

**NUTRITION KNOWLEDGE, ATTITUDE,
AND PRACTICE (KAP) AMONG HEALTH
CAMPUS STAFF FOR THEIR CHILDREN
IN MIDDLE CHILDHOOD AND
ADOLESCENCE IN KUBANG KERIAN,
KELANTAN**

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AND PRACTICE (KAP) AMONG HEALTH
CAMPUS STAFF FOR THEIR CHILDREN
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KELANTAN**

by

MICHELLE TING

**Dissertation submitted in partial fulfilment
of the requirements for the degree
of Bachelor of Health Science (Honours)
(Nutrition)**

January 2026

CERTIFICATE

This is to certify that the dissertation entitled “Nutrition Knowledge, Attitude, and Practice (KAP) Among Health Campus Staff for Their Children in Middle Childhood and Adolescence in Kubang Kerian, Kelantan” is the bona fide record of research work done by Ms. “Michelle Ting” during the period from May 2025 to January 2026 under my supervision. I have read this dissertation and that in my opinion it conforms to acceptable standards of scholarly presentation and is fully adequate, in scope and quality, as a dissertation to be submitted in partial fulfillment for the degree of Bachelor of Health Science (Honours) (Nutrition).

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DECLARATION

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

Signature

.....

Michelle Ting

Date: 8th January 2026

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TABLE OF CONTENTS

CERTIFICATE.....	I
DECLARATION	II
ACKNOWLEDGEMENT	III
LIST OF FIGURES	V
LIST OF SYMBOLS	VI
LIST OF ABBREVIATIONS	VII
ABSTRAK.....	VIII
ABSTRACT.....	X
CHAPTER 1: INTRODUCTION	1
1.0 Background of studies	1
1.1 Problem statement & Study rationale	3
1.2 Research questions.....	5
1.3 Objectives	6
1.3.1 General objective	6
1.3.2 Specific objectives	6
1.4 Hypothesis	7
1.5.1 Null Hypothesis (H_0).....	7
1.5.2 Alternative Hypothesis (H_1).....	7
CHAPTER 2: LITERATURE REVIEW.....	8
2.0 Nutrition KAP.....	8
2.0.1 Nutrition knowledge	8
2.0.2 Nutrition attitude.....	8
2.0.3 Nutrition practice	8
2.0.4 Nutrition KAP model.....	9
2.0.5 Overall KAP trends across populations	9

2.0.6	Methodological limitations in nutrition KAP research	10
2.1	Conceptual framework.....	11
CHAPTER 3: METHODOLOGY		12
3.0	Research design	12
3.1	Study area	12
3.2	Study population.....	13
3.3	Subject criteria	14
3.3.1	Inclusion criteria	14
3.3.2	Exclusion criteria	15
3.4	Sample size	15
3.5	Sampling method and subject recruitment.....	17
3.6	Research tool.....	18
3.7	Operational definition	19
3.8	Data collection method	20
3.9	Study flowchart.....	22
3.10	Data analysis	23
3.11	Expected results	25
3.11.1	Expected sociodemographic characteristics of participants	25
3.11.2	Expected distribution of nutrition knowledge, attitude, and practice levels	26
3.11.3	Expected correlations for KAP domains.....	27
3.12	Gantt chart & milestone	27
3.12.1	Gantt chart.....	27
3.12.2	Milestone	29
3.13	Ethical considerations	29
3.13.1	Subject vulnerability	29
3.13.2	Declaration of absence of conflict of interest	30

3.13.3	Privacy and confidentiality	30
3.13.4	Community sensitivities and benefits	30
3.13.5	Honorarium and incentives	31
3.13.6	Ethical review and board approval	31
CHAPTER 4: RESULTS		32
4.0	Introduction.....	32
4.1	Sociodemographic characteristics.....	32
4.2	Knowledge level	34
4.3	Attitude level.....	34
4.4	Practice level.....	35
4.5	Normality test of knowledge, attitude, and practice scores	35
4.5.1	Correlations for KAP Domains.....	36
CHAPTER 5: DISCUSSION.....		37
5.0	Sociodemographic characteristics.....	37
5.1	Knowledge level	38
5.2	Attitude level.....	38
5.3	Practice level.....	39
5.4	Correlations for KAP Domains.....	39
CHAPTER 6: CONCLUSION.....		41
6.0	Summary of the findings.....	41
6.1	Limitations of the study	41
6.2	Strength of the study	42
6.3	Recommendation	43
REFERENCES		1
APPENDICES		10
Appendix A: Questionnaire		10
Appendix B: Questionnaire Link.....		36

ATTACHMENT B	37
INTRODUCTION	37
PURPOSE OF THE STUDY	37
PARTICIPANTS CRITERIA	37
STUDY PROCEDURES	38
RISKS	38
REPORTING HEALTH EXPERIENCES.	39
PARTICIPATION IN THE STUDY	39
QUESTIONS	39
CONFIDENTIALITY	41
SIGNATURES	41
ATTACHMENT S	42
Subject Information and Consent Form (Signature Page)	42
ATTACHMENT P	44
Participant's Material Publication Consent Form Signature Page	44
LAMPIRAN A	1
PENGENALAN	1
TUJUAN KAJIAN	1
KELAYAKAN PENYERTAAN	1
PROSEDUR-PROSEDUR KAJIAN	2
RISIKO	3
PENYERTAAN DALAM KAJIAN	3
PERSOALAN	4
KERAHSIAAN	5
TANDATANGAN	5
LAMPIRAN S	6
LAMPIRAN P	I

