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Knowledge, Attitude, and Practices Towards Anaemia Among UNIMAS Undergraduate Nursing Students

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This project is submitted

In partial fulfilment of the requirements for the degree of

Bachelor of Nursing with Honours

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DECLARATION

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

……

Signature

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ABSTRACT

Anaemia, particularly iron deficiency anaemia (IDA), is a widespread health concern that can significantly affect the academic performance and well-being of university students. This cross-sectional quantitative study aimed to assess the knowledge, attitude, practices (KAP) towards anaemia among undergraduate nursing students at Universiti Malaysia Sarawak (UNIMAS). A total of 163 students were selected through simple random sampling and surveyed using a validated self-administered questionnaire. Data were analysed using IBM SPSS Statistics Version 27. The results showed that 56.4% of students demonstrated good knowledge, while 68.7% had a negative attitude and 53.4% exhibited poor practices related to anaemia prevention. Weak but statistically significant positive correlations were observed between knowledge and attitude ($r = 0.210$, $p = 0.007$), knowledge and practice ($r = 0.262$, $p = 0.001$), and attitude and practice ($r = 0.198$, $p = 0.011$). These findings indicate that while knowledge levels are satisfactory, attitudes and practices remain suboptimal. The study highlights the need for enhanced educational interventions that go beyond theoretical knowledge to improve practical skills and attitudes, ultimately preparing future nurses to effectively prevent and manage anaemia.

Keywords: Anaemia, Knowledge, Attitude, Practice, Nursing students

ABSTRAK

Anemia, khususnya anemia kekurangan zat besi (IDA), merupakan masalah kesihatan yang meluas dan boleh memberi kesan ketara terhadap prestasi akademik serta kesejahteraan pelajar universiti. Kajian keratan rentas ini dijalankan untuk menilai tahap pengetahuan, sikap dan amalan (KAP) terhadap anemia dalam kalangan pelajar kejururawatan prasiswazah di Universiti Malaysia Sarawak (UNIMAS). Seramai 163 pelajar telah dipilih melalui persampelan rawak mudah dan menjawab soal selidik yang telah disahkan kesahihannya. Data dianalisis menggunakan IBM SPSS Statistics Versi 27. Dapatan menunjukkan bahawa 56.4% pelajar mempunyai tahap pengetahuan yang baik, manakala 68.7% menunjukkan sikap negatif dan 53.4% mengamalkan amalan yang kurang baik berkaitan pencegahan anemia. Terdapat korelasi positif yang lemah tetapi signifikan secara statistik antara pengetahuan dan sikap ($r = 0.210$, $p = 0.007$), pengetahuan dan amalan ($r = 0.262$, $p = 0.001$), serta sikap dan amalan ($r = 0.198$, $p = 0.011$). Dapatan ini menunjukkan bahawa walaupun tahap pengetahuan adalah memuaskan, sikap dan amalan masih kurang memuaskan. Kajian ini menyerlahkan keperluan untuk intervensi pendidikan yang lebih menyeluruh yang bukan sahaja menekankan aspek teori tetapi juga membina kemahiran praktikal dan sikap yang positif dalam kalangan pelajar, bagi menyediakan jururawat masa hadapan yang lebih bersedia dalam mencegah dan menguruskan anemia secara berkesan.

Kata kunci: *Anemia, Pengetahuan, Sikap, Amalan, Pelajar kejururawatan*

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LIST OF ABBREVIATIONS

IDA	Iron Deficiency Anaemia
KAP	Knowledge, Attitude, And Practices
UNIMAS	Universiti Malaysia Sarawak
WHO	World Health Organization

CHAPTER 1: INTRODUCTION

1.0 Introduction

This chapter discusses "Knowledge, Attitude, and Practices Towards Anaemia Among UNIMAS Undergraduate Nursing Students" which includes the study's background, problem statement, research questions, general and specific objectives, hypotheses, significance of study, definitions of significant terms, and a chapter summary.

1.1 Background of Study

Anaemia is characterized by a reduction in haemoglobin levels, which is classified by the World Health Organization (WHO) as below than 12.0 g/dL in females and less than 13.0 g/dL in males, resulting in insufficient oxygen-carrying capacity of the blood (Cappellini & Motta, 2015). Over the years, anaemia has become a prevalent global health issue, which affects diverse populations and age groups. In 2021, it was estimated that 1.92 billion individuals were affected by anaemia, which marked a substantial increase of 420 million cases in the last thirty years (Gardner et al., 2023). This shows a progressive increase in the anaemia prevalence which indicates the need for enhanced preventive measures and interventions. Consistent with the worldwide trend, Malaysia has also reported persistently high number of anaemia cases, posing a significant public health challenge among the local community. The National Health and Morbidity Survey (NHMS) 2019 highlighted that anaemia affects one in five Malaysians, with women between the ages of 15 and 49, who are of reproductive age, being the most affected group (IPH, 2019).

Iron deficiency anaemia (IDA) is the most widespread type of anaemia which affects

populations both worldwide and within Malaysia. WHO estimates that almost two billion individuals, or 25% of the global population, are anaemic, with around half of these cases being attributed to IDA (Mantadakis, 2020). Typically, IDA is caused by inadequate dietary iron intake, periodic blood loss or poor iron absorption. As a result, it can lead to various adverse effects, including fatigue, poor concentration and reduced physical performance. This is particularly concerning for young adults, including university students, as IDA can affect their academic performance and impact energy levels for daily activities. University students tend to adopt unhealthy eating lifestyle due to stress and insufficient time for meal consumption. Due to the demanding academic and clinical schedules in the nursing course, nursing students, too, are susceptible to developing these unhealthy habits. This can put them at risk for health conditions such as IDA and could also impact their academic performance, clinical skills and even the quality of the patient care. If this condition is not prevented, it could cause prolonged fatigue, limit their capabilities to perform clinical procedures or even absenteeism from classes or clinical attachments.

1.2 Problem Statement

The rising prevalence of IDA in Malaysia, including among university students indicates a significant public health issue. A study carried out by Mok et al. (2024) reported that 44.5% of the Malaysian university students had inadequate knowledge regarding anaemia, particularly its causes, and were unclear about examples of iron-rich meals. Similarly, a research by Mohamed Abdallh Ali et al. (2022) revealed that majority of the nursing students (53.7%) demonstrated unsatisfactory knowledge regarding the condition. These findings indicate a significant gap in anaemia-related knowledge among the students. As a result, the lack of knowledge leads to failure to

recognize early signs of IDA, its contributing factors and frequently mistaken them for other issues or misattributed to the effects of academic stress. Hence, it is necessary to assess the level of knowledge among Universiti Malaysia Sarawak (UNIMAS) undergraduate nursing students about anaemia. According to the same study, majority of the university students (84.1%) surveyed also exhibited poor attitudes towards anaemia. 69% of the students reported difficulty making iron-rich foods which indicate a lack of practical knowledge and abilities. 83.2% of students from the study also indicated their lack of confidence in preparing iron-rich meals. Furthermore, more than half (51.5%) of the students reported disliking the flavour of iron-rich meals, which may lead to insufficient iron consumption. These findings collectively demonstrate the less than satisfactory attitudes of students towards anaemia and its prevention (Mok et al., 2024).

A study by Huong et al. (2022) found that the majority of Malaysian university students exhibited poor practices related to anaemia. Over half of the participants (52.9%) consumed inadequate amounts of iron-rich foods, with 81.7% students reporting regularly skipping meals which can further increase the risk of anaemia. Furthermore, 63.9% of the students consumed tea or coffee during or after meals, which has been found to reduce iron absorption and contribute to IDA. This finding is consistent with several studies, including one by Shill et al. (2014) which reported a higher prevalence of anaemia among individuals who skip meals. These unhealthy practices reflect a critical gap in knowledge and awareness about anaemia.

This study addresses the limited research on nursing students' knowledge, attitudes, and practices regarding anaemia. Addressing this gap is necessary to evaluate their readiness to manage anaemia effectively in their future roles as well

as providing important insights into this overlooked area.

1.3 Research Questions

1. What is the level of knowledge of the undergraduate nursing students in UNIMAS regarding anaemia?
2. What are the attitudes of UNIMAS undergraduate nursing students towards anaemia?
3. What are the practices towards anaemia prevention among UNIMAS undergraduate nursing students?
4. Is there any relationship between knowledge, attitude, and practice towards anaemia among UNIMAS undergraduate nursing students?

1.4 General Research Objectives

To evaluate the knowledge, attitude, and practice towards anaemia among UNIMAS undergraduate nursing students.

1.5 Specific Research Objectives

1. To assess the level of knowledge on anaemia among UNIMAS undergraduate nursing students.
2. To evaluate UNIMAS undergraduate nursing students' attitudes towards anaemia.
3. To evaluate the practice towards anaemia prevention among UNIMAS undergraduate nursing students.
4. To examine the relationship between knowledge, attitudes, and practice towards anaemia among UNIMAS undergraduate nursing students.

1.6 Hypotheses

1. Null hypothesis (H_0): There is no relationship between knowledge and attitude or knowledge and practice or attitude and practice towards anaemia among UNIMAS undergraduate nursing students.
2. Alternative hypothesis (H_A): There is a relationship between knowledge and attitude or knowledge and practice or attitude and practice towards anaemia among UNIMAS undergraduate nursing students.

1.7 Significance of the Study

1.7.1 Body of Knowledge

This study seeks to enhance the current evidence base by examining the knowledge, attitudes, and practices (KAP) of anaemia among undergraduate nursing students within the UNIMAS setting. Anaemia is a worldwide health concern; nevertheless, most research utilizing its prevalence, causes, and management in the general population, with insufficient focus on healthcare students, especially nursing undergraduates. This study aims to uncover strengths and issues related to nursing students' knowledge, attitudes, and behaviours regarding their well-being. The findings will provide a foundation for future study on developments regarding anaemia-related knowledge, attitudes, and practices among nursing students or for assessing the efficacy of interventions to improve their understanding and behaviours to improve health outcomes.

1.7.2 Target Group and Public

The primary beneficiaries of this study are the undergraduate nursing students at UNIMAS, as the findings will provide a clear understanding of their readiness to manage anaemia in clinical settings. The study can prompt targeted educational interventions by identifying specific areas where their knowledge or practices may be lacking. For instance, if students are unaware of the link between anaemia and poor academic performance due to fatigue and reduced concentration, the study may encourage students to adopt preventive measures, such as improving dietary habits and seeking regular health screenings. Apart from the direct influence on nursing students, the study has indirect implications on the general population. Well-educated and informed nursing students are more likely to provide accurate education and counselling to patients and communities, playing a vital role in reducing the burden of anaemia through early detection, prevention, and management strategies.

1.7.3 Practice

This study is significant for nursing education and the broader healthcare profession as it examines how well nursing students apply their theoretical knowledge of anaemia in clinical and community settings. For example, if the study found participants had inadequate abilities to utilizing common early clinical symptoms of anaemia or provide targeted education regarding prevention, such as dietary modifications and iron supplements, it indicates a need for improved clinical training and practical modules focused on anaemia management.

In addition, the results could possibly contribute to the development of new or enhanced programmes, such as simulation-based educational resources, case

studies or classroom exercises, that enable students to attain higher competencies in patient counselling and patient care. Second, the knowledge obtained from the present study may assist preceptorship programs in ensuring that clinical instructors specifically address the specific deficiencies regarding the delivery of anaemia care.

In the long term, equipping nursing students with a solid foundation in anaemia management will enhance the overall competence of the healthcare workforce, resulting in better patient outcomes and a reduction in anaemia-related complications.

