KNOWLEDGE AND ATTITUDE TOWARDS POLYCYSTIC OVARY SYNDROME AMONG FEMALE UNDERGRADUATE STUDENTS IN A PRIVATE UNIVERSITY IN KAJANG

By

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ABSTRACT

BACKGROUND: Polycystic ovary syndrome (PCOS) is a common endocrine disorder that affects women in their childbearing age. Despite the rapid increase in the global prevalence of PCOS, many female university students remain unaware of this condition. This emphasises the necessity of evaluating the knowledge and attitude of female undergraduate students towards PCOS.

OBJECTIVE: To determine the knowledge level and attitude towards PCOS among female undergraduate students in a private university in Kajang.

METHODOLOGY: A cross-sectional study was conducted from 7 August 2023 to 18 August 2023 among 373 female undergraduate students in a private university in Kajang. Participants were recruited using quota sampling technique, and data were collected through face-to-face approach. Data analysis was performed using SPSS version 29.

RESULTS: Majority of participants demonstrated moderate knowledge (40.8%) and good attitude (80.2%) towards PCOS. Chi-square analysis revealed there was a statistically significant association between knowledge level towards PCOS and socio-demographic characteristics (year of study, field of study, medical and family history of PCOS). However, there was no statistically significant association between attitude towards PCOS and socio-demographic

characteristics except for the field of study. Furthermore, a statistically significant association was identified between attitude and knowledge level towards PCOS.

CONCLUSION: Despite their limited knowledge, female undergraduate students generally exhibited positive attitude towards PCOS. These findings underscore the importance of implementing awareness initiatives to bridge the knowledge gap, thereby facilitating early detection and enhancing the reproductive and overall health of university students.

KEYWORDS: Polycystic ovary syndrome, knowledge, attitude, female university students

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Date: 29th September 2023

PERMISSION SHEET

It is hereby certified that **TEH SIN YIE** (ID No: 18UMB04491) has completed this research project titled "KNOWLEDGE AND ATTITUDE TOWARDS POLYCYSTIC OVARY SYNDROME AMONG FEMALE UNDERGRADUATE STUDENTS IN A PRIVATE UNIVERSITY IN KAJANG" under the supervision of Dr. Thavamalar a/p Paramasivam (Supervisor) from M. Kandiah Faculty of Medicine and Health Sciences.

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Yours truly,

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DECLARATION

I hereby declare that the research project is based on my original work except for quotations and citations which have been duly acknowledged. I also declare that it has not been previously or concurrently submitted for any other degree at UTAR or other institutions.

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(TEH SIN YIE)

Date: 29th September 2023

APPROVAL SHEET

This research project entitled “KNOWLEDGE AND ATTITUDE TOWARDS POLYCYSTIC OVARY SYNDROME AMONG FEMALE UNDERGRADUATE STUDENTS IN A PRIVATE UNIVERSITY IN KAJANG.” is prepared by TEH SIN YIE and submitted as partial fulfilment of the requirements for the degree of Bachelor of Nursing (Honours) at Universiti Tunku Abdul Rahman.

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TABLES OF CONTENTS

ABTRACT ..... **i**

ACKNOWLEDGEMENTS ..... **iii**

PERMISSION SHEET ..... **iv**

DECLARATION ..... **v**

APPROVAL SHEET ..... **vi**

LIST OF DIAGRAMS, FIGURES AND TABLES ..... **xii**

LIST OF ABBREVATIONS ..... **xiv**

CHAPTER 1: INTRODUCTION 1

1.0 CHAPTER OVERVIEW 2

1.1 BACKGROUND OF THE STUDY 2

1.2 PROBLEM STATEMENT 4

1.3 ORIGINALITY 6

1.4 SIGNIFICANCE OF THE STUDY 6

1.5 RESEARCH OBJECTIVES 7

1.5.1 GENERAL OBJECTIVES 7

1.5.2 SPECIFIC OBJECTIVES 8

1.6 RESEARCH QUESTIONS 9

1.7 HYPOTHESIS 10

1.7.1 NULL HYPOTHESIS 10

1.7.2 ALTERNATIVE HYPOTHESIS 11

1.8 CONCEPTUAL FRAMEWORK 12

1.9 CONCEPTUAL AND OPERATIONAL DEFINITIONS 13

1.9.1 POLYCYSTIC OVARY SYNDROME 13

1.9.2 KNOWLEDGE 14

1.9.3 ATTITUDE 14

1.9.4 SOCIO-DEMOGRAPHIC CHARACTERISTICS 15

1.9.4.1 YEAR OF STUDY 15

1.9.4.2 FIELD OF STUDY 15

1.9.4.3 MEDICAL HISTORY OF PCOS 16

1.9.4.4 FAMILY HISTORY OF PCOS 16
1.9.5 UNDERGRADUATE STUDENTS 16
1.9.6 PRIVATE UNIVERSITY 16
1.10 SUMMARY 17
CHAPTER 2: LITERATURE REVIEW 18
2.0 CHAPTER OVERVIEW 19
2.1 SEARCH STRATEGY 19
2.2 REVIEW ON LITERATURE 21
2.2.1 KNOWLEDGE ON POLYCYSTIC OVARY SYNDROME 21
2.2.2 ATTITUDE ON POLYCYSTIC OVARY SYNDROME 22
2.2.3 SOCIO-DEMOGRAPHIC CHARACTERISTICS 23
2.2.3.1 YEAR OF STUDY 23
2.2.3.2 FIELD OF STUDY 24
2.2.3.3 MEDICAL HISTORY OF PCOS 24
2.2.3.4 FAMILY HISTORY OF PCOS 25
2.2.4 ASSOCIATION BETWEEN ATTITUDE AND KNOWLEDGE LEVEL TOWARDS PCOS 26
2.3 SUMMARY 27
CHAPTER 3: METHODOLOGY 28
3.0 CHAPTER OVERVIEW 29
3.1 RESEARCH DESIGN 29
3.2 SETTING OF THE STUDY 30
3.3 POPULATION 31
3.3.1 TARGET POPULATION 31
3.3.2 ACCESSIBLE POPULATION 31
3.4 SAMPLE 31
3.5 SAMPLING 31
3.5.1 SAMPLING METHOD 31
3.5.2 SAMPLE SIZE 33
3.5.3 SAMPLING CRITERIA 36
3.5.3.1 INCLUSION CRITERIA 36

3.5.3.2 EXCLUSION CRITERIA 36
3.6 VARIABLES 36
3.6.1 INDEPENDENT VARIABLES 36
3.6.2 DEPENDENT VARIABLES 37
3.7 RESEARCH INSTRUMENT 37
3.7.1 SECTION A: SOCIO-DEMOGRAPHIC VARIABLES 37
3.7.2 SECTION B: KNOWLEDGE ON PCOS 37
3.7.3 SECTION C: ATTITUDE TOWARDS PCOS 38
3.8 VALIDITY AND RELIABILITY 39
3.8.1 CONTENT VALIDITY 39
3.8.2 RELIABILITY 39
3.9 PILOT STUDY 40
3.10 DATA COLLECTION PROCEDURE 41
3.11 ETHICAL CONSIDERATION 42
3.11.1 UNIVERSITY ETHICAL BOARD AND COMMITTEE 42
3.11.2 PERMISSION TO USE INSTRUMENT 42
3.11.3 CONSENT INFORMATION 43
3.12 GANTT CHART 43
3.15 SUMMARY 44
CHAPTER 4: DATA ANALYSIS AND RESULT 45
4.0 CHAPTER OVERVIEW 46
4.1 TYPE OF ANALYSIS 46
4.1.1 DESCRIPTIVE ANALYSIS 46
4.1.2 INFERENTIAL ANALYSIS 46
4.2 STATISTICAL DATA PROCESSING AND ANALYSIS 47
4.3 RESULTS 47
4.3.1 SOCIO-DEMOGRAPHIC CHARACTERISTICS OF THE PARTICIPANTS 47
4.3.2 KNOWLEDGE LEVEL TOWARDS PCOS 49
4.3.2.1 FREQUENCY AND PERCENTAGE OF CORRECT AND INCORRECT ANSWERS REGARDING KNOWLEDGE ON PCOS 49