LIST OF TABLES

Table No.	Title	Page
Table 3.11.1	Expected Distribution of Sociodemographic Characteristics	25
Table 3.11.2	Expected Distribution of Nutrition Knowledge, Attitude, and Practice Levels	26
Table 3.11.3	Expected Correlations for Knowledge, Attitude, and Practice (KAP) Domains	27
Table 3.12.1	Gantt Chart	27-29
Table 4.1	Distribution of Sociodemographic Characteristics	33
Table 4.2	Distribution of Nutrition Knowledge Level	34
Table 4.3	Distribution of Attitude Level	35
Table 4.4	Distribution of Practice Level	35
Table 4.5	Normality Test of Knowledge, Attitude, and Practice Scores	36
Table 4.5.1	Correlations for Knowledge, Attitude, and Practice (KAP) Domains	36

LIST OF FIGURES

Figure No.	Title	Page
Figure 2.1	Conceptual Framework	11
Figure 3.4.1	Raosoft Sample Size Calculator Inputs	16
Figure 3.4.2	Power Analysis for Two-Group Comparison (Cohen's $d = 0.3$)	17
Figure 3.9	Study Flowchart	22

LIST OF SYMBOLS

ρ	Spearman's rank correlation coefficient
p	Probability value
SD	Standard deviation
<	Less than
$\geq$	Greater than or equal to

LIST OF ABBREVIATIONS

BMI	Body Mass Index
DOSM	Department of Statistics Malaysia
FAO	Food and Agriculture Organization
HPUSM	Hospital Pakar Universiti Sains Malaysia
IBM	International Business Machines
JEPeM	Human Research Ethics Committee (USM)
KAP	Knowledge, Attitude, and Practice
N/A	Not applicable
NCBI	National Center for Biotechnology Information
SPSS	Statistical Package for the Social Sciences
USM	Universiti Sains Malaysia
WHO	World Health Organization

**PENGETAHUAN, SIKAP, DAN AMALAN PEMAKANAN DALAM
KALANGAN STAF KAMPUS KESIHATAN TERHADAP ANAK-ANAK
MEREKA YANG BERADA DALAM PERINGKAT KANAK-KANAK
PERTENGAHAN DAN REMAJA DI KUBANG KERIAN, KELANTAN**

ABSTRAK

Status pemakanan kanak-kanak dan remaja dipengaruhi secara signifikan oleh pengetahuan, sikap dan amalan (PSA) pemakanan ibu bapa. Ibu bapa memainkan peranan penting dalam membentuk tingkah laku pemakanan semasa kanak-kanak dan remaja, yang boleh memberi implikasi jangka panjang terhadap kesihatan. Kajian ini bertujuan untuk menentukan tahap pengetahuan, sikap dan amalan pemakanan dalam kalangan staf Kampus Kesihatan, Universiti Sains Malaysia (USM), terhadap anak-anak mereka yang berumur 6 hingga 19 tahun, serta untuk mengkaji korelasi antara pengetahuan, sikap dan amalan pemakanan. Kajian keratan rentas deskriptif-analitik ini dijalankan dalam kalangan staf Pusat Pengajian Sains Kesihatan, Kampus Kesihatan USM, Kubang Kerian, Kelantan, menggunakan kaedah persampelan mudah. Data dikumpul melalui soal selidik berstruktur yang diisi sendiri oleh responden dan merangkumi ciri sosiodemografi serta pengetahuan, sikap dan amalan pemakanan. Analisis statistik deskriptif dan korelasi Spearman telah dijalankan menggunakan perisian SPSS versi 28.0. Majoriti responden menunjukkan tahap pengetahuan pemakanan yang tinggi (75.76%) dan sikap yang positif (90.91%), manakala tahap amalan pemakanan didapati kebanyakannya berada pada tahap sederhana (54.55%). Analisis korelasi Spearman menunjukkan terdapat korelasi positif yang lemah tetapi signifikan secara statistik antara pengetahuan dan amalan pemakanan ($\rho = 0.293$, $p = 0.003$), serta antara sikap dan amalan pemakanan ($\rho = 0.305$, $p = 0.002$). Kesimpulannya, walaupun kebanyakan ibu bapa mempunyai tahap pengetahuan pemakanan yang tinggi dan sikap yang positif, hubungan antara faktor-faktor tersebut dengan amalan pemakanan adalah lemah. Dapatan ini menunjukkan keperluan untuk

intervensi pemakanan yang memberi penekanan kepada strategi yang dapat membantu menterjemahkan pengetahuan dan sikap kepada amalan pemakanan yang lebih berkesan dalam kalangan keluarga.

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ABSTRACT

The nutritional status of children and adolescents is strongly influenced by parental nutrition knowledge, attitudes, and practices (KAP). Parents play a crucial role in shaping dietary behaviours during middle childhood and adolescence, which may have long-term health implications. This study aimed to determine the levels of nutrition knowledge, attitude, and practice among staff of the Health Campus, Universiti Sains Malaysia (USM), regarding their children aged 6–19 years, and to examine the correlations between nutrition knowledge, attitude, and practice. A descriptive-analytical cross-sectional study was conducted among staff from the School of Health Sciences, USM Health Campus, Kubang Kerian, Kelantan, using convenience sampling. Data were collected through a structured, self-administered questionnaire comprising sociodemographic characteristics and nutrition KAP. Descriptive statistics and Spearman's rank correlation analysis were performed using SPSS version 28.0. Most respondents demonstrated a high level of nutrition knowledge (75.76%) and attitude (90.91%), while nutrition practice was predominantly at a moderate level (54.55%). Spearman's correlation analysis showed a weak but statistically significant positive correlation between nutrition knowledge and practice ($\rho = 0.293$, $p = 0.003$), as well as between attitude and practice ($\rho = 0.305$, $p = 0.002$). In conclusion, although most parents possessed high nutrition knowledge and positive attitudes, these were only weakly associated with nutrition practices. This suggests that future nutrition interventions should focus on strategies that facilitate the translation of knowledge and attitudes into effective dietary practices within families.