1.7.4 Policy Making

The study could influence policy-making decisions within nursing education and institutional health programs. For example, if the findings point to large information gaps regarding the long-term effects of anaemia, policymakers may modify the nursing curriculum to include more information on anaemia-related issues. This could involve incorporating anaemia-focused modules, competency assessments, or community outreach programs to increase awareness among students and the public. At the institutional level, the study could promote the execution of regular anaemia screening and prevention initiatives targeted at nursing students, ensuring their health and readiness to meet academic and clinical demands. On a broader scale, the findings could also be used to inform national public health policies by offering evidence-based suggestions for future interventions. This may include promoting health education campaigns on anaemia prevention in educational institutions or extending access to iron supplemental funding programs. In addressing these significant areas, the research corresponds to

Malaysia's healthcare objectives and will, in turn, strengthen the country's efforts to lessen anaemia prevalence.

1.8 Definition of Terms

Gilanie (2022) defines knowledge as the comprehension or awareness of a subject, including facts, information, and abilities obtained through experience or education. In this study, knowledge will be measured using the 9-item instrument from Knowledge, Attitude and Practices Questionnaire developed by Shahzad et al. (2017) and Jalambo et al. (2017). Participants will respond to each question with Yes or No options, awarding 1 point for each correct answer and 0 points for incorrect responses.

Knowledge: As defined by Kapur (2024), attitude refers to the manner, actions, and behaviour of individuals. This study will evaluate attitudes towards anaemia utilizing the Knowledge, Attitude and Practices Questionnaire developed by Shahzad et al. (2017) and Jalambo et al. (2017), a 5-item tool scored on a 3-point Likert scale (Not serious/Not beneficial/Difficult/Not confident/Dislike=0, Not sure/Maybe=1 and Serious/Beneficial/Not difficult/Confident/Like=2).

Practice: Practice involves a range of methods that can be applied, modified, taught, learned, and shared, regardless of the timing or specific conditions of their use (Short, 2023). In this study, practices related to anaemia will be assessed using the Knowledge, Attitude and Practices Questionnaire developed by Shahzad et al. (2017) and Jalambo et al. (2017), an 8- item scale with a 3-point Likert response

(Never=0, Sometimes=1, Always=2).

Anaemia: Cappellini and Motta (2015) defines anaemia as a decline in haemoglobin levels, with the WHO specifying guidelines of below 12.0 g/dL for females and less than 13.0 g/dL for males.

Undergraduate Nursing Students: Undergraduate nursing students refer to those currently enrolled in the Bachelor of Nursing Programme at the Faculty of Medicine and Health Sciences, Universiti Malaysia Sarawak, during the data collecting period.

1.9 Chapter Summary

Chapter 1 concludes with a discussion of the background of study, problem statement, research questions, research aims and objectives, conceptual framework, significance of study and the definition of terms.

CHAPTER 2: LITERATURE REVIEW

2.0 Introduction

For the literature review, an electronic search of several databases which included PubMed, and Google Scholar was performed. Current literatures ranging from the year 2017 to 2024 were considered. Keywords used in the search were “anaemia”, “nursing students”, “healthcare students”, “university students”, “knowledge”, “practice” and “attitude”. The search generated a total of 47 studies. The search results were further filtered to only include free full text articles in English. The abstracts were further reviewed for their contexts. The final review was based on a total of eight articles included.

2.1 Knowledge towards Anaemia

Natour et al. (2022) conducted a study examining the understanding of anaemia and its related variables among 117 students from various health-related disciplines, including medicine, nursing, pharmacy, and allied health. The study evaluated the impact of a nutrition course on their understanding of anaemia. The findings revealed that the students generally had a good basic knowledge of anaemia. Most participants were aware of iron-rich food sources and the inhibitory effects of tea and coffee on iron absorption. Other than that, they also demonstrated strong nutritional awareness, particularly regarding the causes and consequences of anaemia. The high knowledge levels were attributed to the inclusion of anaemia-related material in the curriculum, specifically through the nutrition course.

Similarly, Huong et al. (2022) carried out a cross-sectional research to assess knowledge, attitudes, practices (KAP), and health-seeking behaviours (HSB) about

anaemia among 180 female university students at a medical university in Malaysia. The data was obtained via an online questionnaire adapted from validated instruments to evaluate participants' knowledge based on the total number of correct responses and their levels of awareness. It was shown that the majority of students (98.3%) recognised IDA as the predominant type of anaemia. A significant percentage of respondents demonstrated a good understanding of haemoglobin's function (96.1%) and recognised the negative consequences (82.8%), aetiology (90%), and symptoms (92.8%) of anaemia. The results indicated that the average score of the participants was 60.3%, demonstrating a generally good understanding of anaemia among the students. Nonetheless, regarding the recognition of all potential consequences of anaemia, only 60% to 80% of students demonstrated accuracy, indicating a need to improve their understanding in this field of study.

A similar trend was observed in a study conducted by Dhivakar et al. (2020) in the Kanchipuram district of Tamil Nadu, involving 40 female students from an Allied Health Sciences College. The findings revealed that 92.5% of the participants demonstrated a high level of knowledge regarding anaemia, while only 7.5% (n = 3) exhibited a moderate level of knowledge. All participants (100%) were able to accurately define anaemia as a condition characterized by decreased haemoglobin levels and successfully identified its signs, symptoms, and long-term complications. The high level of knowledge observed among the majority of participants may be attributed to their academic background in the allied health sciences, which likely provided them with relevant education on the topic.

Overall, all three studies reviewed found that students had a good understanding of anaemia. This is probably because most of the participants were studying in health-related courses, which gave them more exposure to medical topics, including anaemia. However, it

is important to note that the findings may not apply to students from non-health backgrounds. Since the participants were mainly from allied health or nursing programs, their knowledge may not reflect that of the general student population. In conclusion, while the studies show positive results in terms of knowledge among healthcare students, the results may not be generalisable. Future studies should consider including students from various academic fields to get a better picture of how well anaemia is understood across different groups.

2.2 Attitude towards Anaemia

Attitude of nursing students can influence how they perceive and manage health conditions such as anaemia. A positive attitude toward anaemia can enhance their ability to follow best practices and improve outcomes by effectively managing and preventing complications associated with the condition. A study revealed that majority of the Malaysian university students showed poor attitude towards anaemia (Mok et al., 2024). This cross-sectional study was aimed to examine the relationship between anaemia-related information, anaemia status, menstrual health, and attitudes among university students in Malaysia. From the results, 83.2% of the respondents lack confidence in preparing iron-rich meals and 87.8% of them felt uncertain about consuming them. Additionally, 51.5% expressed a dislike for the taste of iron-rich foods, underscoring the need for targeted interventions to improve dietary practices and perceptions of iron-rich foods. This is likely due to university students opting for fast food and meals that require minimal preparation.

On the other hand, a study conducted in Indonesia revealed that majority of the respondents had favourable attitude towards anaemia. A cross-sectional study was conducted by Trisyani et al. (2018) to assess the knowledge and attitudes of nursing students regarding sources of iron supplements at the Faculty of Nursing, Padjadjaran

University, Indonesia. The study revealed that the majority of respondents had favourable attitudes (52.79%), while (47.20%) of them were unfavourable related to the consumption of foods high in iron. The findings also showed that the respondents demonstrated good attitude in consuming food from animal protein sources (51.77%), plant protein sources (53.80%) and plant sources (61.92%). These findings may be a result of the emphasis placed on nutritional education in Indonesian programmes, along with cultural norms that promote the consumption of a variety of iron-rich foods.

Similarly, a study by Dhivakar et al. (2020) conducted among 40 students from an Allied Health Sciences College in Kanchipuram, Tamil Nadu, showed that 77.5% of respondents had a moderate attitude, while 22.5% had a low attitude towards anaemia. This suggests that although the participants had some awareness, there were still gaps in their attitudes that may affect behaviour and preventive practices.

To conclude, the findings from these three studies show varying levels of attitude towards anaemia among university students, suggesting that attitudes may be influenced by several factors including cultural norms, educational background, and access to nutritional knowledge. For instance, Malaysian university students showed poor attitudes, possibly due to lifestyle factors such as fast-food consumption and lack of practical knowledge in meal preparation. In contrast, Indonesian nursing students demonstrated more favourable attitudes, likely supported by strong educational content on nutrition and cultural practices encouraging diverse diets. The Indian study reflects a moderate stance, which may suggest partial awareness but insufficient motivation or confidence to act on it. Overall, it can be concluded that while knowledge may exist, attitude remains a crucial and sometimes lacking component in anaemia prevention and management.

2.3 Practice towards Anaemia

According to Huong et al. (2022), the respondents demonstrated poor practices towards anaemia prevention. The research evaluated knowledge, attitudes, practices (KAP), and health- seeking behaviour (HSB) on anaemia among 180 female undergraduate students. The results indicated that only 5.6% of the participants consumed vitamin C-rich fruits during their meals. Additionally, just 15.0% of them incorporated legumes into their daily diets. Additionally, beverage consumption habits were also poor, with coffee, tea, and milk commonly consumed before meals, which can potentially interfere with iron absorption. Furthermore, skipping meals was common among 87.1% of students, which may increase their risk of developing anaemia.

Another study conducted in Pakistan similarly highlighted poor practices in anaemia prevention among respondents. Channar et al. (2023) carried out a cross-sectional study to evaluate the dietary habits of undergraduate nursing students at a private sector institution. The findings revealed that 60.9% of the participants reported skipping breakfast, a habit that significantly increases the risk of anaemia. Breakfast is a crucial meal that often provides essential nutrients required for maintaining healthy haemoglobin levels. According to Sayed and Nagarajan (2022), persistent breakfast skipping prevents the body from obtaining the variety of nutrients necessary for haemoglobin synthesis, increasing their susceptibility to anaemia.

Consistent with the previous findings, a study conducted among 200 female university students at the University of Tabuk, Saudi Arabia reported poor practices related to anaemia prevention. The study by Alzaheb and Al-Amer (2017) identified several contributing factors, including insufficient intake of iron and vitamin C, inadequate red meat consumption (less than 2 times per week), frequent tea consumption

(more than 2 times per week), and a history of IDA. Particularly, regular tea consumption was highlighted as a contributing factor. This is due to its high polyphenol content, which can inhibits non-heme iron absorption and affect an individual's iron levels (Anand et al., 2014). This dietary practice is particularly significant within Saudi culture, where tea consumption is a time-honoured ritual frequently observed before and after meals (Alzaheb & Al-Amer, 2017).

In conclusion, these studies indicated that university students exhibited poor practices in preventing anaemia. In the contexts of Pakistan and Malaysia, this issue is largely attributed to the habit of skipping meals, particularly breakfast, which is common among students. Students in both countries often prioritize other activities or sleep overeating a nutritious meal, resulting in irregular eating patterns. As a result, their intake of essential nutrients needed for optimal health, including those necessary for haemoglobin synthesis, is inadequate, increasing the risk of anaemia. In contrast, the situation in Saudi Arabia reflects different underlying causes. Additionally, cultural practices, such as the frequent consumption of tea before and after meals, further hinder iron absorption due to the presence of polyphenols in tea. These findings underscore the need for context-specific interventions that address both dietary habits and cultural influences in promoting anaemia prevention among university students.

2.4 Relationship Between Variables

Huong et al. (2022) identified a significant relationship between knowledge and attitude ($p = 0.003$). They also found a significant link between knowledge and practice ($p = 0.005$). The findings suggest that higher levels of knowledge are strongly associated with improved attitudes but show only a moderate association with practices. Specifically, while

greater knowledge was associated with improved attitudes and slightly better practices, the relationship between knowledge and behaviour was weaker. This suggests that, although knowledge can enhance attitudes, it does not necessarily translate into significant changes in behaviour.