4.3.2.2 FREQUENCY AND PERCENTAGE OF PARTICIPANTS' KNOWLEDGE LEVEL TOWARDS PCOS 52
4.3.3 ATTITUDE TOWARDS PCOS 53
4.3.3.1 FREQUENCY AND PERCENTAGE OF PARTICIPANTS' RESPONSES REGARDING ATTITUDE TOWARDS PCOS 54
4.3.3.2 FREQUENCY AND PERCENTAGE OF PARTICIPANTS' ATTITUDE TOWARDS PCOS 57
4.3.4 ASSOCIATION BETWEEN KNOWLEDGE LEVEL TOWARDS PCOS AND SOCIO-DEMOGRAPHIC CHARACTERISTICS 58
4.3.5 ASSOCIATION BETWEEN ATTITUDE TOWARDS PCOS AND SOCIO-DEMOGRAPHIC CHARACTERISTICS 61
4.3.6 ASSOCIATION BETWEEN ATTITUDE AND KNOWLEDGE LEVEL TOWARDS PCOS 65
4.4 SUMMARY 66
CHAPTER 5: DISCUSSION 67
5.0 CHAPTER OVERVIEW 68
5.1 DISCUSSION OF MAJOR FINDINGS 68
5.1.1 KNOWLEDGE LEVEL TOWARDS PCOS 68
5.1.2 ATTITUDE TOWARDS PCOS 69
5.1.3 ASSOCIATION BETWEEN KNOWLEDGE LEVEL TOWARDS PCOS AND SOCIO-DEMOGRAPHIC CHARACTERISTICS 71
5.1.4 ASSOCIATION BETWEEN ATTITUDE TOWARDS PCOS AND SOCIO-DEMOGRAPHIC CHARACTERISTICS 74
5.1.5 ASSOCIATION BETWEEN ATTITUDE AND KNOWLEDGE LEVEL TOWARDS PCOS 76
5.2 SUMMARY 78
CHAPTER 6: CONCLUSION AND RECOMMENDATION 79
6.0 CHAPTER OVERVIEW 80
6.1 STRENGTH AND LIMITATION OF THE STUDY 80
6.1.1 STRENGTHS OF THE STUDY 80
6.1.2 LIMITATIONS OF THE STUDY 81
6.2 IMPLICATIONS OF THE STUDY 82
6.3 RECOMMENDATIONS FOR FUTURE RESEARCH 84
6.4 CONCLUSION 85

REFERRENCES 87
APPENDICES..... 100
APPENDIX A: CONSENT DECLARATION FORM 100
APPENDIX B: RESEARCH INSTRUMENT 101
APPENDIX C: COVER LETTER OF RECRUITMENT..... 104
APPENDIX D: PERMISSION TO USE INSTURMENT 105
APPENDIX E: ETHICAL BOARD APPROVAL LETTER..... 106
APPENDIX F: PERSONAL DATA PROTECTION STATEMENT..... 108
APPENDIX G: RESEARCH INSTRUMENT CONTENT VALIDATION . 109
APPENDIX H: GANTT CHART 110
APPENDIX I: TURNINIT ORIGINALITY REPORT..... 111

LIST OF DIAGRAMS, FIGURES AND TABLES

DIAGRAMS		PAGE
1.1	Conceptual Framework of knowledge level and attitude towards polycystic ovary syndrome among female undergraduate students in a private university in Kajang.	13
2.1	Search Strategy Flowchart	20
3.1	Population of female undergraduate students in a private university in Kajang based on field of study	32
3.2	Sample Size for Main Study using Quota Sampling	35
3.3	Sample Size for Pilot Study using Quota Sampling	41

FIGURES		PAGE
3.1	Location of the study setting	30
4.1	Frequency and percentage of participants' knowledge level towards PCOS (n=373)	53
4.2	Frequency and percentage of participants' attitude towards PCOS (n=373)	57

TABLES		PAGE
3.1	Summary of reliability test	40
4.1	Frequency and percentage distribution of participants based on socio-demographic characteristics (n=373)	48
4.2	Frequency and percentage of participants' responses on knowledge of PCOS (n=373)	50
4.3	Frequency and percentage of participants' responses on attitude towards PCOS (n=373)	55
4.4	Association between knowledge level towards PCOS and socio-demographic characteristics (n=373)	58
4.5	Association between attitude towards PCOS and socio-demographic characteristics (n=373)	62
4.6	Association between attitude and knowledge level towards PCOS (n=373)	64

LIST OF ABBREVIATIONS

ABBREVIATION	MEANING
DALYs	Disability-Adjusted Life-Years
FAM	Faculty of Accountancy and Management
FCI	Faculty of Creative Industries
KAP	Knowledge, Attitude and Practice
LKC FES	Lee Kong Chian Faculty of Engineering and Science
HPO	Hypothalamic-Pituitary-Ovarian
MK FMHS	M. Kandiah Faculty of Medicine and Health Sciences
PCOS	Polycystic Ovary Syndrome
QOL	Quality of Life
SPSS	Statistical Package for Social Sciences
UTAR	Universiti Tunku Abdul Rahman

CHAPTER ONE

INTRODUCTION

CHAPTER 1: INTRODUCTION

1.0 CHAPTER OVERVIEW

Chapter one illustrates the study background, problem statement, significance of the study, general and specific objectives, research questions, hypotheses, conceptual framework as well as conceptual and operational definition.

1.1 BACKGOURND OF THE STUDY

Polycystic ovary syndrome (PCOS) also referred to as polycystic ovarian syndrome, is a common metabolic and endocrine disorder affecting women in their childbearing age, typically between 15 and 49 years (Siam, et al., 2020; Farooq, 2018; Pasquali, 2018). The aetiology of PCOS is unknown, but a combination of genetic, environmental and lifestyle factors is believed to be the determinants (Bulsara, et al., 2021). PCOS is characterised by hyperinsulinemia and hyperandrogenism, causing hormonal imbalances which disrupt the menstrual cycle and result in the development of cysts in the ovaries, from which the name was derived (Rosenfield, 2020; Ajmal, Khan and Shaikh, 2019).

Globally, the Rotterdam criteria are used to diagnose PCOS (Yan, et al., 2021; Deswal, et al., 2020). According to Rotterdam criteria, when a person has two out of the three criteria which are clinical or biochemical signs of an increased level of androgen, amenorrhea or irregular menses, and the detection of cysts in the ovary by ultrasonography, they are diagnosed as having PCOS. Hyperandrogenism manifests clinically as hirsutism, male-pattern alopecia or

acne, and biochemically as an elevated serum androgen level (Celik, Celik and Polat, 2018).

PCOS has lifelong implications for a woman's reproductive, metabolic and psychological well-being. Worldwide, PCOS is the leading cause of anovulatory infertility, primarily due to hyperandrogenism affecting ovulation (Ajmal, Khan. and Shaikh, 2019; Oriji and Onwuegbulam, 2019). Additionally, PCOS heightens the risk of endometrial cancer in premenopausal women by threefold due to extended exposure of the endometrium to unopposed oestrogen resulting from chronic anovulation (Chen, et al., 2021; Ignatov and Ortmann, 2020).

Furthermore, it is associated with insulin resistance, increasing the chances of a person having type 2 diabetes and obesity (Ajmal, Khan and Shaikh, 2019). The disorder is also linked to hypertension, dyslipidemia and cardiovascular disease (Fazleen, Whittaker and Mamun, 2018). Moreover, women with PCOS often experience psychological disabilities such as anxiety, low self-esteem, and depression due to physical changes and comorbidities (Almeshari, et al., 2021; Coban, et al., 2019). Consequently, it reduces the quality of life (QOL) of women affected by the condition (Moghadam, et al., 2018).

Unfortunately, PCOS cannot be cured, but there are treatments to control the symptoms and prevent complications. Treatment plans are tailored based on individual symptoms and fertility desires (Abinaya, et al., 2019). These treatments include weight management, lifestyle modifications and pharmacological treatments such as hormonal contraceptives for menstrual irregularities, androgen suppressors for hirsutism and metformin for compensated hyperinsulinemia (Hinkle and Cheever, 2018; Pasquali, 2018; Kamboj and Bonny, 2017). Hence, early detection is important, as delayed diagnosis can lead to the progression of complications and hinder the implementation of lifestyle changes, which are crucial to alleviate symptoms and enhance QOL (Pasquali, 2018).

1.2 PROBLEM STATEMENT

Globally, PCOS affects approximately 5% to 18% of women in their childbearing age (Joham, et al., 2022; Ding, et al., 2017) and approximately 3% to 11% of adolescents (Naz, et al., 2019). Around 1.55 million women suffer from PCOS, with an increase of 4.47% from 2007 to 2017, whereby 0.43 million had disability-adjusted life-years (DALYs) in 2017 (Liu, et al., 2021). PCOS can begin as early as menarche but is commonly diagnosed in their twenties and thirties, with the peak age being 20 to 24 years (Motlagh Asghari, et al., 2022). Thus, university students are at higher risk of developing PCOS.

Studies revealed that despite university students being at higher risk and the potential negative impact of PCOS, still majority of the students had never heard about PCOS (Siti Normiyah Hussin and Nur Hafizah Kadir, 2020; Haq, et al., 2017; Nelson, Viswanath and Philip, 2017) and had unsatisfactory knowledge (Umaisa, et al., 2021; Srujana, Vasundhara and Miryani, 2018). The lack of awareness among university students has created a troubling situation where many of them experience the symptoms without realising they have the disorder (Siti Normiyah Hussin and Nur Hafizah Kadir, 2020; Haq, et al., 2017).