CHAPTER 1:INTRODUCTION

1.0 Background of studies

Nutrition plays a critical role in the growth, development, and overall health of children and adolescents. Middle childhood (approximately 6 to 12 years) and early adolescence (approximately 10 to 19 years) have historically received less scientific attention compared to other life stages, especially in nutrition and health. This is largely because much attention has been rightly directed toward the first 1000 days of life, based on the understanding that early nutritional deficits may have irreversible effects. However, these periods which cover most primary schooling years and the transition into adolescence are critical phases that offer important opportunities to address nutritional needs and support healthy development. These stages represent a critical and transformative phase, making middle childhood and early adolescence a final major window to positively influence long-term health outcomes and productivity (Sawyer et al., 2019; Bagley, 2024; Sinai et al., 2021; Shi et al., 2024; Saavedra & Prentice, 2023).

During middle childhood, adequate and balanced eating supports essential processes such as brain development, immune function, and the establishment of healthy eating behaviours that can persist into later life. A balanced diet including a variety of foods from different food groups in the right proportions ensures that children's nutritional needs are met to support these processes. This period also provides a unique opportunity for "catch-up" growth to address any nutritional deficits from earlier stages, thereby reducing the risk of stunting and other growth impairments (Soliman et al., 2014). Furthermore, nutrition during middle childhood lays the groundwork for the more rapid and complex changes of adolescence (Sawyer et al., 2019; Norris et al., 2021).

Adolescence, which follows middle childhood and typically ranges from 10 to 19 years, is a transformative phase marked by rapid physical growth, cognitive maturation, and psychosocial development. These changes increase nutritional demands significantly and include critical milestones such as the onset of puberty, which often differs between sexes (Bagley, 2024; Shi et al., 2024). A balanced diet that is rich in energy, macronutrients, and micronutrients supports optimal growth, bone mineralization, and hormonal changes necessary for sexual maturation (Parent et al., 2003).

Importantly, nutrition during middle childhood and adolescence plays a significant role in the timing and progression of puberty. Overweight and obesity, which often develop during middle childhood, are associated with earlier pubertal onset in girls, likely due to increased body fat and hormonal changes that influence the hypothalamic-pituitary-gonadal axis. Conversely, undernutrition and chronic illnesses during these stages can delay puberty in both sexes by impairing growth and hormonal development. While early life nutrition including factors such as birth size and infant feeding practices also impacts pubertal timing and metabolic health, nutritional status during middle childhood and adolescence remains critical in shaping the onset and progression of puberty (Parent et al., 2003; Naddeh & AlSharei, 2022).

In the Malaysian context, these nutritional challenges are significant. Malaysia faces a "triple burden" of malnutrition among children and adolescents, characterized by the coexistence of undernutrition (such as stunting and anaemia), overweight, and obesity. Poor dietary patterns, including excessive fast-food consumption and inadequate fruit and vegetable intake, contribute to imbalanced nutrient profiles that affect growth and development during both middle childhood and adolescence (Saavedra & Prentice, 2023).

While much research has focused on the dietary behaviours of children and adolescents themselves, the knowledge, attitudes, and practices (KAP) of their primary caregivers, especially parents and guardians play a pivotal role in shaping these behaviours. Caregivers' understanding of nutrition, their beliefs about healthy eating, and the practices they model or enforce at home are key determinants of children's dietary patterns and, consequently, their health outcomes (Millanzi et al., 2023).

Staff members at health-focused academic institutions, such as the School of Health Sciences at Universiti Sains Malaysia, are uniquely positioned as both role models and sources of health information within their communities. However, little is known about their own nutrition-related KAP for their children, especially in semi-urban settings like Kubang Kerian, Kelantan.

Despite the recognized importance of caregiver influence, limited data exists on the nutrition KAP of health professionals in their role as parents, especially within academic health institutions. This study aims to assess the nutrition KAP of staff at the School of Health Sciences, Universiti Sains Malaysia, in relation to the balanced eating habits they promote for their children aged 6–19 years in Kubang Kerian, Kelantan. By focusing on this population, the study seeks to illuminate how professional health knowledge translates or does not translate into daily household practices, offering critical insights for family nutrition interventions and policy development.

1.1 Problem statement & Study rationale

Optimal nutrition during middle childhood and adolescence is essential for healthy growth, cognitive development, and long-term disease prevention (Moore Heslin & McNulty, 2023). While the importance of these life stages is well-established, the role of caregivers especially those with health-related expertise in shaping dietary habits at home

is often overlooked. Staff at health-focused academic institutions, such as Schools of Health Sciences, are uniquely positioned to influence their children's nutrition, both as health professionals and as primary caregivers.

Despite their background, there remains a significant gap in understanding the nutrition (KAP) of these staff members regarding the dietary care of their own children. Most existing research and surveillance efforts have focused on the first 1000 days of life, with 95.3% of child health research dedicated to early childhood (<5 years), while only 0.55% targets ages 10–14 and 0.61% focuses on ages 15–19 (Saavedra & Prentice, 2023; Keats et al., 2023). As a result, there is limited information on how even health-literate caregivers approach nutrition for children in middle childhood and adolescence, and most national and international nutrition databases do not capture data for these age groups (Keats et al., 2023).

In Malaysia, the “triple burden” of malnutrition including undernutrition, overweight, and micronutrient deficiencies remains a significant concern among children and adolescents, with long-term implications for academic achievement, health, and national productivity (Poh et al., 2023). Staff at Schools of Health Sciences are often viewed as role models in their communities, expected to promote healthy eating, limit unhealthy foods, and encourage physical activity within their households. However, research suggests that professional knowledge does not always translate into consistent or optimal nutrition practices at home. Factors such as time constraints, work-related stress, cultural food preferences, and competing responsibilities may hinder the ability of even health-educated parents to implement healthy dietary behaviours.