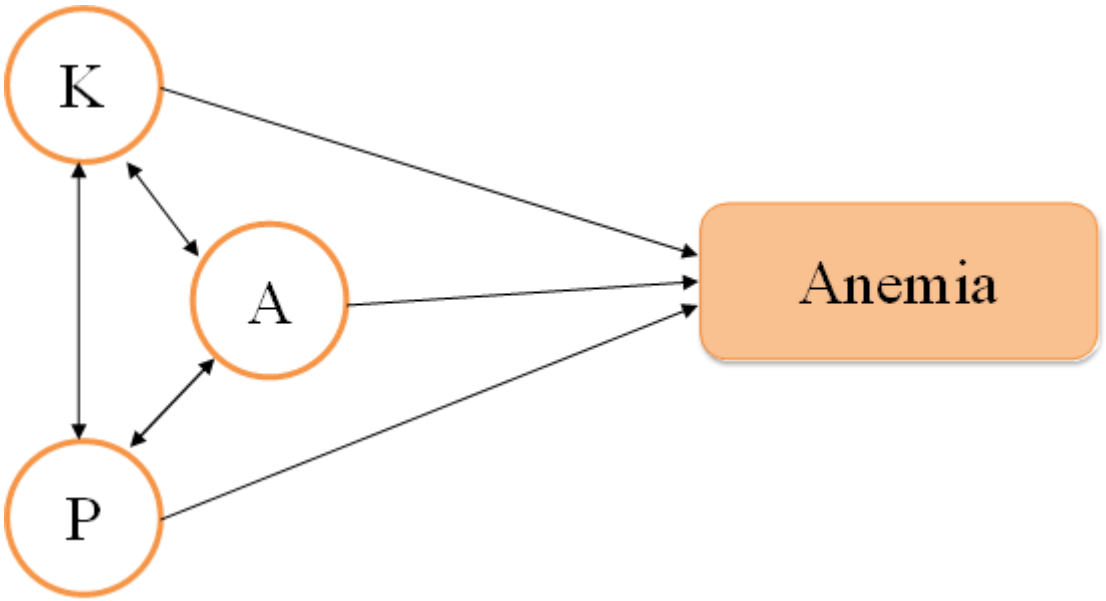
Similarly, a research by Hamed (2021) evaluated knowledge, attitudes, and dietary habits among anaemic college ladies, revealing a statistically significant correlation between the respondents' knowledge about anaemia and their attitudes. From the researcher's point of view, this finding indicates that acquiring accurate knowledge about the condition can lead to a more positive attitude. In conclusion, these results imply that a better understanding of anaemia is associated with more favourable attitudes towards managing anaemia.

2.5 Conceptual Framework

Knowledge, attitude, and practice towards anaemia among nursing students can significantly impact both patient and hospital outcomes. Even though the knowledge level is considered to be good among the students, it is not sufficient on its own. It must be accompanied by a positive attitude and effective practice for nursing students to successfully apply their knowledge and make a meaningful impact on preventing anaemia. Attitudes towards something, whether positive or negative, are influenced by an individual's beliefs about the consequences of their actions. When nursing students acquire sufficient knowledge through educational programs and adopt a positive attitude, it can lead to improved practices in preventing anaemia. These practices, in turn, can help reduce and prevent the occurrence of anaemia. Figure 1 shows the conceptual map adapted from a study by Agustina et al. (2021). The figure shows the relationships

between knowledge, attitude and practice towards anaemia. Knowledge can affect attitude, and attitude can also influence how knowledge is acquired. For instance, an individual's understanding (K) of anaemia can lead to a more positive attitude (A) towards managing the condition. On the other hand, a positive attitude (A) towards health can encourage a person to actively seek and acquire more knowledge (K) about the prevention and treatment of anaemia. Another connection illustrated is between knowledge and practice. A solid understanding of anaemia (K) can lead to better practices (P), such as improved diet and regular health check-ups. In contrast, hands-on experience in managing anaemia (P) can enhance or alter existing knowledge (K) based on the practical outcomes.

Figure 2.1: Conceptual framework for Knowledge, Attitude and Practices towards Anaemia



CHAPTER 3: METHODOLOGY

3.0 Introduction

For this chapter, it comprises of research design, research setting, population, inclusion and exclusion criteria, sampling method and sampling size, study instrument, ethical consideration, and data collection procedures.

3.1 Research Design

This study employed quantitative research methods using a cross-sectional approach. Cross-sectional studies are ideal for evaluating illness prevalence, attitudes, or knowledge among healthcare professionals (Kesmodel, 2018). Other than that, according to Wang and Cheng (2020), these studies analyse data from a population at a specific point in time. Quantitative methods were chosen because they provide valuable insights into the structure of reality and established discourses. Additional advantage of this study design is the reduction of potential personal bias among respondents (Savela, 2018).

3.2 Research Setting

This research was carried out among undergraduate nursing students from the Bachelor of Nursing with Honours Programme at the Faculty of Medicine and Health Sciences (FMHS) at UNIMAS. UNIMAS is a public university situated in Kota Samarahan, Sarawak. The faculty offers two main undergraduate programmes namely, the Bachelor of Nursing with Honours Programme and the Doctor of Medicine Programme.

3.3 Population

The study population consisted of 235 undergraduate nursing students who were officially and actively enrolled in the Bachelor of Nursing program at the FMHS, UNIMAS at the time of the study. These students are distributed across four academic years, with 51 students in Year 1, 63 students in Year 2, 57 students in Year 3, and 64 students in Year 4.

3.4 Sampling Method and Sample Size

Simple random sampling was employed to recruit participants to ensure that every respondent had an equal probability of being selected. Hence, all UNIMAS undergraduate nursing students who fulfilled the inclusion and exclusion criteria had equal chance of being selected to participate in the study.

A comprehensive list of nursing students from Year 1 to Year 4 was obtained from the academic office of the faculty, which included the names and relevant details of all enrolled students across the four academic years. The researcher entered the student's list into a Microsoft Excel spreadsheet where each data row containing individual student's particulars was assigned to a unique serial number. The randomizer formula function of the Microsoft Excel was utilized to randomly pick the required number of participants for the study based on the calculation of the sample size. The randomly selected students were then contacted to participate in the study by the researcher. Follow-ups were carried out by the researcher for non-respondents until the required study sample was achieved.

The sample size was calculated using the Slovin's Formula which amounted to a total of 148 students required for the study:

Equation 3.1

$$n = \frac{N}{1 + Ne^2}$$

where:

n: required

sample size N:

population size

e: acceptable margin of error

$$n = \frac{N}{1 + Ne^2}$$

$$= 235/1+ (235 \times 0.05^2)$$

$$= 148.031$$

$$= 148$$

In anticipation of potential non-respondents and missing data, an additional 10% was added to the calculated sample size which brings the total sample size to 163 respondents required for the study:

$$148 \times 10\% = 14.8$$

$$\text{Sample size} = 148 + 14.8$$

$$= 162.8$$

$$= 163$$

3.5 Inclusion and Exclusion Criteria

The inclusion criteria for this study are all undergraduate nursing students from

year 1 to year 4 who are enrolled in the Bachelor of Nursing programme at Faculty of Medicine and Health Sciences in UNIMAS. This excludes post-registration students from the same course as they are practicing nurses who may have vastly different knowledge, attitude and practice towards anaemia when compared to pre-registration undergraduate nursing students. The study also included first year to fourth year undergraduate nursing students who were willing to participate in the research.

Postgraduate students, those who refused participation or did not provide consent and participants in the pilot study were excluded.

3.6 Research Instrument

A Knowledge, Attitude and Practices (KAP) questionnaire from Shahzad et al. (2017) and Jalambo et al. (2017) was adapted for data collection in this study. The KAP questionnaire was adopted from the standardized KAP on iron deficiency anaemia from Food and Agriculture Organization (FAO) guidelines. The original author's permission was sought for the adoption of the tool in this study (Appendix V). The questionnaire was administered in English and comprised of four sections namely Section A for participant's demographic data, Section B for knowledge on anaemia, Section C for attitude towards anaemia and Section D for practices towards anaemia (Appendix IV).

Section A collected information on the participant's demographic profile which included age, gender and year of study. Section B assessed the respondent's knowledge on anaemia by using a 9-item questionnaire measured on a dichotomous scale with options Yes =1 and No=0. The possible total score for this section ranged between 0 to 9. Section C assessed the participant's attitudes towards anaemia which will be assessed using a 6-item

tool measured on a 3-point Likert scale with options, Not likely=0, Somewhat likely=1 and Very likely=2. The minimum possible score for this section is 0 while the maximum score is 12. Section D assessed respondent's practices towards anaemia using a 20-items questionnaire measured using a 3-point Likert scale (Never=0, Sometimes=1, Always=2). The minimum possible score for this section is 0 while the maximum score is 40. There were questions that required reverse scoring which were items 2, 5, 6 (junk food) and 8 (coffee/tea).

3.7 Ethical Consideration

Ethical permission for the study was granted by the Research and Ethics Committee of the FMHS, UNIMAS prior to the initiation of data collection (Appendix I). Participants recruited for the study were provided with a participant information sheet which included full disclosure of the study's objectives, conduct, participant's rights and the researcher's contact information for further inquiries (Appendix II). Upon full disclosure, participants who agreed to participate in the study were required to provide a signed inform consent to indicate their voluntary willingness to participate in the study (Appendix III). Participants were also informed of their right to withdraw from the study at any point without any repercussions. Permission was also sought from the original authors of the instrument adopted for use in this study (Appendix V). All data collected in this study will be used solely for this research and securely stored and accessible solely by the researcher and supervisors. To maintain participant's anonymity, participant's responses were entered and coded with all personal identifying particulars omitted to prevent data from being tracked back to any specific individual respondent. The data files were stored securely in a password-protected private file which could only be accessible

only to the researcher and supervisor and will be retained for a period of two years after the study before being destroyed.

3.8 Pilot Study

A pilot study was performed among 10% (n=16) of the total calculated sample size to test the reliability of the instrument. Participants of the pilot study were recruited using the same inclusion criteria and sampling method as the actual study.

For the validity, the face validity assessment evaluates respondents' perceptions of the clarity and appropriateness of the questionnaire items (Jalambo et al., 2017). The instrument used this this study had been validated by the original authors with an expert panel also validating the content of the questionnaire.

Reliability testing was performed to evaluate internal consistency using IBM SPSS Statistics version 27. This study evaluated the reliability of the questionnaire using Kuder-Richardson Formula 20 (KR-20) for knowledge scale while Cronbach's alpha for the attitude and practice scales during the pilot study. According to Hair et al. (2010), Cronbach's alpha score above 0.60 is considered as reliable. In this study, the reliability for knowledge scale is found to be very good (9 items; KR-20 co-efficient = .83). The reliability for attitude scale is found to be acceptable (6 items; $\alpha = .61$) while reliability for practice scale is found to be good (20 items; $\alpha = .76$).

3.9 Data Collection Procedures

The data collection process commenced after official ethical clearance was obtained from the Research and Ethics Committee of FMHS, UNIMAS. Upon receiving ethical clearance, a list of actively enrolled undergraduate nursing students from Year 1

to Year 4 of the Bachelor of Nursing with Honours Programme was obtained from the academic office of FMHS. The sample size was selected from the population by using simple random sampling. The names were entered into a Microsoft Excel spreadsheet, and a random selection was performed using the random number function (RAND). The printed questionnaires were distributed to the respondents. They were required to complete the informed consent form on the first page of the questionnaire before proceeding with the survey questions. A total of 163 respondents participated in the actual study. Additionally, a pilot study was conducted with 16 selected participants to ensure feasibility of the study. Finally, after the data were collected, the input and data analysis were performed using IBM SPSS Statistics Software (version 27).

3.9 Data Analysis

After completing the data collection, the data were entered into IBM SPSS Statistics Version 27 for subsequent statistical analysis.