Nevertheless, the attitude of university students towards PCOS is equally concerning. Studies have shown that most of the students only seek medical advice when their condition becomes life-threatening. This hesitancy is rooted in their belief that the symptoms are not serious and do not warrant immediate attention (Al Bassam, Ali and Rahman, 2018; Haq, et al., 2017). Consequently, lack of awareness of the disorder leads to negative attitude towards medical management, which is a primary contributor to the problem (Abu-Taha, et al., 2020). Hence, it is important to conduct research on students' knowledge and attitude towards PCOS.

Furthermore, the researcher is personally interested in this study, as a few of her friends and the researcher herself have been diagnosed with PCOS. Besides, research on this topic remains limited, especially among university students in

Malaysia. Thus, the present study focuses on the knowledge level and attitude towards PCOS among female undergraduate students to bridge the research gap.

1.3 ORIGINALITY

Research on the topic of PCOS among university students started in Middle Eastern countries from 2010 to 2023. However, from 2017 to 2023, there were nine studies conducted in India, Egypt, and Indonesia, focusing on students' knowledge and attitudes towards PCOS. These studies involved higher secondary school students, nursing students and adolescent girls, and only one study was among undergraduate students. There were three studies conducted in Malaysia from 2017 to 2022 which assessed PCOS knowledge among medical students and the community. Notably, only one study specifically assessed the knowledge and attitude towards PCOS among undergraduate students, but it was conducted in Perak.

1.4 SIGNIFICANCE OF THE STUDY

Present study holds significant value as a reference for future research due to the limited research focusing on the knowledge and attitude of university students towards PCOS, especially in Malaysia. Furthermore, the study findings can be crucial in the planning of health promotion events to raise awareness about PCOS. These efforts can significantly contribute to the early detection and prevention of chronic complications and infertility, ultimately enhancing women's QOL (Ismayilova and Yaya, 2022).

Moreover, the medicine and health sciences department can utilize the study's findings to assess the need for further emphasis on this topic for health sciences students as they are future healthcare providers. Armed with good knowledge of PCOS, they can provide effective health education to increase public awareness and create a healthier community.

1.5 RESEARCH OBJECTIVES

1.5.1 GENERAL OBJECTIVES

To determine the knowledge level and attitude towards polycystic ovary syndrome among female undergraduate students in a private university in Kajang.

1.5.2 SPECIFIC OBJECTIVES

1. To determine the knowledge level towards polycystic ovary syndrome among female undergraduate students in a private university in Kajang.
2. To determine the attitude towards polycystic ovary syndrome among female undergraduate students in a private university in Kajang.
3. To determine the association between knowledge level towards polycystic ovary syndrome and socio-demographic characteristics (year of study, field of study, medical history of PCOS, family history of PCOS) among female undergraduate students in a private university in Kajang.
4. To determine the association between attitude towards polycystic ovary syndrome and socio-demographic characteristics (year of study, field of study, medical history of PCOS, family history of PCOS) among female undergraduate students in a private university in Kajang.
5. To determine the association between attitude and knowledge level towards polycystic ovary syndrome among female undergraduate students in a private university in Kajang.

1.6 RESEARCH QUESTIONS

1. What is the knowledge level towards polycystic ovary syndrome among female undergraduate students in a private university in Kajang?
2. What is the attitude towards polycystic ovary syndrome among female undergraduate students in a private university in Kajang?
3. What is the association between knowledge level towards polycystic ovary syndrome and socio-demographic characteristics (year and field of study, medical and family history of PCOS) among female undergraduate students in a private university in Kajang?
4. What is the association between attitude towards polycystic ovary syndrome and socio-demographic characteristics (year and field of study, medical and family history of PCOS) among female undergraduate students in a private university in Kajang?
5. What is the association between attitude and knowledge level towards polycystic ovary syndrome among female undergraduate students in a private university in Kajang?

1.7 HYPOTHESIS

1.7.1 NULL HYPOTHESIS

H_o1: There will be no statistically significant association between knowledge level towards polycystic ovary syndrome and socio-demographic characteristics (year and field of study, medical and family history of PCOS) among female undergraduate students in a private university in Kajang.

H_o2: There will be no statistically significant association between attitude towards polycystic ovary syndrome and socio-demographic characteristics (year and field of study, medical and family history of PCOS) among female undergraduate students in a private university in Kajang.

H_o3: There will be no statistically significant association between attitude and knowledge level towards polycystic ovary syndrome among female undergraduate students in a private university in Kajang.

1.7.2 ALTERNATIVE HYPOTHESIS

H_a1: There will be statistically significant association between knowledge level towards polycystic ovary syndrome and socio-demographic characteristics (year and field of study, medical and family history of PCOS) among female undergraduate students in a private university in Kajang.

H_a2: There will be statistically significant association between attitude towards polycystic ovary syndrome and socio-demographic characteristics (year and field of study, medical and family history of PCOS) among female undergraduate students in a private university in Kajang.

H_a3: There will be statistically significant association between attitude and knowledge level towards polycystic ovary syndrome among female undergraduate students in a private university in Kajang.

1.8 CONCEPTUAL FRAMEWORK

The conceptual framework illustrated the way the research was conducted, as shown in **Diagram 1.1**. In the present study, the socio-demographic characteristics, which are year and field of study, medical and family history of PCOS, are independent variables for specific objectives 3 and 4 because it could affect the knowledge and attitude of students.

The knowledge level on PCOS is an independent variable for the specific objective 5, as knowledge affects attitude. However, in objective 3, knowledge is dependent, as socio-demographic characteristics will affect a person's knowledge level. Attitude towards PCOS is a dependent variable in specific objectives 4 and 5, as it can change due to socio-demographic characteristics and knowledge. In **Diagram 1.1**, the two-way arrows show a possible significant association between knowledge and attitude.

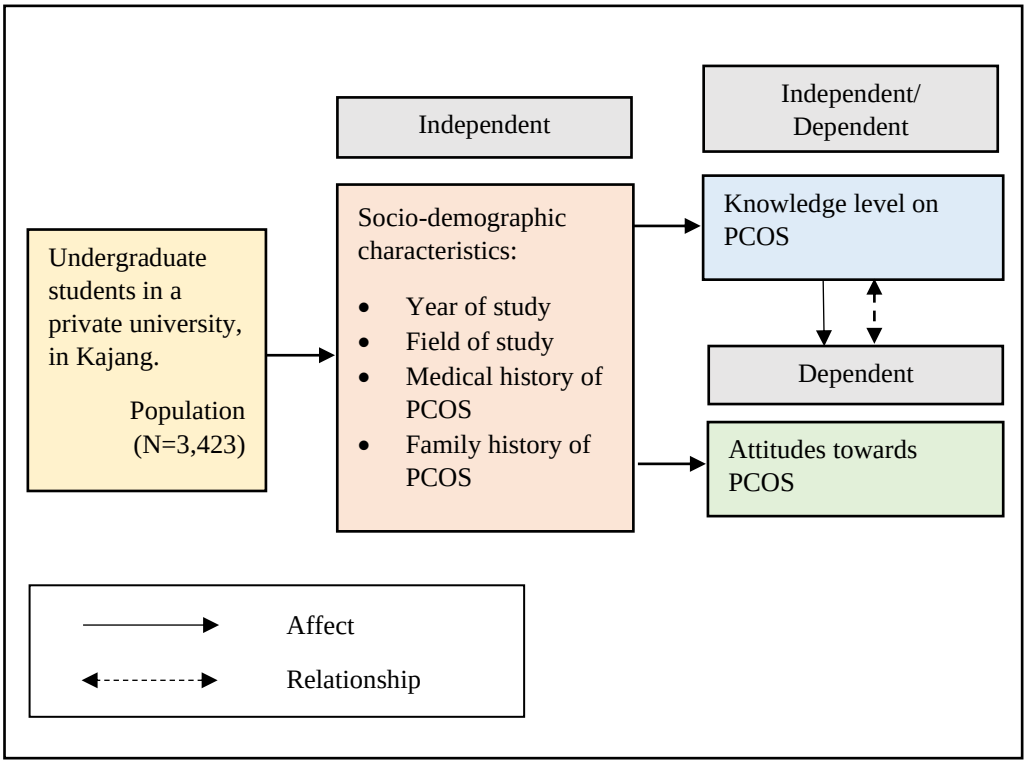


Diagram 1.1: Conceptual framework of knowledge level and attitude towards polycystic ovary syndrome among female undergraduate students in a private university in Kajang.

1.9 CONCEPTUAL AND OPERATIONAL DEFINITIONS

1.9.1 POLYCYSTIC OVARY SYNDROME

Hinkle and Cheever (2018) defined PCOS as a complex endocrine disorder that affects the hypothalamic-pituitary-ovarian (HPO) axis, leading to elevated androgen levels, chronic irregular periods, and the presence of multiple cysts on one or both ovaries.