Despite these expectations, few studies have explored how health campus staff apply their nutrition knowledge as parents and caregivers. The extent of their nutrition

knowledge, the attitudes they hold, and the dietary practices they promote at home remain unclear (Chen et al., 2012). Understanding these dimensions is essential for identifying gaps, correcting misconceptions, and designing effective interventions tailored to this influential group of caregivers. While the World Health Organization (WHO) defines adolescence as ages 10 to 19, this study operationally defines adolescence as 13 to 19 years to better reflect the later phase of adolescence when children begin making more independent dietary choices. This also aligns with local school-age classifications in Malaysia.

Findings from this study will provide valuable insights into the KAP of staff at the School of Health Sciences, Universiti Sains Malaysia, Kubang Kerian, regarding the nutrition of their children aged 6–19 years. These results could inform targeted nutrition education programs within academic health institutions and support broader policy efforts to address malnutrition among Malaysian children and adolescents.

1.2 Research questions

1. What is the level of nutrition knowledge among School of Health Sciences staff regarding balanced eating for their children in middle childhood and adolescence in Kubang Kerian, Kelantan?
2. What is the attitude level of School of Health Sciences staff toward balanced eating for their children in middle childhood and adolescence in Kubang Kerian, Kelantan?
3. What is the dietary practice level of School of Health Sciences staff regarding balanced eating for their children in middle childhood and adolescence in Kubang Kerian, Kelantan?

4. What is the relationship between nutrition knowledge, attitude, and practice (KAP) among School of Health Sciences staff regarding balanced eating for their children in middle childhood and adolescence in Kubang Kerian, Kelantan?

1.3 Objectives

1.3.1 General objective

- To assess the nutrition knowledge, attitude, and practice (KAP) of School of Health Sciences staff regarding balanced eating for their children in middle childhood and adolescence in Kubang Kerian, Kelantan.

1.3.2 Specific objectives

1. To determine the level of nutrition knowledge among School of Health Sciences staff regarding balanced eating for their children in middle childhood and adolescence in Kubang Kerian, Kelantan.
2. To determine the attitude level of School of Health Sciences staff toward balanced eating for their children in middle childhood and adolescence in Kubang Kerian, Kelantan.
3. To determine the dietary practice level of School of Health Sciences staff regarding balanced eating for their children in middle childhood and adolescence in Kubang Kerian, Kelantan.
4. To investigate the relationship between nutrition knowledge, attitude, and practice (KAP) among School of Health Sciences staff regarding balanced eating for their children in middle childhood and adolescence in Kubang Kerian, Kelantan.

1.4 Hypothesis

1.5.1 Null Hypothesis (H_0)

- There is no significant relationship between nutrition practice and knowledge, and practice and attitude among School of Health Sciences staff regarding balanced eating for their children in middle childhood and adolescence in Kubang Kerian, Kelantan.

1.5.2 Alternative Hypothesis (H_1)

- There is a significant relationship between nutrition practice and knowledge, and practice and attitude among School of Health Sciences staff regarding balanced eating for their children in middle childhood and adolescence in Kubang Kerian, Kelantan.

CHAPTER 2: LITERATURE REVIEW

2.0 Nutrition KAP

2.0.1 Nutrition knowledge

Nutrition knowledge refers to an individual's understanding of nutrition concepts, including awareness of dietary guidelines, nutrient functions, and the relationship between diet and health or disease. It encompasses both factual and procedural knowledge, such as recognising nutrient-rich foods and interpreting nutrition labels (Hammouh et al., 2023). The Food and Agriculture Organization (FAO, 2014) further describes nutrition-related knowledge as what people know about nutrition, dietary recommendations, and healthy eating practices, forming the foundation for informed dietary choices.

2.0.2 Nutrition attitude

Attitude in the KAP framework refers to a person's beliefs, feelings, and perceptions about nutrition and healthy eating, including their motivation to adopt healthy dietary behaviours, perceived benefits or barriers, and readiness to change. These attitudes are often shaped by cultural and personal factors and are typically assessed using scaled items that measure favourable or unfavourable inclinations toward specific nutrition practices (Liao & Yang, 2023). The Food and Agriculture Organization (FAO, 2014) similarly defines attitudes as people's beliefs, feelings, and perceptions about nutrition, highlighting their influence on dietary choices.

2.0.3 Nutrition practice

Practice in the KAP framework refers to the actual behaviours or actions related to nutrition, such as food choices, meal preparation, and eating habits. These behaviours are observable and reflect how an individual's nutrition knowledge and attitudes are translated into daily life (Hammouh et al., 2023). The Food and Agriculture Organization

(FAO, 2014) similarly describes nutrition practices as the tangible actions people take regarding food, including both healthy and unhealthy dietary behaviours.

2.0.4 Nutrition KAP model

According to the Food and Agriculture Organization (FAO, 2014), KAP studies are designed to assess people's knowledge (what is known), attitudes (what is thought), and practices (what is done) relating to nutrition, diet, foods, and closely related hygiene and health issues. The KAP model is a widely used framework in public health and nutrition research that builds on this approach. It explains that people first gain knowledge, which shapes their attitudes, and these attitudes then affect what they do in practice. In the context of nutrition, greater awareness and understanding are expected to foster more positive attitudes, ultimately leading to healthier dietary behaviours (Liao & Yang, 2023; Hammouh et al., 2023). KAP surveys are frequently used to identify behavioural gaps and guide the development of targeted nutrition interventions.