To analyse the data, both descriptive and inferential statistical methods were employed. Descriptive statistics, including frequency, percentage, mean, and standard deviation, were used to summarise all relevant variables, such as demographic data, knowledge, attitude, and practice related to anaemia.

For the inferential analysis, as all of the variables were not normally distributed, the Spearman correlation test was applied to assess the relationships between knowledge and attitude, attitude and practice, and knowledge and practice. A *p-value* of less than .05 was considered statistically significant, indicating rejection of the null hypothesis.

3.10 Chapter Summary

Chapter 3 concludes by discussing research design, research setting, target population, inclusion and exclusion criteria, sampling method, sample size, study instruments, ethical considerations, data collection procedures, and data analysis methods.

CHAPTER 4: RESULTS

4.0 Introduction

This chapter describes the results of demographic data, knowledge towards anaemia, attitude towards anaemia, practice towards anaemia, relationship between the variables and summary of the chapter.

4.1 Demographic data

A total of 163 nursing undergraduate students from FMHS, UNIMAS participated in this study with a 100% response rate. The age of the participants ranged from 19 years old to 26 years old, with a mean age of 21.79 (SD + 1.399). There was a total of 40 participants from Year 1 (24.5%), 46 participants from Year 2 (28.2%), 37 participants from Year 3 (22.7%) and 40 participants from Year 4 (24.5%). There was a total of 26 male participants (16%) and 137 female participants (84%) participated in the study. Table 4.1 showed the demographic data of the respondents.

Table 4.1 Distribution of respondents by demographic attributes of UNIMAS undergraduate nursing students (n=163)

Characteristics		**Frequency (n)**	**Percentage (%)**	**(Mean SD)**
Age				(21.79 ± 1.399)
Year of Study	Year 1	40	24.5%	
	Year 2	46	28.2%	
	Year 3	37	22.7%	
	Year 4	40	24.5%	
Gender	Male	26	16.0%	

Female	137	84.0%

4.2 Knowledge towards anaemia

Figure 4.2 shows the normality distribution for total score of knowledge towards anaemia. During the Kolmogorov-Smirnov test, the skewness value showed -1.199 and kurtosis value of 1.064. The skewness value of -1.199 indicates a moderately negatively skewed distribution, where more respondents scored higher on the knowledge scale. Additionally, the kurtosis value of 1.064 suggests a distribution that is slightly more peaked than the normal distribution, meaning that the scores are more concentrated around the mean.

The Kolmogorov-Smirnov test yielded a statistic of 0.199 with a significance value of less than 0.001. The results indicate that the total knowledge scores significantly deviate from a normal distribution ($p < 0.05$). This non-normality is further supported by the histogram, which shows a concentration of scores toward the higher end of the scale. Therefore, the total score for knowledge towards anaemia was considered as not normally distributed in this study as the *p-value* is <.001.

Figure 4.2 Normality distribution for total score of knowledge towards anaemia among UNIMAS undergraduate nursing students (n=163)

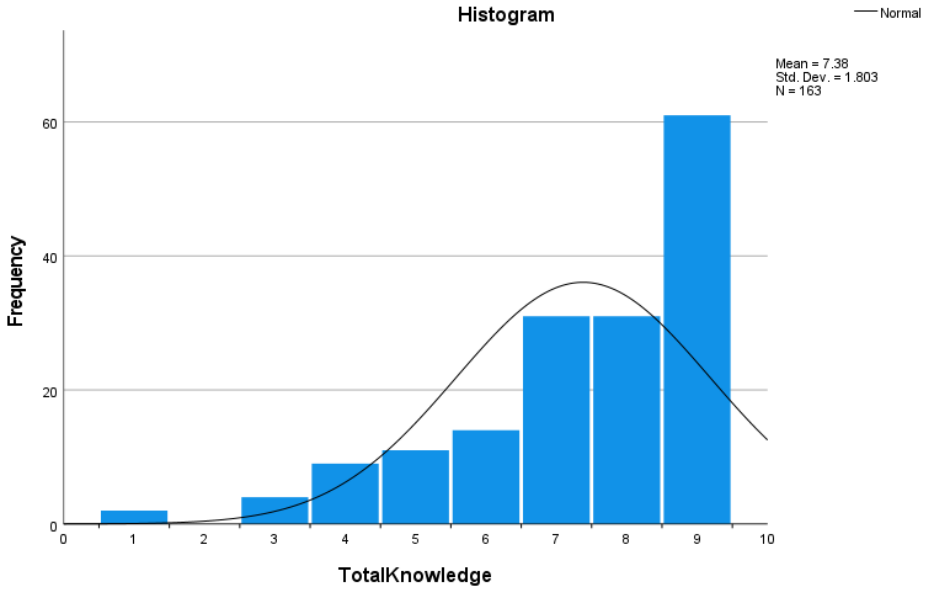


Table 4.2.1 showed the participants' responses to items assessing knowledge towards anaemia. The results were based on self-reported data which was measured using dichotomous scale (Yes = 1, No = 0). The item with highest mean score was "*Have you heard about iron-deficiency anaemia?*" with mean of 0.99 (SD= 0.110). 98.8% (n=161) of the respondents reported that they had heard about IDA, while only 1.2% (n=2) reported otherwise. This was followed by the fourth and fifth items which had identical mean and standard deviation values (M=0.91, SD=0.29). 90.8% (n=148) of the respondents knew the consequences of IDA for pregnant women and the causes of IDA, while 9.2% (n=15) did not.

On the other hand, the lowest mean score was observed for the eighth item (M=0.6, SD=0.492). Only 59.5% (n=97) of the participants reported that they knew foods that decrease iron absorption, which makes this area with lower level of knowledge.

The overall mean score for the knowledge section is 7.38 (SD= 1.803). This indicates that while overall awareness and knowledge about iron-deficiency anaemia are generally high among the respondents, there remains a gap in understanding the dietary inhibitors of iron absorption.

Table 4.2.1 Knowledge towards anaemia among UNIMAS undergraduate nursing students (n=163)

No.	Knowledge Items	Yes N (%)	No N (%)	Mean (SD)
1.	Have you heard about iron-deficiency anaemia?	161 (98.8%)	2 (1.2%)	0.99 (0.110)
2.	Can you recognize someone who has anaemia?	108 (66.3%)	55 (33.7%)	0.66 (0.474)
3.	Do you know consequences of iron-deficiency anaemia for infants and young children?	142 (87.1%)	21 (12.9%)	0.87 (0.336)
4.	Do you know consequences of iron-deficiency anaemia for pregnant women?	148 (90.8%)	15 (9.2%)	0.91 (0.290)
5.	Do you know causes of iron-deficiency anaemia?	148 (90.8%)	15 (9.2%)	0.91 (0.290)
6.	Do you know prevention of anaemia?	132 (81.0%)	31 (19.0%)	0.81 (0.394)
7.	Do you know that Iron-rich foods-easily absorbed?	133 (81.6%)	30 (18.4%)	0.82 (0.389)

8.	Do you know foods that decrease iron absorption?	97 (59.5%)	66 (40.5%)	0.6 (0.492)
9.	Do you know foods that increase iron absorption?	134 (82.2%)	29 (17.8%)	0.82 (0.384)

Overall, the total knowledge scores regarding anaemia among participants ranged from 1 to 9 points, with a mean score of 7.38 (SD = 1.803). SPSS visual binning based on equal percentiles of scanned cases was used to categorize the scores. As shown in Table 4.2.2, participants who scored 8 points or above were classified as having good knowledge, those who scored exactly 7 points were classified as having fair knowledge, and those who scored below 7 points were categorized as having poor knowledge. Based on this classification, 56.4% (n = 92) of respondents demonstrated good knowledge, 19.0% (n = 31) had fair knowledge, and 24.5% (n = 40) had poor knowledge about anaemia.

Table 4.2.2 Level of knowledge towards anaemia among UNIMAS undergraduate nursing students

Level of knowledge	**n**	**%**
Good knowledge if scores ≥ 8 points	92	56.4
Fair knowledge if scores = 7 points	31	19.0
Poor knowledge if scores < 7 points	40	24.5

4.3 Attitude towards anaemia

Figure 4.3 presented the normality distribution for total score of attitude towards anaemia. During the Kolmogorov-Smirnov test, the skewness value showed -.195 and kurtosis value of -.278. With skewness and kurtosis values were -0.195 and -0.278, respectively, both relatively close to 0, which suggests that the distribution is approximately symmetric with light tails.

The Kolmogorov-Smirnov test yielded a statistic of 0.144 with a significance value of less than 0.001. The results indicate that the total attitude scores deviate significantly from a normal distribution ($p < 0.05$). Therefore, the total score for attitude towards anaemia was considered as not normally distributed in this study as the *p-value* is <.001.

Figure 4.3 Normality distribution for total score of attitude towards anaemia among UNIMAS undergraduate nursing students (n=163)

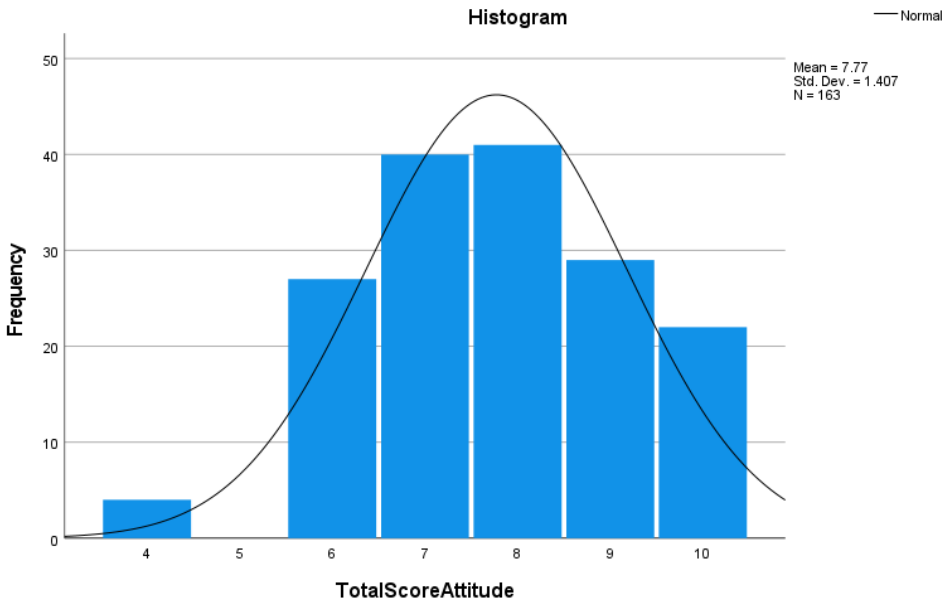


Table 4.3.1 Attitude towards anaemia among UNIMAS undergraduate nursing students (n=163)

No.	Attitude Items	Not serious N (%)	Not sure N (%)	Serious N (%)	Mean (SD)
1.	How serious do you think anaemia is as a public health problem?	7 (4.3%)	33 (20.2%)	123 (75.5%)	1.71 (0.541)
		Not beneficial N (%)	**Not sure N (%)**	**Beneficial N (%)**	**Mean (SD)**
2.	How beneficial do you think it is to prepare meals with iron-rich foods?	1 (0.6%)	4 (2.5%)	158 (96.9%)	1.96 (0.219)
		Difficult N (%)	**Maybe N (%)**	**Not difficult N (%)**	**Mean (SD)**
3.	How difficult is it for you to prepare meals with iron-rich foods?	2 (1.2%)	104 (63.8%)	57 (35.0%)	1.34 (0.50)
		Not confident N (%)	**Maybe N (%)**	**Confident N (%)**	**Mean (SD)**

4. How confident do you feel in preparing meals with iron-rich foods?	8 (4.9%)	102 (62.6%)	53 (32.5%)	1.28 (0.548)
	Dislike N (%)	**Not sure N (%)**	**Like N (%)**	**Mean (SD)**
5. How much do you like the taste of iron-rich food items?	11 (6.7%)	60 (36.8%)	92 (56.4%)	1.50 (0.622)

Table 4.3.1 presents the participants' responses to items assessing their attitudes towards anaemia, based on self-reported data measured using a 3-point Likert scale (Not serious/Not beneficial/Difficult/Not confident/Dislike=0, Not sure/Maybe=1 and Serious/Beneficial/Not difficult/Confident/Like=2). The item with highest mean score was "*How beneficial do you think it is to prepare meals with iron-rich foods?*" with mean of 1.96 (SD = 0.219). Most participants (96.9%, n= 158) believed that it is beneficial to prepare iron-rich foods, 2.5% (n=4) were unsure and only 0.6% (n=1) thinks that is not beneficial. The item "*How serious do you think anaemia is as a public health problem*?" followed closely, with mean score of 1.71 (SD=0.541). Majority of the respondents (75.5%, n=123) considered anaemia as a serious public health problem, while 4.3% (n=7) perceived it as not serious. 20.2% (n=33) were not sure of it.