1.9.2 KNOWLEDGE

Conceptual definition: Cambridge Dictionary (2022a) defined knowledge as the understanding of PCOS-related topics gained by an individual through experience or education.

Operational definition: The knowledge level was measured using a questionnaire adapted from Haq, et al. (2017). It consisted of 20 items with 'Yes', 'No' and 'Not Sure' options. One point was allocated for each correct response and zero for incorrect or uncertain response. The range of the total score was 0 to 20 points, and it was divided into 3 categories: Good knowledge (14-20 points), moderate knowledge (10-13 points) and poor knowledge (0-9 points).

1.9.3 ATTITUDE

Conceptual definition: Collins (2022) defined attitude as the way a person feels and thinks towards a topic or fact related to PCOS.

Operational definition: Attitude was measured using a questionnaire adapted from Jaber, et al. (2022) which consists of eight items. Items 1 to 4 were positive statements and were scored on a 5-point Likert scale, with 'strongly agree' assigned 5 points and 'strongly disagree' assigned 1 point. Items 5 to 8 were negative statements and were scored vice versa. The range of the total score was 8 to 40 points and it was divided into 2 categories: good attitude (24-40 points) and poor attitude (8-23 points) (Mohamed Reda, et al., 2022).

1.9.4 SOCIO-DEMOGRAPHIC CHARACTERISTICS

Merriam-Webster (2022) defined socio-demographics as a combination of sociological and demographic variables that characterise people in a specific sample. In the present study, the socio-demographic characteristics included year and field of study, medical and family history of PCOS.

1.9.4.1 YEAR OF STUDY

Year of study refers to the academic year in which a student is enrolled in a programme. Ordinal scale was used to measure Year 1, Year 2, Year 3, and final year.

1.9.4.2 FIELD OF STUDY

Field of study refers to an area of study that a university student focuses on during their studies. Nominal data was used to categorise participants into non-health sciences, including Lee Kong Chian Faculty of Engineering and Sciences (LKC FES), Faculty of Accountancy and Management (FAM) and Faculty of Creative Industries (FCI) and health sciences, including M. Kandiah Faculty of Medicine and Health Sciences (MK FMHS).

1.9.4.3 MEDICAL HISTORY OF PCOS

Medical history of PCOS refers to an individual who has been diagnosed with PCOS by a doctor. Nominal data was used to classify participants as diagnosed or not diagnosed with PCOS.

1.9.4.4 FAMILY HISTORY OF PCOS

Family history of PCOS refers to a family member who has been diagnosed with PCOS by a doctor. Nominal data was used to categorise participants as having or not having a family history of PCOS.

1.9.5 UNDERGRADUTE STUDENTS

Cambridge Dictionary (2022b) defined undergraduate students as individuals over the age of 18 enrolling in a bachelor's degree programme at a university.

1.9.6 PRIVATE UNIVERSITY

Private university refers to a non-governmental institution that offers higher education for secondary school leavers.

1.10 SUMMARY

In conclusion, PCOS is an endocrine disorder that can lead to lifelong complications that affect QOL. Furthermore, a lot of people are suffering from PCOS without knowing it and the complications due to PCOS can affect a person for life. Despite all this, research pertaining to this topic is very limited. Therefore, the researcher assesses the students' knowledge level and attitude towards PCOS so that appropriate interventions can be carried out to increase their awareness.

CHAPTER TWO

LITERATURE REVIEW

CHAPTER 2: LITERATURE REVIEW

2.0 CHAPTER OVERVIEW

Chapter two discusses the search strategy and literature reviews for the current study.

2.1 SEARCH STRATEGY

UTAR library, Google Scholar and Science Direct were the databases used to search for literature. Keywords including ‘knowledge’, ‘attitude’, ‘Polycystic Ovarian Disease’ OR ‘Polycystic Ovary Syndrome’ AND ‘university students’ OR ‘undergraduate students’ were used in conjunction with Boolean Operators including “AND”, “OR”, “NOT” and (“”) to refine the journal articles to be more relevant to the research topic. A total of 11,476 articles were retrieved and the articles were narrowed down by excluding those published before 2016 (n=5,437), in non-English language (n=1,795), non-academic journals source type (n=4,209) and duplicated articles (n=10). As a result, a total of 11,451 articles were excluded and 25 relevant journal articles were retrieved for literature review. The flow chart illustrating the search strategy for literature review is presented in **Diagram 2.1**.

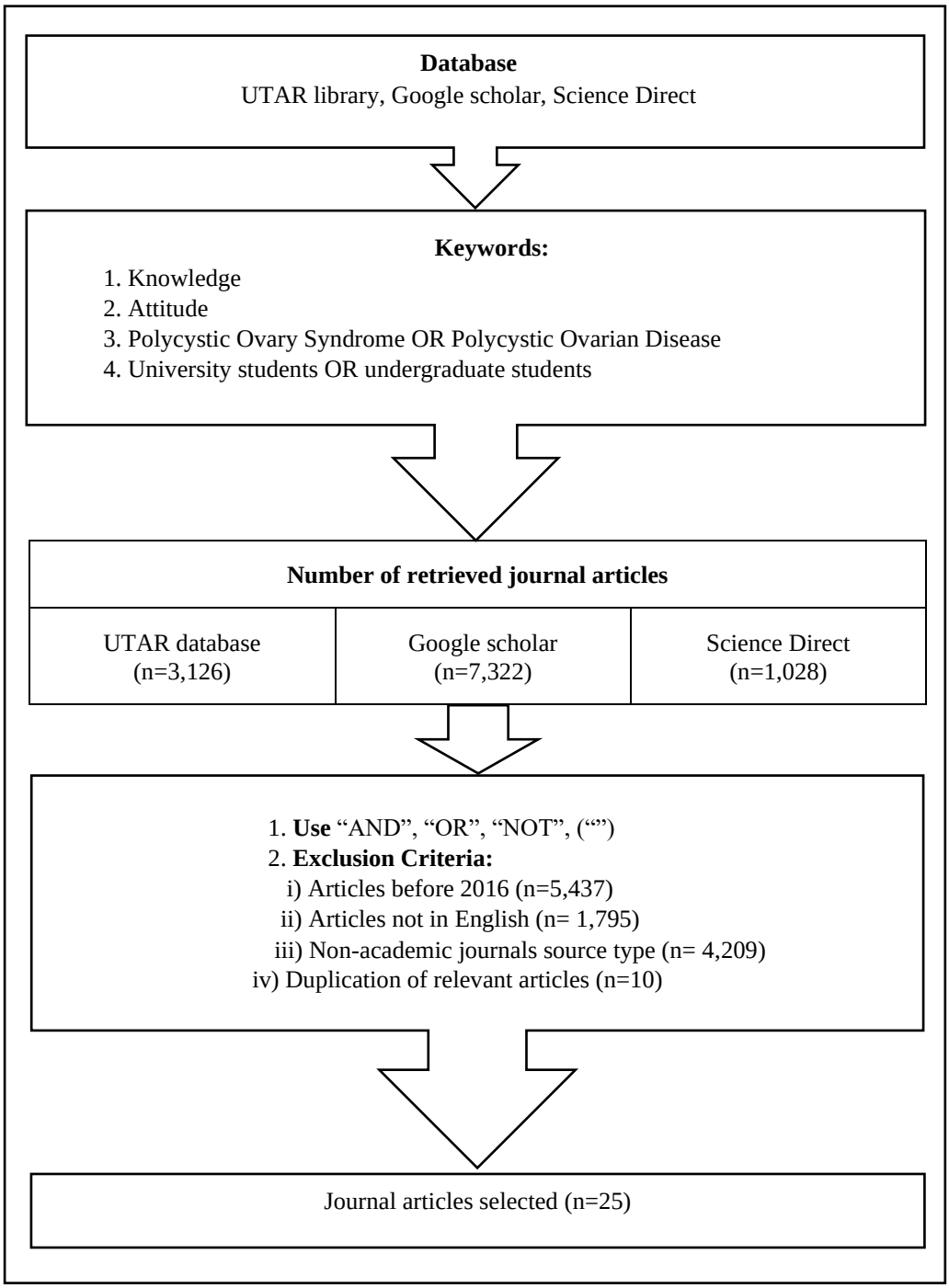


Diagram: 2.1 Search Strategy Flowchart.

2.2 REVIEW ON LITERATURE

In this section, a few themes will be discussed, including knowledge level on PCOS, attitude towards PCOS and socio-demographic characteristics (year and field of study, medical and family history of PCOS).

2.2.1 KNOWLEDGE ON POLYCYSTIC OVARY SYNDROME

Karkar, et al. (2019) reported that only 3% of the students exhibited good knowledge regarding PCOS, while majority of them (73%) had average knowledge and the remaining 24% had poor knowledge in a non-experimental descriptive study done among 100 female undergraduate students in India. The participants for this study were recruited using purposive sampling technique. Similarly, a cross-sectional study involving 260 female nursing students in Egypt revealed that majority of the participants (53.45%) had good knowledge, while 45.4% had moderate knowledge and only 1.2% had poor knowledge (Maghraby, et al., 2022).