2.0.5 Overall KAP trends across populations

Several studies have consistently highlighted a pattern in nutrition KAP, where high knowledge and positive attitudes are not always reflected in actual dietary behaviours. In a cross-sectional study by Ma et al. (2023) involving 1,746 parents of children aged 6 to 15 years in Weifang, China, the nutrition knowledge awareness rate was 65.94%, yet the correlation between knowledge and attitudes was weak ($r = 0.03$). Similarly, among 310 pregnant females aged 18-40 years, Wang et al. (2023) found that although 91% of pregnant women in Shenzhen demonstrated positive attitudes toward nutrition, only 3.8% had good nutrition knowledge, and 16.8% reported good dietary practices. A study among 280 school teachers in Bangladesh by Habib et al. (2023) revealed an average knowledge score of 70.1% and a high proportion of positive attitudes (97.7%), yet only 9.9%

expressed confidence in understanding childhood nutrition. In Malaysia, Yusni et al. (2023) reported that among 107 undergraduate students in USM Kubang Kerian, 95.3% had good nutrition knowledge and 79.4% held positive attitudes; however, only 36.4% exhibited good dietary practices. These findings underscore a consistent gap between nutrition knowledge and actual practices, suggesting that awareness alone may not be sufficient to drive healthy behaviour change.

2.0.6 Methodological limitations in nutrition KAP research

A few existing studies on nutrition KAP share similar methodological limitations that affect the strength and generalisability of their findings. One of the most frequently cited issues is the use of a cross-sectional design, which restricts the ability to draw causal inferences between variables. For instance, studies by Ma et al. (2023), Wang et al. (2023), and Yusni et al. (2023) all adopted cross-sectional approaches, limiting the interpretation of temporal or cause-and-effect relationships. Additionally, reliance on self-reported questionnaires in studies such as Wang et al. (2023), Habib et al. (2023), and Jeinie et al. (2021) introduces the risk of social desirability bias, where participants may overreport positive behaviours or underreport negative ones to align with perceived expectations. Many of these studies also employed convenience or purposive sampling methods, which may be practical but also reduce the representativeness of the sample and limit the generalisability of results to the broader population. For example, Ma et al. (2023) focused on high-income private school parents, while Wang et al. (2023) and Habib et al. (2023) examined specific groups such as pregnant women and school teachers. These relatively homogeneous samples further constrain the applicability of findings to more diverse populations.

2.1 Conceptual framework

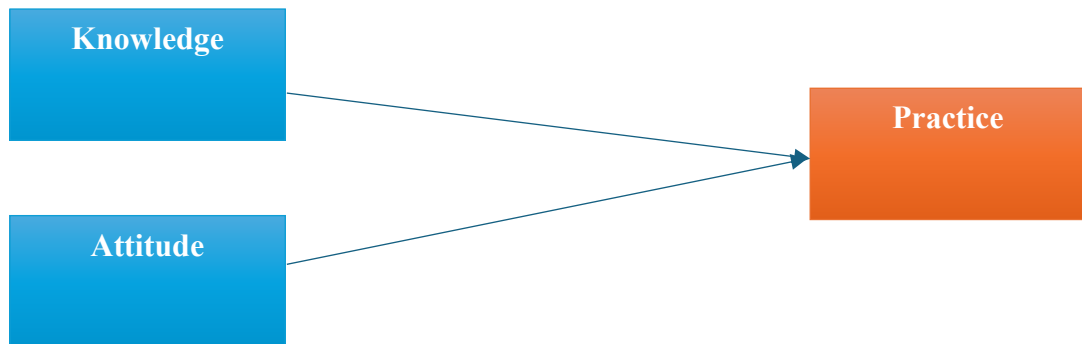


Figure 2.1: Conceptual Framework

CHAPTER 3: METHODOLOGY

3.0 Research design

This study adopts a cross-sectional design to assess nutrition knowledge, attitudes, and practices (KAP) among health campus staff in Kubang Kerian, Kelantan, with a specific focus on the dietary habits of their children in middle childhood (6–12 years) and adolescence (13–19 years). This approach ensures the findings are applicable to caregivers of school-going children and adolescents within the Malaysian context (World Health Organization, 2019).

A cross-sectional approach is appropriate for capturing a snapshot of current KAP levels within this population at a single point in time. This design facilitates the identification of trends, associations, and potential gaps in nutrition-related knowledge and behaviours, providing valuable insights to guide targeted interventions. Similar cross-sectional KAP studies conducted in Jordan and Bangladesh have demonstrated the utility of this approach in informing public health strategies (Al-Rawashdeh et al., 2023; Hasan et al., 2023).

3.1 Study area

Kubang Kerian is a town and federal constituency (P.024) within the Kota Bharu district of Kelantan, Malaysia. According to the Department of Statistics Malaysia (DOSM), the total population of Kubang Kerian is 156,627, based on the 2020 Population and Housing Census (Department of Statistics Malaysia [DOSM], 2023). The area covers approximately 3.2 km², with a population density of 4,910 per km² (City Facts, 2020; City Population, 2024). The demographic profile of Kubang Kerian supports its suitability as a setting for studies involving health campus staff with children in middle childhood and

adolescence, as it shows a significant proportion of children and working-age adults (DOSM, 2023).

A defining feature of Kubang Kerian is the Universiti Sains Malaysia (USM) Health Campus, which houses the School of Medical Sciences, the School of Dentistry, and the School of Health Sciences (USM Health Campus, 2024; EMGS, n.d.). The campus also includes the Hospital Pakar Universiti Sains Malaysia (HPUSM), a 760-bed teaching hospital that was officially renamed in 2024 to reflect its status as a university specialist hospital (Sinar Harian, 2024; USM News, 2024). The integration of academic and healthcare functions within the campus, along with its strong ties to the local community, makes it an ideal setting for community-based research targeting health professionals.

The sociocultural context of Kubang Kerian is characterized by a predominantly Malay-Muslim population, which strongly influences local dietary patterns and nutrition-related attitudes. Kelantanese cuisine, known for its rich use of coconut milk, sweet and creamy curries, and traditional dishes such as nasi kerabu and nasi dagang, reflects these cultural influences and may affect the nutrition knowledge, attitudes, and practices of caregivers in the area (Syahida & Zainal, 2014; Malaysian Journal of Public Health Medicine, 2022).