On the other hand, the lowest mean score was observed for the item "*How confident do you feel in preparing meals with iron-rich foods?*" (M=1.28, SD=0.548). Most respondents responded feeling maybe confident while 32.5% (n = 53) expressed confidence, and a small proportion (4.9%, n = 8) indicated they were not confident.

The overall mean score for the attitude section is 7.77 (SD= 1.407). This suggests that although respondents generally hold a positive attitude toward iron-deficiency anaemia, there is still a lack of confidence when it comes to preparing iron-rich meals.

Table 4.3.2 Level of attitude towards anaemia among UNIMAS undergraduate nursing students (n=163)

Level of Attitude	n	%
Positive attitude if scores ≥ 9 points	51	31.3
Negative attitude if scores < 9 points	112	68.7

Overall, the total attitude scores regarding anaemia among participants ranged from 4 to 10 points, with a mean score of 7.77 (SD = 1.407). SPSS visual binning based on equal percentiles of scanned cases was used to categorize the scores. As shown in Table 4.3.2, participants who scored 9 points or above were classified as having positive attitude while those who scored below 9 points were categorized as having negative attitude. Based on the classification, 31.3% (n = 51) of respondents demonstrated positive attitude while 68.7% (n=112) of them had negative attitude.

4.4 Practice towards anaemia

Figure 4.4 presented the normality distribution for total score of practice towards anaemia. During the Kolmogorov-Smirnov test, the skewness value showed 0.024 and kurtosis value of 0.226. Both values were close to zero, which suggests that the distribution is nearly symmetrical.

The Kolmogorov-Smirnov test yielded a statistic of 0.090 with a *p-value* of 0.003. The results indicate that the total practice scores deviate from a normal distribution ($p < 0.05$). Therefore, the total score for practice towards anaemia was considered as not normally distributed in this study as the *p-value* is less than 0.05.

Figure 4.4 Normality distribution for total score of practice towards anaemia among UNIMAS undergraduate nursing students (n=163)

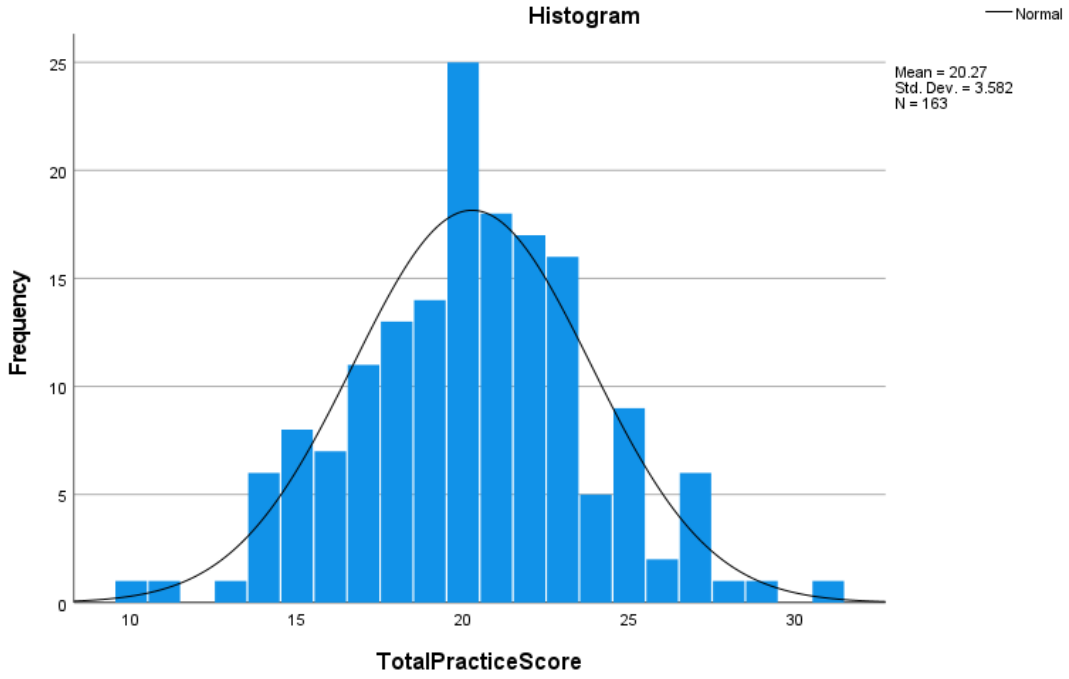


Table 4.4.1 Practice towards anaemia among UNIMAS undergraduate nursing students (n=163)

No.	Practice Items	Never N(%)	Sometimes N(%)	Always N(%)	Mean (SD)
1	Do you consume dietary haem iron (present in animal meats)?	4 (2.5%)	96 (58.9%)	63 (38.7%)	1.36 (0.531)
2	Do you tend to skip meals?*	20 (12.3%)	116 (71.2%)	27 (16.6%)	1.04 (0.537)
3	Do you consume vitamin c rich fruits BEFORE meals?	33 (20.2%)	116 (71.2%)	14 (8.6%)	0.88 (0.526)
4	Do you consume coffee/tea BEFORE meals?	45 (27.6%)	98 (60.1%)	20 (12.3%)	0.85 (0.614)
5	Do you consume milk BEFORE meals?*	6 (3.7%)	92 (56.4%)	65 (39.9%)	1.36 (0.554)
		Never/Not often	**Sometimes (monthly/ weekly)**	**Always (daily)**	**Mean (SD)**
6	How frequently do you consume the following foods:				
	Animal meats	0	41 (25.2%)	122 (74.8%)	1.75 (0.435)
	Fish	12 (7.4%)	132 (81.0%)	19 (11.7%)	1.04 (0.435)
	Vitamin C rich fruits	14 (8.6%)	125 (76.7%)	24 (14.7%)	1.06 (0.480)

	Green leafy vegetables	13 (8.0%)	67 (41.1%)	83 (50.9%)	1.43 (0.638)
	Legumes	47 (28.8%)	107 (65.6%)	9 (5.5%)	0.77 (0.539)
	Coffee/Tea	20 (12.3%)	90 (55.2%)	53 (32.5%)	1.20 (0.640)
	Milk	37 (22.7%)	106 (65.0%)	20 (12.3%)	0.90 (0.584)
	Junk food*	41 (25.2%)	108 (66.3%)	14 (8.6%)	0.83 (0.558)
		Never/Less than 1 serving/day	**Sometimes (1-2 servings/ day)**	**Always (4-6 servings/ day)**	**Mean (SD)**
7	How much of the following foods do you consume per day?				
	Animal meats	13 (8.0%)	105 (64.4%)	45 (27.6%)	1.20 (0.565)
	Fish	77 (47.2%)	78 (47.9%)	8 (4.9%)	0.58 (0.587)
	Vitamin C rich fruits	54 (33.1%)	98 (60.1%)	11 (6.7%)	0.74 (0.576)
	Green leafy vegetables	25 (15.3%)	96 (58.9%)	42 (25.8%)	1.10 (0.635)
	Legumes	97 (59.5%)	63 (38.7%)	3 (1.8%)	0.42 (0.532)
		Never/Less than 1 cup/day	**Sometimes (1-2 cups/day)**	**Always (4-6 cups/day)**	**Mean (SD)**
8	How much of the following beverages do you consume per day?				
	Coffee/Tea*	22 (13.5%)	83 (50.9%)	58 (35.6%)	1.22 (0.667)

Milk	85 (52.1%)	69 (42.3%)	9 (5.5%)	0.53 (0.601)

**Negative statement*

Table 4.4.1 illustrated the participants' responses to items assessing their practice towards anaemia, based on self-reported data measured using a 3-point Likert scale (Never=0, Sometimes=1, Always=2). Based on the data obtained, item *"How frequently do you consume the following foods: animal meats?"* had the highest mean score among the practice items with a mean of 1.75 (SD=0.435), indicating that the majority of respondents consumed animal meat on a daily basis. This was followed by green leafy vegetables, which recorded a mean of 1.43 (SD=0.638), showing that half of the respondents reported daily intake. Meanwhile, the lowest mean score was recorded for legumes, with a mean of 0.42 (SD=0.532), reflecting that very few respondents consumed legumes regularly. Similarly, milk consumption in terms of cups per day also showed a low mean score of 0.53 (SD=0.601), suggesting limited daily intake. These findings highlight a dietary pattern where protein sources such as meat are more commonly consumed compared to plant-based sources like legumes and milk.

Table 4.4.2 Level of practice towards anaemia among UNIMAS undergraduate nursing students (n=163)

Level of Practice	**n**	**%**
Good practice if scores > 20 points	76	46.6
Poor practice if scores ≤ 20 points	87	53.4

In general, the total scores for practice towards anaemia among UNIMAS undergraduate nursing students ranged from 10 to 31 points with a mean score of 20.27

(SD=3.582). SPSS's visual binning of equal percentiles based on scanned cases was used to categorize the data.

Hence, in this study, the respondents who scored more than 20 points were considered to have good practice while those who scored 20 points and below were considered to have poor practice towards anaemia. More than half of the respondents (53.4%, n=87) have poor practice towards anaemia while 46.6% (n=76) of them have good practice.

4.5 Relationship between variables

The Kolmogorov-Smirnov test demonstrated that the total score for knowledge, attitude and practice towards anaemia were considered not normally distributed as the *p-value* = .000 (<.05). Hence, a nonparametric test of Spearman rho correlation coefficient was used to examine the relationship between knowledge, attitude and practice towards anaemia.

Table 4.5 displayed the correlation between the variables. According to Rosińska-Bukowska and Zielińska-Lont (2020)**,** correlations between 0.6 to 0.8 were considered strong, values between 0.4 to 0.6 were considered moderate, between 0.2 to 0.4 were weak and between 0 to 0.2 were considered very weak.

A weak positive correlation was found between knowledge and attitude towards anaemia with r=.210, n=163, p=.007 (<.05). Thus, there was a statistically significant relationship between knowledge and attitude towards anaemia among UNIMAS undergraduate nursing students. This means that students with higher knowledge levels also tended to have more favourable attitudes towards anaemia.

Similarly, a weak positive correlation was also observed between knowledge and practice (r=0.262, p=0.001). Hence, there was a statistically significant relationship between

knowledge and practice towards anaemia. The findings showed that students with greater knowledge about anaemia tended to demonstrate better practice. Among all the relationships assessed between the variables, this had the strongest correlation which underlined the importance of knowledge in fostering good practice.