Conversely, a mixed methodology study conducted by Siti Normiyah Hussin and Nur Hafizah Kadir (2020) among 219 male and female students from public and private universities in Malaysia revealed that 92.2% of the participants demonstrated adequate knowledge about PCOS, with only 7.8% having poor knowledge.

Overall, the existing studies have demonstrated variations in the knowledge levels regarding PCOS among undergraduate students, resulting in the need for further study to explore the gap.

2.2.2 ATTITUDE ON POLYCYSTIC OVARY SYNDROME

A quasi-experimental study conducted in India among 100 female university students revealed that 57% of the students had negative attitude towards PCOS (Gouda, Mohamady and El-Fattah, 2023). Similarly, a descriptive study among 239 adolescent girls in Egypt reported that 52.7% of the participants displayed negative attitude towards PCOS (Mohamed Reda, et al. 2022). This negative attitude could be attributed to participants having limited knowledge related to PCOS.

Al Bassam, Ali and Rahman. (2018) conducted a cross-sectional study among 350 students in Saudi Arabia. Their study reported that 56% of the students did not seek medical treatment when they experienced two or more of the PCOS symptoms because the symptoms were not serious (n=37), negligence (n=19), do not require a doctor (n=13), are due to stress (n=10), fear of being diagnosed (n=9), dislike hospital settings (n=9), busy schedule (n=8), caused by another disease (n=7) and are due to family (n=5).

Overall, the studies showed that students tend to have a negative attitude towards PCOS. A further study is needed to assess the attitude towards PCOS, especially in Malaysia and among undergraduate students, as there are very few literatures.

2.2.3 SOCIO-DEMOGRAPHIC CHARACTERISTICS

2.2.3.1 YEAR OF STUDY

Alshadaifat, et al. (2021) conducted a cross-sectional study among 1182 students from two universities in Jordan highlighted that student in year five and six exhibited higher knowledge compared to those in year one to four. This may be due to extended six-year study programs for health sciences students and the inclusion of PCOS topics in their courses. In contrast, a pre-experimental study conducted by Chauhan, Siddiqui and Chauhan (2021) among 100 female college students in India found no significant association between knowledge and year of study.

A survey among 239 adolescent girls at a university in Egypt revealed that second-year students were 3.72 times more likely to hold positive attitude towards PCOS compared to first-year students (Mohamed Reda, et al., 2022). Therefore, present study focuses on assessing the knowledge level and attitudes of students from the first year to final year.

2.2.3.2 FIELD OF STUDY

A descriptive survey involving 300 undergraduate students from two colleges in India showed participants from the science stream had higher knowledge compared to those from the arts and mathematics stream (Nelson, Viswanath and Philip, 2017).

Similarly, Patel, K. (2017) conducted a pre-experimental study among 60 adolescent girls from science, commerce, and art streams in India. The study revealed a significant association between knowledge and field of study but no significant association between attitude and field of study.

Overall, there is a lack of comparative research specifically exploring the differences between health and non-health science. Therefore, the researcher used the quota sampling technique to recruit a representative sample of participants to study the association between knowledge and attitude towards PCOS and the field of study.

2.2.3.3 MEDICAL HISTORY OF PCOS

A survey conducted among 240 Sudanese women of reproductive age revealed that participants diagnosed with PCOS were ten times more likely to possess adequate knowledge compared to those without PCOS (Alfanob, et al., 2022). Vinaykumar, et al. (2023) conducted a cross-sectional study among 106 females

in India and found that 15% of the participants had PCOS. The study displayed there was significant association between the overall knowledge, attitude, and practice (KAP) scores of PCOS and the presence of PCOS.

Tahir, et al. (2020) conducted a survey among 278 female Pakistani medical students and discovered that 11.2% of the participants had PCOS. Among these cases, 19.4% remained untreated, while the remaining 80.6% were treated using the oral contraceptive pill (39.1%), metformin (34.7%), lifestyle modification and exercise (30.4%) as well as herbal medication (4.3%). Therefore, the medical history of PCOS was studied in current research.

2.2.3.4 FAMILY HISTORY OF PCOS

Jakhar, Sen and Dutt (2022) conducted a cross-sectional study among 428 female college students at three colleges in India, which revealed that there was statistically significant association between knowledge and family history of PCOS. Among the participants, five had a family history of PCOS, and all of them are knowledgeable.

Conversely, a cross-sectional study conducted by Devi and Susila (2022) among 154 nursing students reported that there was no significant association between knowledge and attitude and family history of PCOS. This discrepancy in findings highlights a research gap concerning which family history of PCOS

may lead to better knowledge and attitude towards PCOS, as observed in previous literature.

2.2.4 ASSOCIATION BETWEEN ATTITUDE AND KNOWLEDGE LEVEL TOWARDS PCOS

A descriptive study among 239 adolescent girls in Egypt highlighted that there was a moderately positive correlation between knowledge and attitude towards PCOS ($r=0.413$, $p<0.001$) (Mohamed Reda, et al., 2022). Similarly, Sindhu and Linson (2021) conducted an experimental descriptive survey among 60 adolescent girls in India also found a moderately positive correlation between knowledge and attitude towards PCOS using Pearson correlation ($r=0.36$). These findings suggest that increasing knowledge about PCOS could lead to more positive attitudes.

This implies that educational interventions aimed at enhancing knowledge may promote favourable attitudes, potentially encouraging early diagnosis. However, further research, especially in Malaysia, is needed to comprehensively understand the association between knowledge and attitude towards PCOS.

2.3 SUMMARY

In conclusion, literature review highlighted that majority of the studies were conducted in India, as the prevalence of PCOS was higher in India compared to UK, USA, Turkey, Beijing, Sri Lanka and Spain. Furthermore, there is limited research focused on attitudes towards PCOS, especially among undergraduate students. Additionally, only one study on this topic was conducted in Malaysia. This underscores the existing gap in research literature and emphasises the need for further research on knowledge and attitude towards PCOS, particularly among university students in Malaysia.

CHAPTER THREE

METHODOLOGY

CHAPTER 3: METHODOLOGY

3.0 CHAPTER OVERVIEW

Chapter three illustrates the research design, study setting, population, sample, sampling, variables, research instrument, validity and reliability tests, pilot study, data collection procedure, ethical considerations, and Gantt chart.

3.1 RESEARCH DESIGN

A cross-sectional survey research design was used, as it is the most suitable research design for the current research topic. This design allows the researcher to collect data describing the state of a phenomenon of interest occurring in a population at one point of time (Wang and Cheng, 2020). Thus, the researcher can determine the current undergraduate students' knowledge and attitude towards PCOS in a time- and cost-effective manner.

Cross-sectional studies often conducted using questionnaires (Wang and Cheng, 2020). Therefore, the present study used a questionnaire survey to collect data on students' knowledge and attitude towards PCOS. According to Story and Tait (2019), questionnaire is an effective instrument for studying a large sample of the population and for assessing and measuring individual KAP. Furthermore, the present study was conducted in a private university, and this is the better method.

3.2 SETTING OF THE STUDY

Present study was conducted at a private university located in Sungai Long, Kajang, Malaysia, as shown in **Figure 3.1**. This private university was founded in 2002 and consists of two branches located in Sungai Long and Kampar. Sungai Long campus consists of four main faculties under the undergraduate programme, including FAM, LKC FES, FCI and MK FMHS. Currently, there are approximately 6,935 undergraduate students, around 3,423 of whom are female. Kampar campus was excluded from the present study due to its utilisation of the face-to-face method and transportation issues.