Overall, Kubang Kerian presents a strategic and contextually appropriate location for this research due to its demographic composition, health-oriented academic environment, and culturally specific context, all of which align with the study objectives.

3.2 Study population

The study population will include staff from the School of Health Sciences at USM Health Campus in Kubang Kerian, Kelantan, who are parents or primary caregivers of children and adolescents aged 6 to 19 years. Only full-time staff will be included, as their

stable routines and responsibilities allow them to provide more reliable information compared to part-time staff. The population will cover administrative, academic, clinical, and laboratory staff actively engaged in the school's daily operations, ensuring representation from a range of roles (Universiti Sains Malaysia, 2024).

Although the study title broadly refers to “Health Campus Staff,” the research population was limited to staff from the School of Health Sciences. The School of Health Sciences comprises a range of health-related disciplines, making it a relevant and diverse group for examining nutrition-related knowledge, attitudes, and practices (KAP) within the household setting. The inclusion of staff across different roles captures variations in educational background, professional responsibilities, and exposure to health and nutrition information, offering a comprehensive view of caregiver-related nutrition behaviours (Chen et al., 2012).

3.3 Subject criteria

3.3.1 Inclusion criteria

1. Full-time staff member at the USM School of Health Sciences.
2. Primary caregiver (e.g., biological parent, adoptive parent, or legal guardian) of at least one child aged 6–19 years who has resided in the same household.
3. Able to understand and complete a self-administered questionnaire in English or Bahasa Malaysia.
4. Engaged in administrative, academic, clinical, or laboratory roles within the School of Health Sciences.

3.3.2 Exclusion criteria

1. Caregivers who are currently participating in another nutrition-related study or intervention.
2. Caregivers of children who have special dietary needs due to medical conditions such as food allergies, diabetes, or metabolic disorders.
3. Caregivers whose children rely entirely on external food sources (e.g., boarding school, daycare, food delivery services) for their daily meals.

3.4 Sample size

The required sample size for this cross-sectional study was calculated based on a total population of 242 staff members from the School of Health Sciences, Universiti Sains Malaysia, Kubang Kerian. Sample size calculations were conducted separately for each study objective to ensure adequate statistical power for both descriptive and inferential analyses.

For Objectives 1 to 3, which involve estimating levels of nutrition knowledge, attitudes, and practices, the Raosoft online sample size calculator was used. Using a 95% confidence level, 5% margin of error, and a response distribution of 50%, which assumes maximum variability—the recommended minimum sample size was 149 participants.

For Objective 4, which explores the relationship between nutrition knowledge, attitude, and practice (KAP), the sample size was calculated using the *TTestIndPower* function from the Statsmodels package (Statsmodels Developers, 2023). The analysis assumed a medium effect size (Cohen's $d = 0.3$), a significance level of 0.05, and a power of 80%, which is considered standard in health sciences research (Cohen, 1988; Das et al., 2016). This yielded a required sample size of 176 participants. To account for potential non-response, an additional 10% buffer has been added, bringing the total sample size to

194 participants. This will be the final target sample size used in this study. Similar studies assessing nutrition-related knowledge, attitudes, and practices have also been conducted with relatively small sample sizes, such as 120 nurses in Lesotho, 144 healthcare workers in Palestine, and 189 hospital staff in Canada (Mekhoa et al., 2022; Naser et al., 2021; Laur et al., 2016). Therefore, this study focused only on staff from the School of Health Sciences, with a total population of 242, which is consistent with the scope and sample sizes reported in similar KAP studies.

Raosoft Sample Size Calculator Inputs:

- Margin of Error: 5%
- Confidence Level: 95%
- Population Size: 242
- Response Distribution: 50%

Result:

Recommended Sample Size = 149

Figure 3.4.1: Raosoft Sample Size Calculator Inputs

This figure presents the input parameters used in the Raosoft online sample size calculator. Based on a margin of error of 5%, a confidence level of 95%, a response distribution of 50%, and a total population of 242 staff members, the calculator recommended a minimum sample size of 149 participants. This calculation supports Objectives 1 to 3, which focus on estimating proportions related to nutrition knowledge, attitude, and practice (KAP).

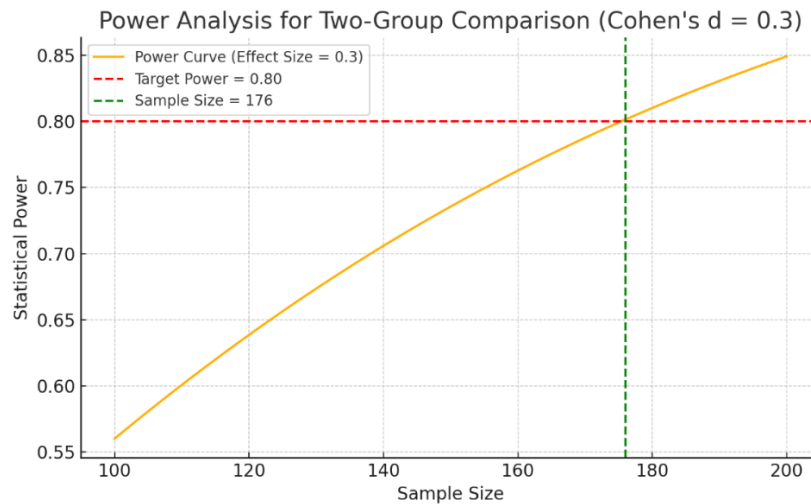


Figure 3.4.1: Power Analysis for Two-Group Comparison (Cohen's $d = 0.3$)

This figure presents the power analysis conducted using the *TTestIndPower* function from the Statsmodels package to detect a medium effect size (Cohen's $d = 0.3$), with a 95% confidence level and 80% statistical power. The red dashed line represents the target power of 0.80, while the green dashed line indicates the required sample size of 176 participants. This analysis supports the sample size determination for examining the relationships between nutrition knowledge, attitude, and practice (KAP) domains.