On the other hand, a very weak positive correlation was found between attitude and practice with r=0.198, p=0.011. As the *p-value* is less than 0.05, there was a statistically significant relationship between attitude and practice towards anaemia. This indicates that students with a more positive attitude towards organ donation tended to exhibit slightly better practices. Despite the relatively weak correlation, the statistical significance supports the presence of a meaningful relationship.

In conclusion, the findings suggest that both knowledge and attitude are positively associated with practice related to anaemia. By improving the students' knowledge, it could help strengthen their attitudes and encourage better practices related to anaemia. However, since the correlations found were relatively weak, it suggests that other factors might also play a role in shaping these behaviours and should be explored in future research.

Table 4.5 Relationship between knowledge, attitude and practice towards anaemia among UNIMAS undergraduate nursing students (n=163)

			Knowledge	**Attitude**	**Practice**
Spearman's Rho	**Knowledge**	Correlation Coefficient	1.000	.210**	.262**
		Sig. (2-tailed)	.	.007	.001
		N	163	163	163

Attitude	Correlation Coefficient	.210**	1.000	.198*
	Sig. (2-tailed)	.007	.	.011
	N	163	163	163
Practice	Correlation Coefficient	.262**	.198*	1.000
	Sig. (2-tailed)	.001	.011	.
	N	163	163	163

**. Correlation is significant at the 0.05 level (2-tailed).*

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

CHAPTER 5: DISCUSSION AND CONCLUSION

5.0 Introduction

For this chapter, it discusses the findings obtained on knowledge, attitude and practice towards anaemia, relationship between the variables and summary of the findings. Besides, implications of the study, recommendations, limitations of the study and conclusion are also addressed in this chapter as well.

5.1 Knowledge towards anaemia

This study found that the respondents demonstrated a generally good level of knowledge about anaemia, with a mean score of 7.38 (SD = 1.803). A majority (56.4%, *n* = 92) had good knowledge, while 19.0% (*n* = 31) showed a fair level, and 24.5% (*n* = 40) had poor knowledge. These results are likely influenced by the fact that the participants are nursing students, who have been exposed to anaemia-related content through both academic learning and clinical experience. Their educational background likely contributes to their awareness of the condition.

Despite this, the proportion of students with good knowledge is still lower than expected for individuals in a healthcare programme. This suggests that while some understanding exists, there are still gaps that need to be addressed. Several possible factors may explain the relatively low level of knowledge among some students. For example, anaemia may not be thoroughly emphasised in the nursing curriculum, leading to limited focus or superficial understanding. Some students may also prioritise learning topics that are more frequently assessed in examinations or encountered in high-acuity clinical settings, causing them to overlook conditions like anaemia. Limited exposure to anaemia cases during

clinical postings, reliance on passive learning methods, or lack of access to up-to-date educational resources could also contribute to these knowledge gaps.

These findings are consistent with a study conducted by Mok et al. (2024) among Malaysian university students, which reported that students from health-related programmes had a higher proportion of good knowledge (31.7%) compared to those from non-health-related programmes (13.6%). This supports the idea that a healthcare background is associated with better understanding of anaemia. However, being in a health-related course alone does not guarantee adequate knowledge. A contrasting study by Najm et al. (2024) on nursing students at the University of Baghdad revealed that most of the respondents had poor knowledge of iron deficiency anaemia. Another study in Turkey by Kuş et al. (2022) had reported similar findings, indicating that the majority of the medical students possess inadequate knowledge about anaemia, including iron deficiency anaemia, and struggle to consistently update their understanding. They also reported feeling unprepared to accurately diagnose and manage anaemia, highlighting a lack of confidence and continuity in refreshing their knowledge.

Several factors may contribute to the low level of knowledge on anaemia, even among students enrolled in health science programmes such as medicine and nursing. Variations in curriculum content, teaching strategies, availability of learning resources, and the level of emphasis placed on anaemia within the programme may explain these differences. As noted by Natour et al. (2022), the absence of regular in-service training sessions related to anaemia in government hospitals after graduation may further contribute to the insufficient understanding of this condition.

In summary, although nursing students are expected to have a solid understanding of anaemia, the results indicate that knowledge levels are still inconsistent. This highlights the need for improved educational strategies, such as integrating more anaemia-related topics

into the curriculum, increasing case exposure during clinical placements, and promoting active, self-directed learning. Strengthening these areas may help better prepare nursing students to manage common conditions like anaemia in their future clinical roles.

5.2 Attitude towards anaemia

In this study, the respondents generally demonstrated a positive attitude towards anaemia, with a mean score of 7.77 (SD = 1.407). A total of 56.4% (n = 92) of participants displayed a positive attitude, while 43.6% (n = 71) exhibited a negative attitude. Despite the overall positive trend, a notable proportion of respondents expressed uncertainty and low confidence in their ability to implement preventive measures, particularly in preparing iron-rich meals. Specifically, more than half of the respondents (62.6%, n = 102) reported feeling only "somewhat confident" in preparing meals high in iron content, while 4.9% (n = 8) stated they were not confident at all. Additionally, 63.8% (n = 104) acknowledged that preparing iron-rich meals might be difficult, indicating perceived barriers in translating knowledge and attitude into practical dietary behaviour.

These findings are consistent with those of Huong et al. (2022), whose study also identified a negative attitude among participants, largely related to their perceived self-efficacy in preparing iron-rich meals. Similarly, Jalambo et al. (2017) reported that 66.4% (n = 87) of respondents in their study expressed only moderate confidence in their ability to prepare such meals. The pattern across studies suggests that confidence and perceived difficulty are influential factors shaping attitudes toward anaemia prevention.

However, it remains concerning that a considerable proportion of the students in this study held negative attitudes, particularly given their greater academic and clinical exposure

to anaemia-related content. As future healthcare providers, nursing students are expected to possess not only good knowledge but also a proactive and confident attitude in addressing common health issues like anaemia. The presence of uncertainty and self-doubt suggests that exposure alone may not be sufficient to cultivate such attitudes. This highlights the need for more targeted educational interventions such as practical workshops, cooking demonstrations, or experiential learning that can help build both confidence and competence in translating knowledge into action.

5.3 Practice towards anaemia

In this study, the overall practice regarding anaemia among UNIMAS undergraduate nursing students was found to be poor, with a mean score of 20.27 (SD = 3.582). More than half of the respondents (53.4%, n = 87) demonstrated poor practice, while only 46.6% (n = 76) exhibited good practice. These results suggest that despite having an acceptable level of knowledge, many students are not incorporating that knowledge into their daily health behaviours.

A significant concern highlighted in the findings was the low intake of legumes, which recorded the lowest mean score of 0.42 (SD = 0.532). This suggests that very few students regularly consume legumes, a key source of non-heme iron. As noted by Sartika and Ringo (2023), red beans, which are rich in iron, can play an important role in preventing anaemia, as iron is essential for haemoglobin formation. Therefore, the lack of legume consumption may be a contributing factor to poor iron intake among the students.

In addition, dietary patterns among respondents revealed other poor practices. For example, 71.2% (n = 116) reported occasionally skipping meals, and 56.4% (n = 92)

admitted to sometimes consuming milk before meals, a habit known to hinder iron absorption due to the calcium content in dairy products. Notably, 60.9% of respondents reported regularly skipping breakfast. This aligns with research by Channar et al. (2023) who found that students who frequently miss breakfast are significantly more likely to be anaemic.

These findings are consistent with previous literature that has documented poor dietary practices among students in healthcare fields. For instance, Huong et al. (2022) reported that 81.7% of students skipped meals, while Sayed and Nagarajan (2022) found that 76.9 % (n = 100 students) skip breakfast regularly. These trends suggest that even students equipped with medical knowledge may still engage in unhealthy eating behaviours, possibly due to time constraints, academic stress, financial limitations, or a lack of emphasis on applying theoretical knowledge to personal health choices.

In conclusion, although nursing students may possess a reasonable understanding of anaemia, this knowledge is not always reflected in their practices. Poor dietary habits such as skipping meals, inadequate intake of iron-rich foods, and the consumption of iron absorption inhibitors highlight the need for improved health education strategies. Universities should incorporate practical components into nutrition education, offer workshops on meal planning, and leverage health campaigns to promote consistent, balanced eating habits. These steps are crucial in reducing anaemia risk and enhancing students' overall well-being.

5.4 Relationship between variables

5.4.1 Relationship between knowledge and attitude

A weak positive correlation was identified between knowledge and attitude towards anaemia ($r = .210$, $n = 163$, $p = .007$, $p < .05$), indicating a statistically significant relationship among UNIMAS undergraduate nursing students. This finding suggests that students with higher levels of knowledge tend to demonstrate more favorable attitudes towards anaemia, implying that as students become more informed about the condition, they are more likely to adopt constructive and positive attitudes in relation to its prevention and management.

These findings are in line with those reported in several previous studies. For instance, Huong et al. (2022) found a statistically significant positive linear correlation between knowledge and attitude ($p = 0.003$), emphasizing that greater knowledge was associated with better attitudes, and suggesting that educational efforts could potentially enhance both domains. Similarly, a study conducted by Hamed (2021) among college female students at the Medical Clinics of the Students' University Hospital reported a significant relationship between participants' knowledge and their attitude scores regarding anaemia ($p = 0.034$). According to the researchers, this relationship indicates that gaining adequate knowledge about anaemia may lead to the development of a more positive attitude towards it.

Furthermore, this result aligns with findings from a study conducted in Tanzania by Margwe and Lupindu (2018), which concluded that insufficient knowledge and unfavorable attitudes were significantly associated with the prevalence of anaemia ($p = 0.001$). This underscores the critical role of knowledge as a foundation for shaping attitudes and, ultimately, influencing health-related behaviors. Taken together, these consistent findings across different populations highlight the importance of educational programs and awareness

initiatives aimed at improving students' understanding of anaemia, which could, in turn, foster more positive attitudes and proactive health practices related to prevention and management.

5.4.2 Relationship between knowledge and practice

Apart from the relationship between knowledge and attitude, this study also found a weak positive correlation between knowledge and practice towards anaemia ($r = 0.262$, $p = 0.001$), showing a statistically significant association between these two variables. The results indicated that students with better knowledge about anaemia were more likely to practice good habits in preventing and managing the condition. Among all the variables tested, the relationship between knowledge and practice showed the strongest correlation, highlighting how important knowledge is in encouraging better health-related behaviors. This suggests that when students are more informed about anaemia, they are more likely to apply that knowledge in practical ways that benefit their health.

These findings are in line with a study from Indonesia by Munira and Viwattanakulvanid (2024), where female students with good knowledge were found to be 2.52 times more likely to engage in anaemia prevention practices compared to those with poor knowledge. This supports the idea that the more knowledge the students had regarding anaemia, the better they are at applying what they had learned. Similarly, a study by Mohamed Abdallh Ali et al. (2022) in Cairo showed that more than half of the female nursing students had poor knowledge about anaemia, and most of them showed poor practices, especially with low intake of iron-rich foods. Together, these studies and the current findings emphasize the importance of educational efforts to improve both knowledge and practical behaviors related to anaemia prevention and management among nursing students. By

improving awareness and understanding, students can be better equipped to take care of their own health and guide others effectively in the future.

5.4.3 Relationship between attitude and practice

In this study, a very weak positive correlation was found between attitude and practice towards anaemia, with a Pearson correlation coefficient of $r = 0.198$ and a p-value of 0.011. Since the *p-value* is less than 0.05, this relationship is considered statistically significant. Although the correlation is weak in strength, its significance suggests that there is still a meaningful connection between students' attitudes and their practices. In other words, students who held more positive attitudes towards anaemia were slightly more likely to engage in appropriate preventive or management behaviours related to the condition. This implies that having the right mindset or perception about anaemia might play a role, albeit a small one, in influencing how students apply their knowledge in real-life scenarios.