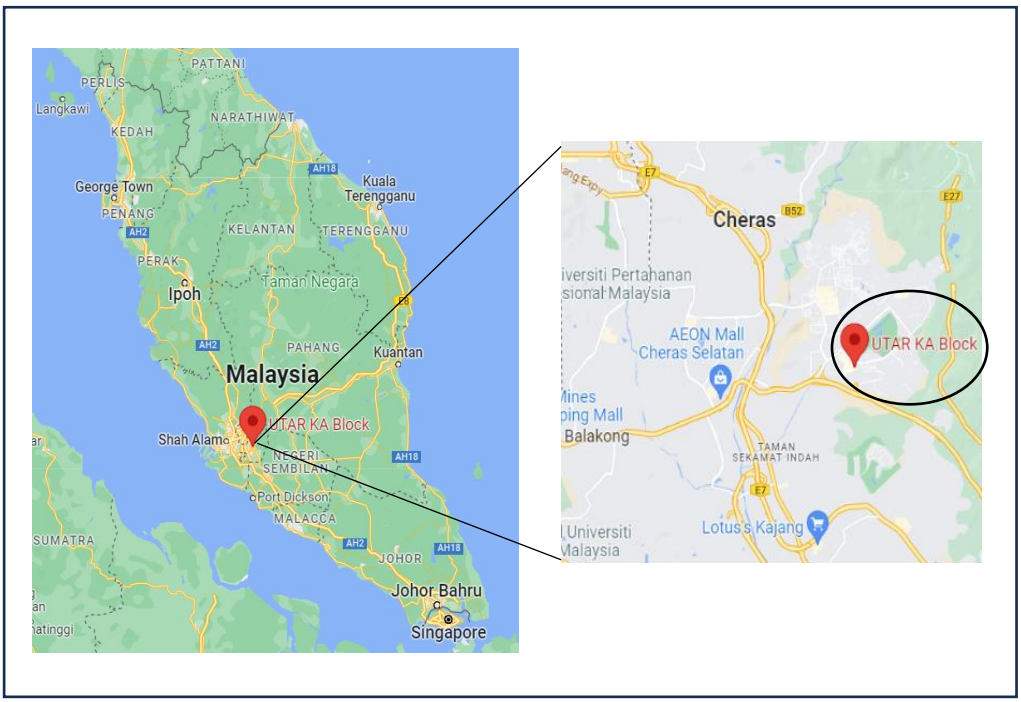


Figure 3.1: Location of the study setting.

3.3 POPULATION

3.3.1 TARGET POPULATION

All female students who are currently enrolled in a private university in Sungai Long campus, Kajang.

3.3.2 ACCESSIBLE POPULATION

Female students aged 18 to 25 enrolled in an undergraduate program including FAM, LKC FES, FCI and MK FMHS at a private university in Sungai Long campus, Kajang.

3.4 SAMPLE

Female undergraduate students aged 18 to 25 studying in their first to final year at a private university in Sungai Long.

3.5 SAMPLING

3.5.1 SAMPLING METHOD

Non-probability proportional quota sampling technique was used to recruit participants. This sampling method allows the researcher to pre-determine the characteristics and distribution of the sample, ensuring that small sample groups are appropriately representative of the population and provide sufficient statistical power for the results (Andrade, 2020; Sarstedt, et al., 2018; Etikan and Bala, 2017). Therefore, 50% of the data was collected from health sciences

students and the other 50% from non-health sciences students to ensure adequate representation of students from both fields of study. Furthermore, the number of health sciences students is smaller compared to non-health sciences, as shown in **Diagram 3.1**. Participants were recruited based on who the research was able to approach, as quota sampling uses similar recruitment techniques as convenient sampling (Etikan and Bala, 2017).

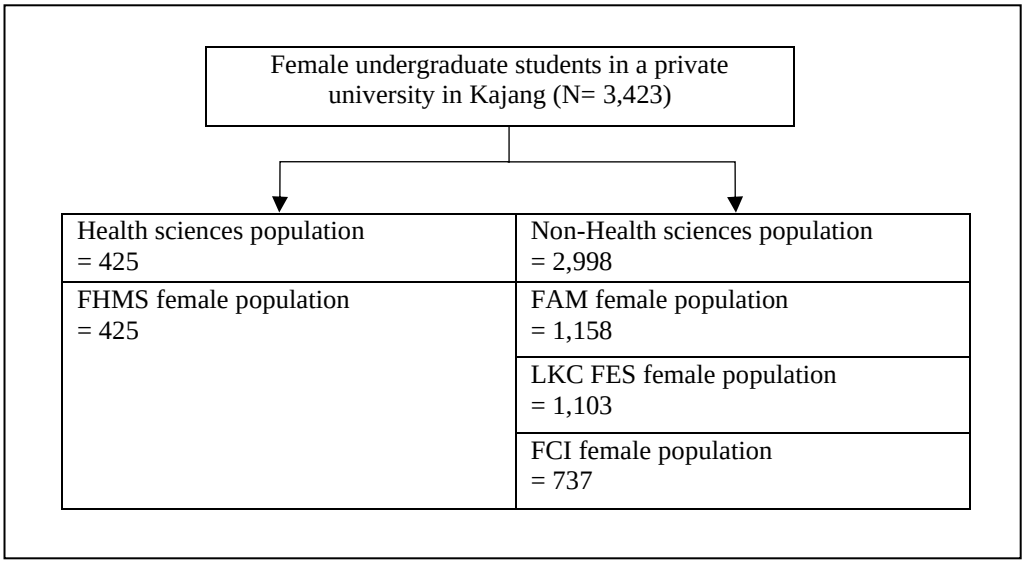


Diagram 3.1: Population distribution among female undergraduate students in a private university in Kajang based on field of study.

3.5.2 SAMPLE SIZE

Sample size was calculated using the formula developed by Krejcie and Morgan (1970), as illustrated below:

$$S = \frac{x^2 \mathrm{NP}(1 - \mathrm{P})}{d^2\ (\mathrm{N} - 1) + x^2(1 - P)}$$

S = Sample size

x^2 = Chi-square of degree of freedom 1 and confidence 95%= 3.841

N = Undergraduate female population size = 3,423

P = Prevalence from previous studies= 0.48 (Nelson, Viswanath and Philip, 2017)

d = Margin of error =5% = 0.05

By applying the formula,

$$S = \frac{x^2 \mathrm{NP}(1 - \mathrm{P})}{d^2\ (\mathrm{N} - 1) + x^2(1 - P)}$$

$$= \frac{3.841(3423)(0.48)(1-0.48)}{0.05^2(3423-1)+3.841(1-0.48)}$$

= 311 + 0.2 (311)

Total sample size = 373

According to Nelson, Viswanath and Philip (2017), 48% of 300 undergraduate students in India had poor knowledge regarding PCOS. The prevalence for this study was used because it is the closest country to Malaysia. The sample size is 311. An additional 20% of the sample size is added due to attrition rates (Vallejo, et al., 2019). Therefore, the total sample size is 373.

Quota sample

Quota sample was calculated as shown below:

Health Sciences female sample

$$373\ (total\ sample\ size) \div 50\% = 186$$

MK FMHS is the only health sciences faculty at the private university in Kajang. Therefore, 50% of the health sciences female sample was represented by 186 participants from MK FMHS.

Non-health Sciences female sample

$$373\ (total\ sample\ size) \div 50\% = 187$$

FAM, LKC FES and FCI are the non-health science faculty at the private university in Kajang. Therefore, 50% of the non-health sciences female sample was represented by 187 participants from these three faculties. They were recruited proportionally based on their respective faculty female populations to ensure equal representation in the final sample, as demonstrated by the detailed calculations below.

FAM

$$\frac{1158\ (FAM\ female\ population)}{2998\ (Total\ non-health\ sciences\ female\ population)} \times 224\ (total\ non-health\ sciences\ sample\ size) = 72$$

LKC FES

$$\frac{1103\ (LKC\ FES\ female\ population)}{2998\ (Total\ non-health\ sciences\ female\ population)} \times 224 = 69$$

FCI

$$\frac{737\ (FCI\ female\ population)}{2998\ (Total\ non-health\ sciences\ female\ population)} \times 224 = 46$$

The total sample size for the present study is 373, which is an odd number and resulted in an uneven distribution of participants between health and non-health sciences, despite the targeted aim for a balanced 50% representation in each field. Consequently, 186 participants were recruited from the health sciences (FMHS) and 187 from non-health sciences (72 of them from FAM, 69 from LKC FES and 46 from FCI), as illustrated in **Diagram 3.2**.

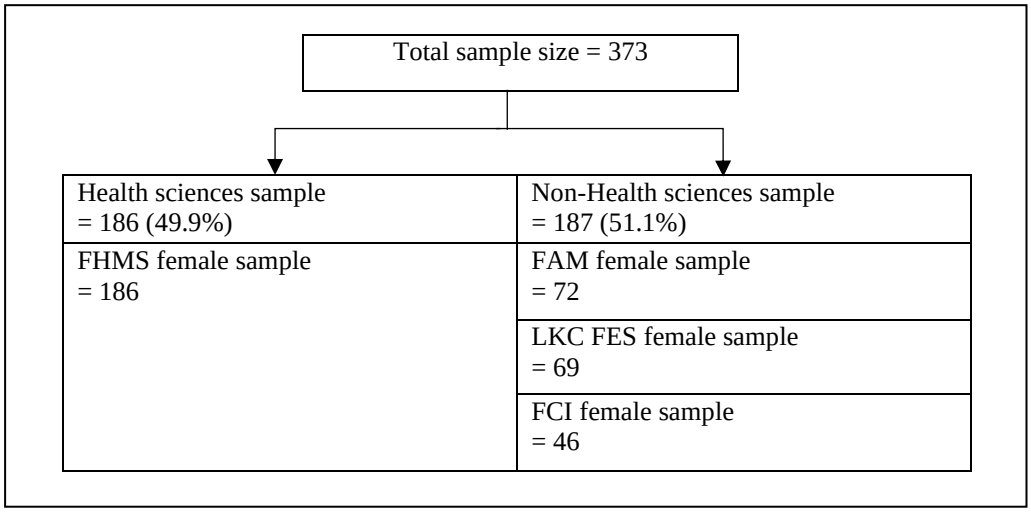


Diagram 3.2: Sample Size for Main Study using Quota Sampling.

