aggressiveness with a loss of distrust for humans ☐ Tendency to convulse
- ☐ Paralysis ☐ Don't know

9. How long is rabies contagious in animals (dogs/cats)?

- ☐ 3–7 days ☐ One year ☐ Don't know
- ☐ One month ☐ 7 years

10. List the signs of rabies in humans

- ☐ Fever ☐ Paraesthesia ☐ Hydrophobia ☐ Nausea; Vomiting
- ☐ Pain or tingling ☐ Delusions ☐ Aerophobia ☐ Anxiety
- ☐ Headache; Dizziness ☐ Convulsions ☐ Paralysis

11. What are the ways of prevention against rabies?

- ☐ Vaccination of pets against rabies
- ☐ Don't know
- ☐ Raising community awareness about rabies
- ☐ Active surveillance of rabies in animals
- ☐ Detention and 15 days clinical observation for any healthy-looking dog or cat known to have bitten a person
- ☐ Immediately submit intact heads of presumed rabid animals packed in ice to a laboratory
- ☐ Immediately euthanize unvaccinated dogs or cats bitten by a known rabid animal

12. What are the first aid is given to a patient after a bite/scratch from a suspected rabid animal?

- ☐ Immediate and thorough cleansing of the wound with soap and water, followed by ethanol or iodine
- ☐ Suturing the wound
- ☐ Applying herbs on wound
- ☐ Don't know

13. What are the measures for the prevention of rabies in humans after an animal bite?

- ☐ Immediate and thorough cleansing of the wound with soap or detergent and water
- ☐ Take to the health centre for administration of human rabies immunoglobulin as soon as possible
- ☐ Suturing the wound
- ☐ Don't know

14. What is the vaccination regime/schedule for pets against rabies?

- ☐ Once a year
- ☐ Once in a lifetime
- ☐ Once every 2 or 3 years
- ☐ Don't know

15. What is the vaccination schedule for humans against rabies?

- ☐ Once a year ☐ Once every 2 years ☐ Don't know
- ☐ Vaccinate high-risk groups ☐ Once in a lifetime

16. What is the incubation period of rabies in humans?

- ☐ 3 - 4 days ☐ 9 days to 7 years ☐ Don't know
- ☐ 2 – 3 months ☐ Once in a lifetime

Section C

Attitude on Rabies Disease Prevention among UNIMAS Undergraduate Nursing Students

There are a total of 9 questions. Please select the options that best reflects your level of agreement with each statement.

Tick (✓) accordingly.

	Strongly disagree	Disagree	Slightly disagree or agree	Agree	Strongly agree
Do you believe that rabies is not caused by bacteria?					
Do you think that rabies affects mammals?					
Not all pets are the only sources of rabies infection					
Do you believe that bats transmit rabies?					

Did you know that rabies can be transmitted by aerosols?					
Will you advise a person bitten/scratched by a suspected rabid animal to seek treatment at a medical centre?					
Are communities ready to vaccinate their pets?					
Do you think that pet vaccination contributes greatly to the fight against rabies in the affected districts?					
Will awareness-raising efforts lead to effective rabies control in the affected districts?					

Section D

Practice of Rabies Management and Prevention among UNIMAS Undergraduate Nursing Students

There are 7 questions. Please select the options that best reflects your level of agreement with each statement.

Tick (✓) accordingly.

	Strongly disagree	Disagree	Slightly disagree or agree	Agree	Strongly agree
Wash the wound(s) quickly with soap and water, detergent and rinse thoroughly with water for at least 15 minute is the best method in handling wound bites					
Disinfecting the wound by applying antiseptic solution (Polyvidone iodine or 70% alcohol solution) is the best method in handling wound by animal bites					

Tetanus prophylaxis by giving tetanus injection prior to wound bite is important as an action for post-exposure management of rabies					
Assessing the risk of rabies infection once encountered a possible rabies case					
Categorising the type of bites for further confirmation of vector of rabies investigation					
Starting the post-exposure prophylaxis as recommended and according to the protocol by WHO if encountering a possible rabies case					
Report the bite, scratch, lick or any aggression by a suspicious animal by filling out a declaration form					

APPENDIX F: Gantt Chart

Final Year Project: Gantt Chart

Months	Aug-24	Sep-24	Oct-24	Nov-24	Dec-24	Jan-25	Feb-25	Mar-25	Apr-25	May-25	Jun-25	Jul-25
Task												
Determination of research title												
Literature Review												
Meeting with Supervisor												
Draft Research Proposal												
Oral Proposal Defense												
Ethical Approval												
Submission of research proposal draft												
FYP 1: Submission of Final Research Proposal												
Data Collection												
Data Analysis												
Drafting Research Report												
Submission of final research draft												
FYP 2: Submission of Final Year Project												

APPENDIX G: Budget Proposal

Item	Actual Budget (RM)
1. Printing materials for pilot study - Research instrument - Participant Information Sheet (PIS) - Informed consent form	20
2. Printing materials for actual study - Research instrument - Participant Information Sheet (PIS) - Informed consent form	85
3. Software (SPSS)	5
4. Binding of final report	50
Total	160

APPENDIX H: Similarity Index Report

Draft 1

ORIGINALITY REPORT

10%

SIMILARITY INDEX

8%

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5%

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3%

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PRIMARY SOURCES

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4%

2

Submitted to Universiti Malaysia Sarawak

Student Paper

1%

3

Submitted to Southern University And A & M College

Student Paper

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4

www.researchgate.net

Internet Source

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5

Ali, A, EY Ahmed, and D Sifer. "A Study on Knowledge, Attitude and Practice of rabies among residents in Addis Ababa, Ethiopia", Ethiopian Veterinary Journal, 2014.

Publication

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Mohd Yasir Mohd Mukhtar, Afzan Mat Yusof, Muhammad Lokman Md Isa. "Knowledge, attitude and practice on occupational safety and health among workers in petrochemical

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companies", IOP Conference Series: Earth and Environmental Science, 2020

Publication

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