This finding is further supported by a study conducted in India by R. Renuga et al. (2020), where a moderate positive correlation was reported between attitude and practice ($r = 0.6$). In that study, students who showed more favourable attitudes towards anaemia were found to engage in better health practices. The authors concluded that fostering a positive attitude may help improve health behaviours, especially among young female students who are at greater risk of anaemia. This supports the idea that improving students' attitudes through awareness campaigns or health education can have a positive impact on their practical behaviours.

However, not all studies have found such a correlation. In contrast, a study by Huong et al. (2022) reported no significant relationship between attitude and practice towards anaemia, with a correlation of $r = -0.067$ and a *p-value* of 0.369. This suggests that, in their

study population, students' attitudes did not significantly influence their actual behaviours or health practices. It highlights that even if students have a positive view of anaemia or believe it is important to prevent it, this attitude may not always translate into action unless accompanied by other influencing factors such as motivation, access to resources, or institutional support.

Taken together, these mixed findings suggest that while attitude can be associated with better practices, its impact may vary depending on the context, population, and other external factors. Therefore, when organising anaemia prevention programmes or health promotion interventions, it is important not only to improve students' attitudes but also to ensure they are motivated and supported to put those attitudes into practice.

5.5 Summary of findings

The results showed that the mean score for the knowledge section was 7.38 (SD = 1.803). Among the respondents, 56.4% (n = 92) demonstrated good knowledge about anaemia, 19.0% (n = 31) had fair knowledge, and 24.5% (n = 40) showed poor knowledge. For attitude, the mean score was 7.77 (SD = 1.407), with majority of them (56.4%, n = 92) displaying a positive attitude, while 43.6% (n = 71), showed a negative attitude. The mean score for practice was 20.27 (SD = 3.582), with 53.4% (n = 87) having poor practice towards anaemia, and 46.6% (n = 76) demonstrating good practice.

The Kolmogorov-Smirnov test indicated that the total scores for knowledge, attitude, and practice were not normally distributed, as the *p-value* was .000 ($p < .05$). Spearman's rho correlation revealed a weak positive correlation between knowledge and attitude ($r = .210$, $p = .007$), and between knowledge and practice ($r = .262$, $p = .001$). A very weak positive correlation was found between attitude and practice ($r = .198$, $p = .011$). Since all *p-*

values were below .05, the correlations were statistically significant. These findings suggest that both knowledge and attitude are positively associated with practices related to anaemia.

5.6 Implications of study

The findings of this study highlight several important implications regarding the understanding and behaviour of undergraduate nursing students towards anaemia. Although the average knowledge score suggests that students have a basic understanding of the condition, the presence of fair and poor knowledge levels among many indicates that current educational exposure may not be sufficient to ensure a thorough grasp of the topic.

Moreover, despite some students having good knowledge, many still displayed a negative attitude towards anaemia. This suggests that knowledge alone may not be enough to shape a positive mindset. Without a constructive attitude, students may not fully appreciate the importance of anaemia prevention and management, which could affect how they approach related issues in both personal and professional contexts.

The practices observed among students further reflect this concern. Even with some understanding of anaemia, many students were not consistently applying this knowledge in their daily lives, such as through dietary habits or health-seeking behaviours. This gap between knowledge and practice points to a lack of behaviour change, which may be influenced by attitude or other external factors.

The correlations found between knowledge, attitude, and practice—although weak—were statistically significant, suggesting that these elements are related. Improving one aspect, such as knowledge, may help enhance attitudes and practices, but targeted efforts are still needed to address each area effectively.

These results have several implications for nursing education and student well-being. Firstly, there is a clear need to reinforce not only theoretical content but also the importance of attitude and behavioural change in anaemia prevention. Secondly, the presence of poor practices among future healthcare providers raises concerns about their readiness to promote health education and model healthy behaviours. Thirdly, the overall negative attitude towards anaemia among students may reflect a lack of engagement or perceived relevance, which should be addressed in curriculum design and student support services.

5.7 Recommendations

Based on the findings of this study, several recommendations can be made to improve the knowledge, attitude, and practices of undergraduate nursing students towards anaemia. Firstly, the nursing curriculum should be enhanced by including more detailed and practical content on anaemia. This includes education on its causes, symptoms, prevention, and management. Interactive teaching methods such as simulations, case studies, and group discussions should be incorporated to reinforce understanding and promote active student engagement.

In addition to academic improvements, health promotion activities within the university setting are highly encouraged. Organizing awareness campaigns, seminars, and peer-led initiatives can help increase students' awareness and motivate them to adopt healthier behaviours. These programs can also serve to address misconceptions and foster a more positive attitude towards the prevention and management of anaemia.

To support students in applying their knowledge to real-life situations, it is recommended that regular anaemia screenings and nutritional counselling services be made

accessible through the university health centre. These services can provide early detection and personalized advice, bridging the gap between theoretical knowledge and actual practice.

Furthermore, the university should create an environment that encourages healthy living by ensuring that campus food outlets offer nutritious, iron-rich meal options. Policies that support student health and well-being can reinforce positive behaviours and contribute to long-term habit formation.

Lastly, future research should be conducted to explore the underlying factors contributing to negative attitudes and poor practices despite adequate knowledge. Qualitative studies may provide deeper insight into students' beliefs and barriers, while longitudinal studies can evaluate the effectiveness of educational and health interventions over time.

5.8 Limitations of study

This study had several limitations that may have affected the overall findings. Firstly, there is limited existing research that specifically focuses on nursing students' knowledge, attitudes, and practices towards anaemia. This made it difficult to find reliable references or comparisons to support the study and develop a stronger discussion.

Other than that, as this was the researcher's first time conducting an independent study, the discussion section may not be as detailed or in-depth as studies done by more experienced researchers. The ability to interpret and analyse data is something that improves with experience, and this may have influenced the quality of the discussion.

Another limitation is that the study only involved undergraduate nursing students from UNIMAS, from Year 1 to Year 4. Because of this, the results cannot be generalised to

students from other institutions, as they may have different backgrounds or learning experiences.

Besides, time was also a constraint, as the study was carried out during the clinical posting period. Managing both clinical responsibilities and research tasks was challenging and may have limited the time available for data collection and analysis. In addition, financial constraints also posed difficulties, as certain aspects of the study required funding for resources and materials, which was limited.

5.9 Conclusion

As a conclusion, this study aimed to assess the levels of knowledge, attitude, and practices (KAP) regarding anaemia among undergraduate nursing students at UNIMAS. The findings revealed that while more than half of the respondents possessed good knowledge about anaemia, the majority still demonstrated negative attitudes and poor practices related to anaemia prevention and management. Weak but statistically significant relationships were found between knowledge, attitude, and practice, suggesting that higher knowledge levels are associated with more positive attitudes and better practices, although not strongly.

Despite their academic background in nursing, many students expressed uncertainty and lacked confidence in applying their knowledge practically, particularly in areas such as preparing iron-rich meals and maintaining healthy dietary habits. These gaps highlight a disconnect between theoretical understanding and real-life application, which could affect future clinical performance and health promotion capabilities.

In conclusion, although nursing students are expected to serve as future health educators and advocates, their current attitudes and practices towards anaemia are insufficient. There is a need for targeted interventions within the nursing curriculum that

emphasise applied nutrition, self-care, and practical skills in anaemia prevention. Strengthening these areas will not only benefit the students' personal health and academic performance but also enhance their preparedness to deliver effective patient education and contribute to reducing the burden of anaemia in the broader community.

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APPENDICES

Appendix A: Cover Letter for Ethical Application

Pejabat Akademik
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UNIVERSITI MALAYSIA
SARAWAK
94300 Kota Samarahan

MEMORANDUM

Reference	:	UNIMAS/NC-21.05/03-03 Jld. 8(146)
To	:	Joyceline Junih Binti John (73521) 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 Towards Anemia Among UNIMAS Undergraduate Nursing Students**

The above matter is referred.

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

Student Name	:	**Joyceline Junih Binti John**
Student ID	:	**73521**
Programme	:	**Bachelor of Nursing with Honours**
Research Title	:	***Knowledge, Attitude, and Practice Towards Anemia Among UNIMAS Undergraduate Nursing Students***
Supervisor Name	:	**Mr Dev Nath Kaushal**
Supervisor H/P	:	**+60 10-525 7118**

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: Participant's Information Sheet

UNIMAS
UNIVERSITI MALAYSIA SARAWAK

PARTICIPANT INFORMATION SHEET/ *MAKLUMAT KAJIAN PESERTA*

Title of the study/ ***Tajuk kajian***	:	**Knowledge, Attitude, and Practice Towards Anaemia Among UNIMAS Undergraduate Nursing Students**
Main Researcher/ ***Penyelidik utama***	:	**Joyceline Junih Binti John Justin Hasnan**
Supervisor/ ***Penyelia***	:	**a) Course coordinator: Shalin Lee Wan Fei, Feryante Rintika** **b) Main research supervisor: Dev Nath Kaushal**
Institution/ ***Institut***	:	**Department of Nursing** **Faculty of Medicine & Health Sciences Universiti Malaysia Sarawak**
Name of sponsor/ ***Nama Penaja***	:	**No external funding/** ***Tiada penaja luar***

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

6. **Introduction**:

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

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

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

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

The purpose of this study is to explore how much UNIMAS nursing students know about anemia, their attitude towards anemia and how they manage anemia. This research is necessary to improve the understanding, attitude and practice of nursing students regrading anemia in order to enhance their ability to manage and educate others about the condition effectively.

This research will be conducted for duration of six months (25/01/2025 till 30/06/2025). The expected number of participants is 164 individuals. Participants for this study include UNIMAS undergraduate nursing students who provide consent to participate during the study period and are able to comprehend and respond to the questionnaire in English. Postgraduate students and those who participated in the pilot study will be excluded.

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

It is important that you answer all of the questions asked by the study staff honestly and completely which will take about 10 minutes of your time.

You will be given a survey form to be answered. This form contains four sections which will enquire about demographic data, knowledge towards anemia, attitude towards anemia and practice towards anemia.

9. **What are the potential risks and side effects of being in this study?**
Participation to this study will not affect your treatment, and the risk is minimal. You are free to decline to answer any of the questions that you feel uncomfortable with.

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

There may or may not be any benefits to you. Information obtained from this study will help nursing students to understand the condition better, manage anemia and improve health education for patients.

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

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

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

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

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

If you have any questions about the study or if you think you have a study related injury and you want information about this study, please contact the study doctor, Joyceline Junih binti John Justin Hasnan at telephone number 012-8098350.

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

Appendix C: Informed Consent Form

Version 1.0, dated 15-Dec-2024

INFORMED CONSENT FORM

Title of Study: Knowledge, Attitude, and Practice Towards Anemia Among UNIMAS Undergraduate Nursing Students

By signing below I confirm the following:

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

Subject:

Signature: I/C number:

Name: Date:

Investigator conducting informed consent:

Signature: I/C number:

Name: Date:

Impartial witness:

Signature: I/C number:

Name: Date:

Appendix D: Questionnaire

SECTION A: Demographic data

Please fill in the information required. Insert a tick (✓) in the box under the suitable option for you.

1. Age: _____ years old

2. Sex
   - Male ☐
   - Female ☐

3. Year of study
   - Year 1 ☐
   - Year 2 ☐
   - Year 3 ☐
   - Year 4 ☐

SECTION B: Knowledge on anaemia

Please rate the following statements below by placing a (√) in the appropriate boxes.

Item	Question	Yes	No
K1	Have you heard about iron-deficiency anaemia?		
K2	Can you recognize someone who has anaemia?		
K3	Do you know consequences of iron-deficiency anaemia for infants and young children?		
K4	Do you know consequences of iron-deficiency anaemia for pregnant women?		
K5	Do you know causes of iron-deficiency anaemia?		