3.5.3 SAMPLING CRITERIA

3.5.3.1 INCLUSION CRITERIA

- Female undergraduate students who are studying in a private university in Kajang
- Age between 18 and 25 years.
- Consented to participate in the study.

3.5.3.2 EXCLUSION CRITERIA

- Male students
- Female foundation and postgraduate (Master and PhD) students
- Below 18 years and above 25 years.
- Refuse to participate in the study.

3.6 VARIABLES

3.6.1 INDEPENDENT VARIABLES

Independent variable is a variable that stands by itself and is unaffected by other variables (Polit and Beck, 2018). Therefore, the independent variables for specific objectives 3 and 4 are socio-demographic characteristics (year and field of study, medical and family history of PCOS) as these characteristics may influence students' knowledge and attitude towards PCOS. Moreover, knowledge level is an independent variable for specific objective 5 because it can affect students' attitudes.

3.6.2 DEPENDENT VARIABLES

Dependent variable is an outcome that depends on an independent variable (Polit and Beck, 2018). Knowledge level is the dependent variable for specific objective 3, as it can be affected by socio-demographic characteristics. Besides, attitude is the dependent variable for specific objectives 4 and 5, as it can change due to socio-demographic characteristics and knowledge.

3.7 RESEARCH INSTRUMENT

A self-reported, closed-ended and structured questionnaire was used in the present study. It consisted of 3 sections and is attached in **Appendix B**.

3.7.1 SECTION A: SOCIO-DEMOGRAPHIC VARIABLES

Section A assessed the participant's socio-demographic data. It consisted of five items including age, year and field of study, medical and family history of PCOS.

3.7.2 SECTION B: KNOWLEDGE ON PCOS

Section B assessed the participants' level of knowledge regarding PCOS using a questionnaire adapted from Haq, et al. (2017). The questionnaire consisted of 20 items covering the definition, risk factors, signs and symptoms, diagnosis, complications and treatments of PCOS.

Each item has ‘Yes’, ‘No’ and ‘Not Sure’ options. One point was given for each correct response and incorrect or uncertain response was given zero points. The maximum point that can be achieved is 20 and the minimum is 0. When the total score for knowledge was ≥70% (14-20 points), <70% (10-13 points) and <50% (0-9 points), it was categorised as good, moderate, and poor knowledge, respectively (Thabet, et al., 2021). The scoring system was based on previous research conducted by Thabet, et al. (2021) who also used the same questionnaire developed by Haq, et al. (2017), but with distinct point categorizations.

3.7.3 SECTION C: ATTITUDE TOWARDS PCOS

Section C assessed the participant’s attitude towards PCOS using a questionnaire adopted from Jaber, et al. (2022). The questionnaire consisted of eight items and each item was measured using a 5-point Likert scale with ‘strongly agree’, ‘agree’, ‘neutral’, ‘disagree’ and ‘strongly disagree’.

Items 1 to 4 were positive statements and items 5 to 8 were negative statements. Positive statements were assessed using a 5-point Likert scale with ‘strongly agree’, ‘agree’, ‘neutral’, ‘disagree’ and ‘strongly disagree’. Points allocated were 5 for ‘strongly agree’ and 1 for ‘strongly disagree’. Negative statements were scored vice versa. The range of the total score was 8 to 40 points. The scoring was categorised as good attitude when the total score was ≥60% (24-40 points) and poor attitude when the total score is <60% (8-23 points) (Mohamed Reda, et al., 2022).

3.8 VALIDITY AND RELIABILITY

3.8.1 CONTENT VALIDITY

Content validation ensures the adequacy of the instrument in assessing the intended domains, which in present study are knowledge and attitude towards PCOS (Yusof, 2019). Therefore, it was done by sending the questionnaire to one internal expert and one external expert. Amendments were made to the wording, grammar, and explanations of the terms in accordance with their suggestions, as shown in **Appendix G**.

3.8.2 RELIABILITY

Reliability refers to the consistency and stability of the questionnaire (Taherdoost, 2016). The reliability test for the present study was conducted after the pilot study. According to Taber (2018) and Vaske, Beaman and Sponarski (2017), Cronbach's alpha is a suitable indicator for assessing the internal consistency of both the knowledge test items, which include the 'Yes', 'No' and 'Not sure' options used in **Section B** of the questionnaire and the attitude scale items, such as the Likert scale used in **Section C**.

As a result, the reliability of the questionnaires for **Section B** and **Section C** were examined using Cronbach's alpha. The Cronbach's alpha coefficient for **Section B** was found to be 0.797, which closely resembled the original questionnaire's coefficient of 0.799 as reported by Haq, et al. (2017). The Cronbach's alpha for Section C was calculated as 0.630, while the original questionnaire from Jaber,

et al. (2022) yielded a coefficient of 0.714. The variance in values may have resulted from the previous study assessed the overall Cronbach's alpha for both sections combined, resulting in a single Cronbach's alpha value. However, the present study used two separate questionnaires. According to Singh (2017), an acceptable Cronbach's alpha value typically falls within the range of 0.70 to 0.80. However, values above 0.60 have also been considered acceptable (Taber, 2018; Gallais, et al., 2017). Hence, based on **Table 3.1**, both the questionnaires used in **Section B** and **Section C** of this study demonstrated acceptable levels of reliability.

Table 3.1: Summary of reliability test

Section	Cronbach's Alpha	
	Original Study	Current Study
Section B	0.799 (Haq, et al., 2017)	0.797
Section C	0.714 (Jaber, et al., 2022)	0.630

3.9 PILOT STUDY

Pilot study was conducted from 7 August 2023 to 8 August 2023 after obtaining ethical approval from the UTAR Ethical Board. It has been conducted to evaluate the feasibility and applicability of the study instrument as well as identified potential problems before the main study, allowing for modifications to enhance its quality and efficiency (In, 2017; Polit and Beck, 2017). A total of 37 participants, accounting for 10% of the total sample size, were recruited using proportional quota sampling method and the calculation process is shown in **Diagram 3.3**. These participants were excluded from the main study to prevent results from being duplicated. No changes were made to the instrument for the main study as no problem was encountered during pilot study.

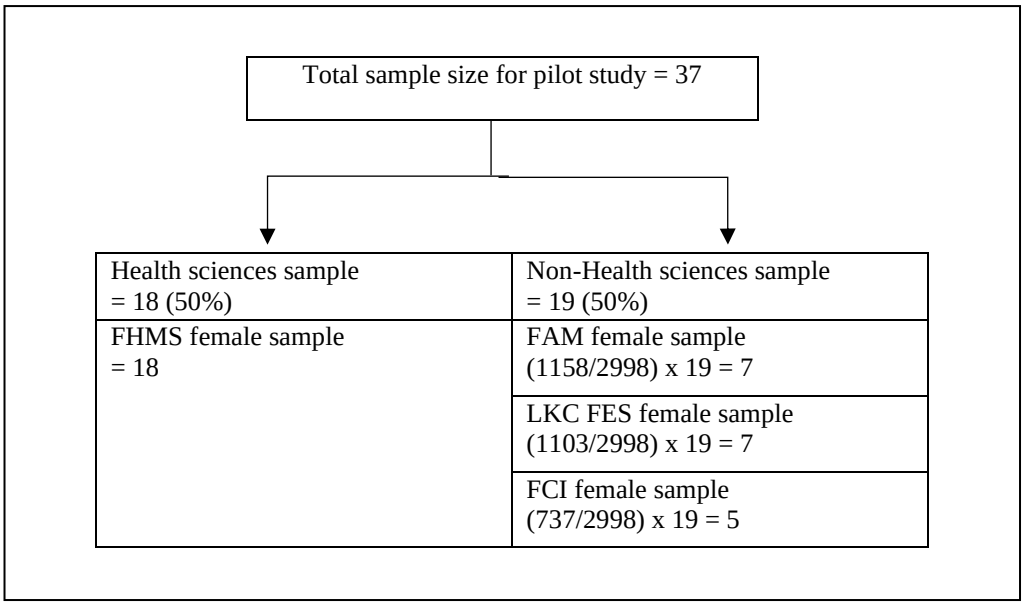


Diagram 3.3: Sample Size for Pilot Study using Quota Sampling.

3.10 DATA COLLECTION PROCEDURE

Data collection for the main study was conducted from 13 August 2023 to 22 August 2023, using face-to-face approach. Before collecting data, participants were provided with both verbal and written explanations regarding the study's objectives and significance, aimed at ensuring understanding (**Appendix C**). Once explanation was given, participants were required to provide their signature, indicating their agreement and acknowledgment of the consent form (**Appendix A**) and the university's Personal Data Protection Statement (**Appendix F**).