3.5 Sampling method and subject recruitment

This study will employ a convenience sampling method to recruit participants among staff from the School of Health Sciences in Kubang Kerian, Kelantan, who meet the inclusion criteria. Convenience sampling is a non-probability technique in which participants are selected based on their availability and willingness to participate, rather than through random selection (Etikan et al., 2016). Since the study population was limited to staff from the *School of Health Sciences* ($N = 242$), this approach was considered practical and appropriate, as the entire population was relatively small and accessible. Convenience sampling has been widely applied in similar KAP studies

involving healthcare staff with small defined populations (Mekhoa et al., 2022; Naser et al., 2021; Laur et al., 2016).

The study population will be drawn from the USM Health Campus staff directory, which provides the names and email addresses of the School of Health Sciences staff. The researcher will personally send study invitations via email, and one reminder will be sent two weeks after the initial invitation to those who have not responded. Each invitation will include a brief description of the study's purpose as well as the inclusion and exclusion criteria to allow self-assessment of eligibility. Participants who do not meet the criteria will not be required to respond further. While this recruitment approach is practical and efficient, the reliance on convenience sampling may introduce bias and limit the generalisability of the findings. Informed consent will be obtained digitally, with the Google Form providing a detailed information sheet and consent checkbox before participants proceed to the questionnaire.

3.6 Research tool

Data for this study will be collected using a structured, self-administered questionnaire comprising four sections: sociodemographic characteristics, nutrition knowledge, attitudes, and practices. The questionnaire consists of a total of 50 items, including 13 sociodemographic questions, 20 knowledge questions, 8 attitude items, and 9 practice items.

The knowledge section was adapted from a validated instrument developed by the Technical Working Group (Research), National Coordinating Committee for Food and Nutrition, Ministry of Health Malaysia (Ministry of Health Malaysia, 1997). Each knowledge item presents five answer choices, and participants are instructed to select the most accurate option.

The attitude and practice sections were adapted from the questionnaire developed and validated by Bahathig et al. (2023), which focuses on nutrition, physical activity, and body image among adolescents. For the purposes of this study, only items related to nutrition were selected to align with the study objectives. The attitude section uses a 5-point Likert scale ranging from *Strongly Agree (5)* to *Strongly Disagree (1)*, while the practice section uses a frequency-based 5-point Likert scale ranging from *Never (1)* to *Always (5)*.

The questionnaire will be administered digitally via Google Forms in both English and Bahasa Malaysia, with clear instructions and predefined response options. All required fields will be marked as mandatory within the Google Form, preventing submission of incomplete responses (McPeake et al., 2014). Only fully completed responses will be included in the final analysis to ensure data quality.

3.7 Operational definition

- **Nutrition Knowledge:** The understanding parents have regarding nutritional concepts, such as food groups, nutrient functions, and dietary recommendations for children in middle childhood and adolescence (National Center for Biotechnology Information [NCBI], 2019).
- **Nutrition Attitude:** Parents' beliefs, perceptions, and motivations toward providing healthy food to their children, assessed through agreement with health-promoting statements (NCBI, 2019).
- **Nutrition Practice:** The actual behaviors and habits of parents in terms of food choices, meal preparation, and feeding practices for their children (NCBI, 2019).

- **Middle Childhood:** Refers to children aged 6 to 12 years, as defined in international and Malaysian health literature (NCBI, 2019; Ministry of Health Malaysia, 2008).
- **Balanced Diet:** A diet that includes appropriate proportions of carbohydrates, proteins, fats, vitamins, and minerals as per the Malaysian Dietary Guidelines (Ministry of Health Malaysia, 2020).

3.8 Data collection method

To facilitate efficient data collection and minimise paper usage and data entry errors, the questionnaire will be administered exclusively in digital format via Google Forms (Fink, 2013; McPeake et al., 2014; Scribbr, 2023). This approach allows for immediate submission, real-time data capture, and secure digital storage, ensuring accurate, systematic data collection while maintaining informed consent and participant confidentiality (Creswell & Creswell, 2018; Scribbr, 2023).

Informed consent will be sought digitally. The first page of the Google Form will contain a detailed information sheet outlining the study's purpose, procedures, and confidentiality measures, along with a consent checkbox. Participation will be voluntary, and participants may withdraw at any point before submitting the questionnaire. Only participants who acknowledge and provide consent, and who meet the eligibility criteria, will proceed to complete the questionnaire. The survey is expected to take approximately 15–20 minutes to complete.

Each response will be automatically timestamped and assigned a unique numeric identifier to facilitate organised data handling. All responses will be stored securely on a password-protected Google account, with access restricted solely to the researcher. The data collection period is expected to last approximately two months, allowing sufficient

time to reach the target sample size. One reminder email will be sent two weeks after the initial invitation to those who have not responded.