K6	Do you know prevention of anaemia?		
K7	Do you know that Iron-rich foods-easily absorbed?		
K8	Do you know foods that decrease iron absorption?		
K9	Do you know foods that increase iron absorption?		

SECTION C: Attitude towards anaemia

Please rate the following statements below by placing a (√) in the appropriate boxes.

Item	Question	Not likely	Somewhat likely	Very likely
A1	How likely do you think you are to be anaemic?			
		Not serious	**Not sure**	**Serious**
A2	How serious do you think anaemia is as a public health problem?			
		Not beneficial	**Not sure**	**Beneficial**
A3	How beneficial do you think it is to prepare meals with iron-rich foods?			
		Difficult	**Maybe (Ok/So-so)**	**Not difficult**
A4	How difficult is it for you to prepare meals with iron-rich foods?			
		Not confident	**Maybe (Ok/So-so)**	**Confident**
A5	How confident do you feel in preparing meals with iron-rich foods?			
		Dislike	**Not sure**	**Like**
A6	How much do you like the taste of iron-rich food items?			

SECTION D: Practice towards anaemia

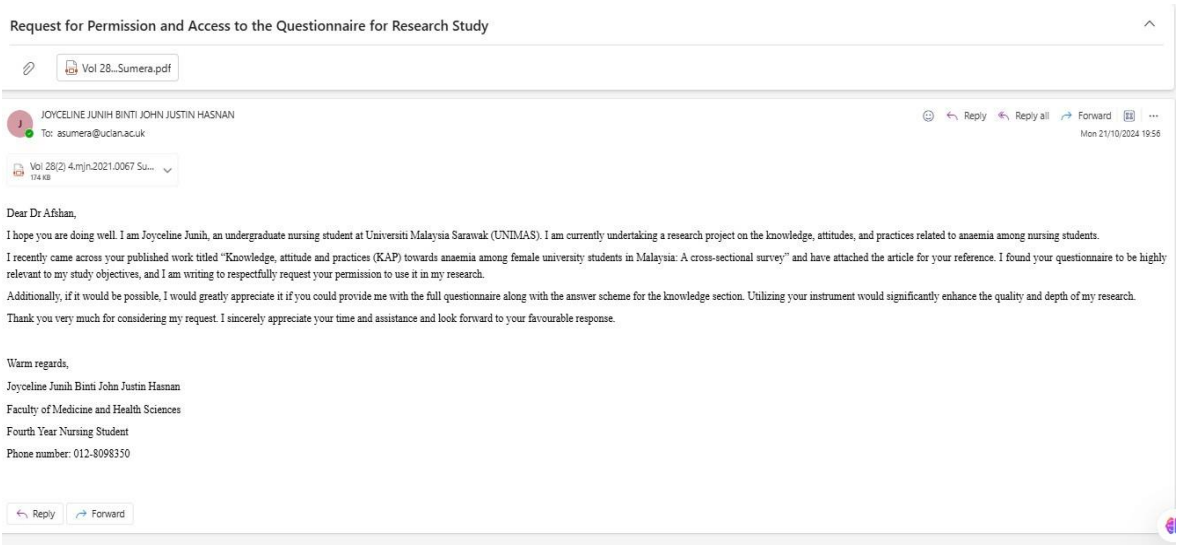
Please rate the following statements below by placing a (√) in the appropriate boxes.

Item	Question	Never	Sometimes	Always
P1	Do you consume dietary haem iron (present in animal meats)?			
P2	Do you tend to skip meals?			
P3	Do you consume vitamin c rich fruits BEFORE meals?			
P4	Do you consume coffee/tea BEFORE meals?			
P5	Do you consume milk BEFORE meals?			

Item	Question	Never/Not often	Sometimes (monthly/weekly)	Always (daily)
P6	**How frequently do you consume the following foods:**			
	Animal meats			
	Fish			
	Vitamin C rich fruits			
	Green leafy vegetables			
	Legumes			
	Coffee/Tea			
	Milk			
	Junk food			

Item	Question	Never/Less than 1 serving/day	Sometimes (1-2 servings/day)	Always (4-6 servings/day)
P7	**How much of the following foods do you consume per day:**			
	Animal meats			
	Fish			
	Vitamin C rich fruits			
	Green leafy vegetables			
	Legumes			
Item	**Question**	**Never/Less than 1 cup/day**	**Sometimes (1-2 cups/day)**	**Always (4-6 cups/day)**
P8	**How much of the following beverages do you consume per day:**			
	Coffee/Tea			
	Milk			

Appendix E: Permission Obtained from Original Author to Use Questionnaire



Request for Permission and Access to the Questionnaire for Research Study

Vol 28...Sumera.pdf

JOYCELINE JUNIH BINTI JOHN JUSTIN HASNAN
To: asumera@uclan.ac.uk

Reply Reply all Forward
Mon 21/10/2024 19:56

Vol 28(2) 4.mjn.2021.0067 Su... 174 KB

Dear Dr Afshan,

I hope you are doing well. I am Joyceline Junih, an undergraduate nursing student at Universiti Malaysia Sarawak (UNIMAS). I am currently undertaking a research project on the knowledge, attitudes, and practices related to anaemia among nursing students.

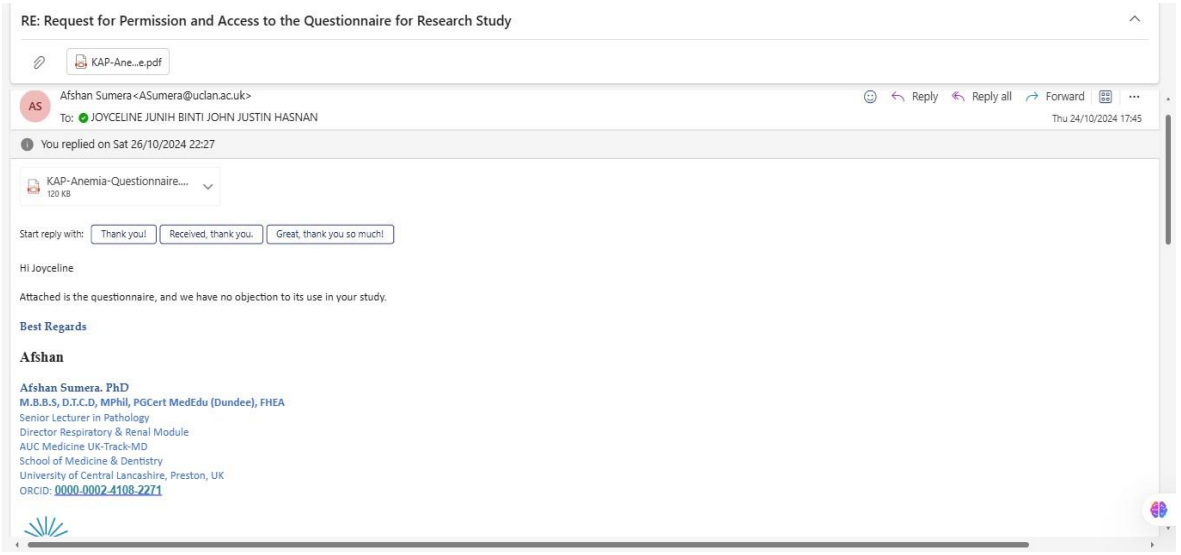
I recently came across your published work titled "Knowledge, attitude and practices (KAP) towards anaemia among female university students in Malaysia: A cross-sectional survey" and have attached the article for your reference. I found your questionnaire to be highly relevant to my study objectives, and I am writing to respectfully request your permission to use it in my research.

Additionally, if it would be possible, I would greatly appreciate it if you could provide me with the full questionnaire along with the answer scheme for the knowledge section. Utilizing your instrument would significantly enhance the quality and depth of my research.

Thank you very much for considering my request. I sincerely appreciate your time and assistance and look forward to your favourable response.

Warm regards,
Joyceline Junih Binti John Justin Hasnan
Faculty of Medicine and Health Sciences
Fourth Year Nursing Student
Phone number: 012-8098350

Reply Forward



RE: Request for Permission and Access to the Questionnaire for Research Study

KAP-Ane...e.pdf

AS Afshan Sumera<ASumera@uclan.ac.uk>
To: JOYCELINE JUNIH BINTI JOHN JUSTIN HASNAN

Reply Reply all Forward
Thu 24/10/2024 17:45

You replied on Sat 26/10/2024 22:27

KAP-Anemia-Questionnaire.... 120 KB

Start reply with: Thank you! Received, thank you. Great, thank you so much!

Hi Joyceline

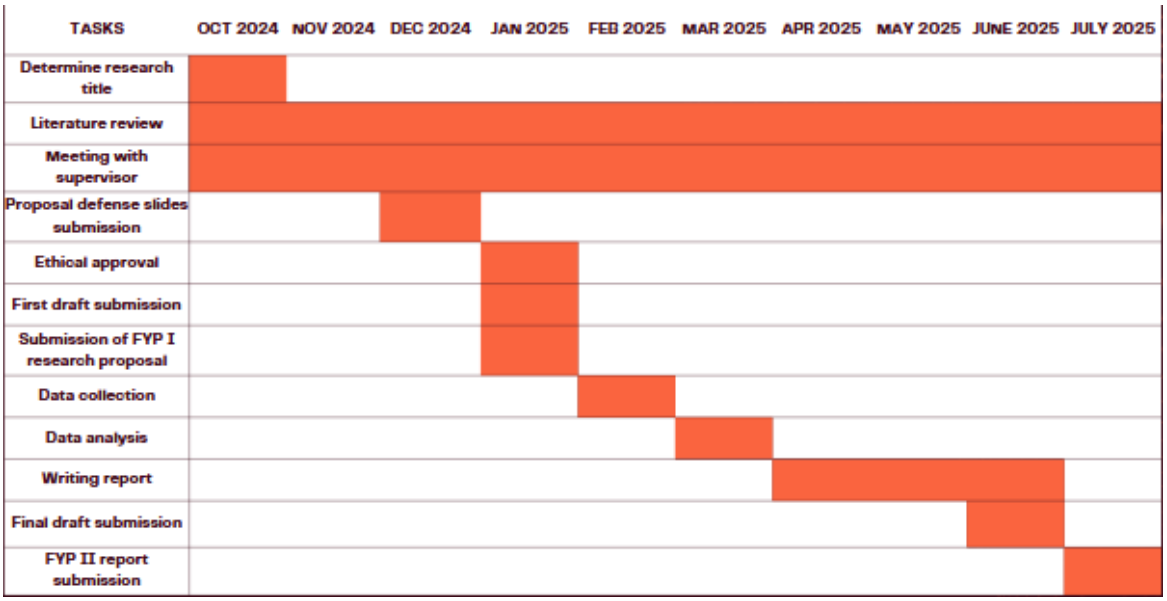
Attached is the questionnaire, and we have no objection to its use in your study.

Best Regards

Afshan

Afshan Sumera. PhD
M.B.B.S, D.T.C.D, MPhil, PGCert MedEdu (Dundee), FHEA
Senior Lecturer in Pathology
Director Respiratory & Renal Module
AUC Medicine UK-Track-MD
School of Medicine & Dentistry
University of Central Lancashire, Preston, UK
ORCID: 0000-0002-4108-2271

Appendix F: Gantt Chart



Appendix G: Budget

Items	Cost	Quantity	Estimated Cost
SPSS Software	RM 5	1	RM 5
Internet Data Plan	RM 30/month	6	RM 180
Poster	RM 39	1	RM 39
Printing and binding of the report	Printing: RM 0.40/page Binding: RM 5	86 pages	RM 39. 40
Total	**RM 263.40**		

Appendix H: Turnitin Similarity Report

TURNITIN 3

ORIGINALITY REPORT

17%	14%	4%	6%
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