3.9 Study flowchart

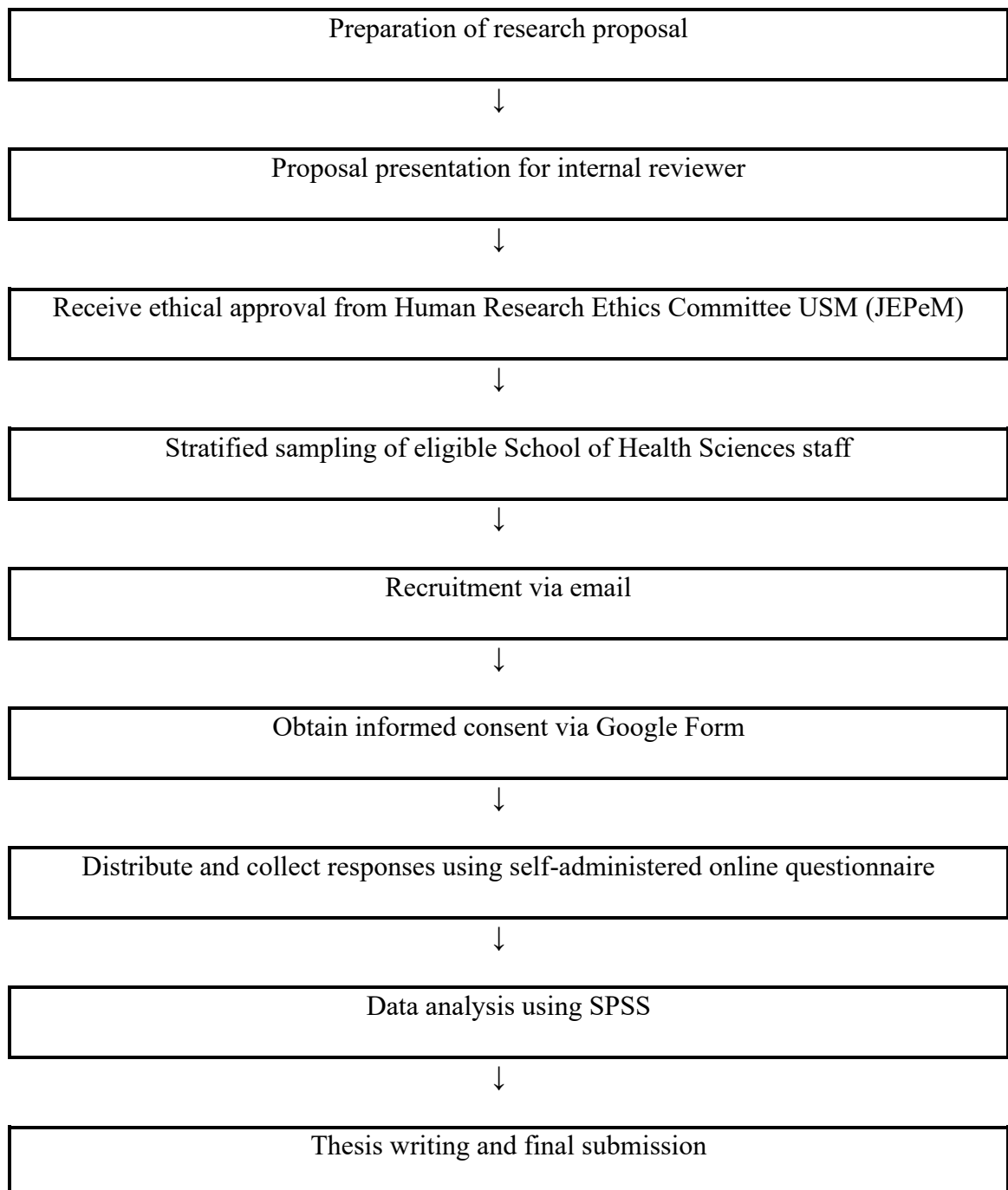


Figure 3.9: Study Flowchart

3.10 Data analysis

Data will be analysed using IBM SPSS Statistics version 29. Descriptive statistics will be used to summarise the characteristics of the respondents and the distribution of nutrition knowledge, attitude, and practice scores.

Sociodemographic variables will be analysed descriptively and presented as frequencies and percentages for categorical variables, and as mean (standard deviation) or median (interquartile range) for continuous variables, depending on data distribution. Sociodemographic variables will be used to describe the study population but will not be included in inferential analyses.

Statistical analyses will be conducted according to each specific objective as follows:

Objective 1 – To determine the level of nutrition knowledge among School of Health Sciences staff regarding balanced eating for their children in middle childhood and adolescence in Kubang Kerian, Kelantan:

Total nutrition knowledge scores will be computed and converted into percentage scores. Knowledge levels will be categorised as low (<50%), moderate (50%–74%), or high ($\geq$ 75%). Results will be presented using frequencies and percentages.

Objective 2 – To explore the attitudes of School of Health Sciences staff toward balanced eating for their children in middle childhood and adolescence in Kubang Kerian, Kelantan:

Total attitude scores will be calculated, converted into percentage scores, and categorised as low (<50%), moderate (50–74%), and high ($\geq$ 75%). Results will be presented using frequencies and percentages.

Objective 3 – To identify the dietary practices of School of Health Sciences staff in ensuring balanced eating for their children in middle childhood and adolescence in Kubang Kerian, Kelantan:

Practice items will be scored using a 5-point Likert scale. Negatively worded items will be reverse scored to ensure that higher scores reflect better practices. Total practice scores will be converted into percentage scores and categorised as low (<50%), moderate (50–74%), and high ($\geq 75\%$). Results will be presented using frequencies and percentages.

Objective 4 – To investigate the relationship between nutrition knowledge, attitude, and practice (KAP) among School of Health Sciences staff regarding balanced eating for their children in middle childhood and adolescence in Kubang Kerian, Kelantan:

Nutrition practice will be treated as the dependent variable, while nutrition knowledge and nutrition attitude will be treated as independent variables.

The normality of continuous knowledge, attitude, and practice scores will be assessed using the Shapiro–Wilk test. Depending on the distribution of the data, Pearson’s correlation coefficient will be used for normally distributed variables, while Spearman’s rank correlation coefficient will be applied for non-normally distributed variables to examine the relationships between nutrition knowledge and practice, and attitude and practice (Al-Rawashdeh et al., 2023; Hasan et al., 2023).

A significance level of $p < 0.05$ will be applied for all inferential analyses.

Handling Missing Data