Participants were given the opportunity to seek clarification on any uncertainties during the questionnaire's completion. According to Ball (2019), face-to-face approaches allow for question clarification, thereby ensuring the high quality of the data collected. Upon submission of the questionnaire, the researcher counter-checked the questionnaires to confirm the completion of all questions, minimising missing data. Participants were also provided with brief information about PCOS to increase their awareness and understanding of the topic after data collection. Collected data were cleaned and analysed using SPSS version 29 and a report for the findings were prepared.

3.11 ETHICAL CONSIDERATION

3.11.1 UNIVERSITY ETHICAL BOARD AND COMMITTEE

Letter for approval to conduct research was submitted to the university's ethical board before commencing the pilot study. Approval was obtained on 3 August 2023, as attached in **Appendix E**.

3.11.2 PERMISSION TO USE INSTRUMENT

Permission to use the instruments from Haq, et al. (2017) and Jaber, et al. (2022) was obtained via email on the 7 February 2023 and the 8 December 2022, respectively (**Appendix D**).

3.11.3 CONSENT INFORMATION

Informed consent was obtained from every participant prior to data collection (**Appendix A**). Detailed information on the research title, purpose, recruitment criteria and protection of their privacy and confidentiality was explained and provided in written form. Participants were informed of their right to withdraw from the study at any point in time and they were assured that their participation would not result in any harmful effects. Although the consent form included participants' names, a code number was assigned to the data collection form. After conducting a comprehensive check for missing data, the consent form was promptly separated from the form. This process guarantees the preservation of participants' anonymity and confidentiality. Hardcopy data were stored in a locked cabinet, and softcopy data were encrypted, with only the researcher having access to the password. Data will be retained for seven years before being disposed.

3.12 GANTT CHART

A Gantt chart of the research plan is shown in **Appendix H**. It is a project management tool which enables the researcher to plan and monitor the progress of tasks to ensure optimal completion of project activities.

3.13 SUMMARY

In conclusion, a cross-sectional survey was conducted as it was suitable for the present research topic. A proportional quota sampling technique was used to recruit 373 participants who met the inclusion criteria. The questionnaire was distributed via face-to-face approach and the collected data was analysed using SPSS version 29.

CHAPTER FOUR

DATA ANALYSIS AND RESULT

CHAPTER 4: DATA ANALYSIS AND RESULT

4.0 CHAPTER OVERVIEW

Chapter four illustrates the data analysis findings in accordance with the research objective and the sociodemographic characteristic.

4.1 TYPE OF ANALYSIS

4.1.1 DESCRIPTIVE ANALYSIS

The variables in the present study, such as socio-demographic characteristics (year and field of study, medical and family history of PCOS), knowledge level and attitude towards PCOS are in categorical data. Descriptive analytics are used to measure categorical data and presented as percentage and frequency (Mishra, et al., 2019) to address specific objectives one and two.

4.1.2 INFERENTIAL ANALYSIS

Inferential analysis was used to analyse the collected data for specific objectives three, four, and five. Even though the collected data was categorical, the chi-square test was used for data analysis. According to Nihan (2020) and Schober, and Vetter (2019), the chi-square test can be used to analyse associations between two categorical data, as in the present study. Data for three specific objectives was presented in a cross-tabulation as frequency, percentage, chi-square value (x^2) and p values.

4.2 STATISTICAL DATA PROCESSING AND ANALYSIS

A total of 373 questionnaires were distributed via a face-to-face approach, and all of them were successfully collected, yielding a 100% response rate. Data cleaning was conducted, and no missing data was identified as the researcher counter-checked the questionnaires upon submission. Descriptive statistics and chi-square test to derive research findings using SPSS version 29. A 95% confidence interval was selected, and statistical significance was determined if the p-value was below 0.05.

4.3 RESULTS

4.3.1 SOCIO-DEMOGRAPHIC CHARACTERISTICS OF THE PARTICIPANTS

The socio-demographic characteristics of the participants were year of study, field of study, medical history, and family history of PCOS. The distribution of the participants across various socio-demographic characteristics was reported using descriptive analysis and presented in frequency and percentage, as shown in **Table 4.1**.

Table 4.1: Frequency and percentage distribution of participants based on socio-demographic characteristics (n=373).

Socio-demographic Characteristics	Frequency (f)	Percentage (%)
Year of Study		
Y1	99	26.5
Y2	99	26.5
Y3	90	24.1
Final Year	85	22.8
Field of Study		
Health Sciences	186	49.9
Non-Health Sciences	187	50.1
Medical history of PCOS		
No	354	94.9
Yes	19	5.1
Family History of PCOS		
No	360	96.5
Yes	13	3.5

Based on **Table 4.1**, participants were equally divided between health and non-health sciences due to the use of the quota sampling technique. This resulted in a balanced 50% representation across all socio-demographic characteristics, including year of study, field of study, medical history, and family history of PCOS.

Year of study was divided into Year 1, Year 2, Year 3 and final year. More than one-fourth of the participants, 99 (26.5%), were from Year 1 and Year 2 each, and less than one-fourth of the participants, 90 (24.1%) and 85 (22.8%), were from Year 3 and the final year, respectively.

Fields of study were classified into health and non-health sciences. Nearly half, 186 (49.9%), and half,187 (50.1%), of the participants were from health and non-health sciences, respectively. Where else, medical and family histories of PCOS were grouped as either having or not having the condition. Among the participants, less than one-tenth of the participants, 19 (5.1%) and 13 (3.5%), reported being medically diagnosed with PCOS and had a family history of PCOS, respectively.

4.3.2 KNOWLEDGE LEVEL TOWARDS PCOS

This section answers research question one: 'What is the knowledge level towards PCOS among female undergraduate students in a private university in Kajang?'.

4.3.2.1 FREQUENCY AND PERCENTAGE OF CORRECT AND INCORRECT ANSWERS REGARDING KNOWLEDGE ON PCOS

A total of 20 items with options of 'Yes', 'No', and 'Not sure' were created with the intent of testing participants' familiarity with PCOS. Collected data was classified into correct and incorrect categories, whereby 'Yes' was in the correct category and those who responded 'No' and 'Not sure' were in the incorrect category. The distribution of correct and incorrect categories for each item is shown in **Table 4.2,** along with frequency and percentage. Significant findings obtained from the table were subsequently discussed.

Table 4.2: Frequency and percentage of participants' responses on knowledge of PCOS (n=373)

	Items	Frequency (Percentage) f (%)	
		Correct	Incorrect
2.1	Have you heard about the term called "polycystic ovary syndrome" (PCOS)?	245 (65.7)	128 (34.3)
2.2	Have you heard about androgen (male) hormone (e.g. testosterone)?	309 (82.8)	64 (17.2)
2.3	In PCOS there is an increased level of androgen hormone.	142 (38.1)	231 (61.9)
2.4	Patient suffering from PCOS have small multiple cysts (a growth filled with liquid) in their ovaries.	269 (72.1)	104 (27.9)
2.5	Obesity may cause PCOS.	138 (37.0)	235 (63.0)
2.6	Prediabetes condition (due to decreased insulin action in body/ increase level of insulin) may cause PCOS.	116 (31.1)	257 (68.9)
2.7	Irregular or absence of menstrual (periods) cycle is a symptom of PCOS.	301 (80.7)	72 (19.3)
2.8	Unusual amount of hair growth on different body parts (upper lip, chin, abdomen, breast, thighs etc.) is a symptom of PCOS.	174 (46.6)	199 (53.4)
2.9	Severe acne problem during menstrual (periods) cycle is a symptom of PCOS.	182 (48.8)	191 (51.2)
2.10	Hair loss from scalp more than normal is a symptom of PCOS.	133 (35.7)	240 (64.3)
2.11	PCOS diagnosis can be confirmed by abdominal ultrasound.	255 (68.4)	118 (31.6)
2.12	Specific blood test can be used for diagnosis of PCOS.	180 (48.3)	193 (51.7)
2.13	PCOS may lead to diabetes (long-term high blood sugar level).	85 (22.8)	288 (77.2)
2.14	PCOS may lead to heart diseases.	51 (13.7)	322 (86.3)
2.15	PCOS may lead to infertility (inability to have children) or reduced fertility (reduced chance to get pregnant).	333 (89.3)	40 (10.7)
2.16	PCOS may lead to anxiety and depression.	273 (73.2)	100 (26.8)
2.17	Hormonal therapy (oral contraceptives, hormone intrauterine device etc.) may be used to treat PCOS.	245 (65.7)	128 (34.3)
2.18	Anti-diabetic medications (metformin) may be used to treat PCOS.	83 (22.3)	290 (77.7)
2.19	Symptomatic treatment (clomiphene, letrozole, acne topical cream etc.) may be given to relief the symptoms of PCOS.	162 (43.4)	211 (56.6)
2.20	Surgery may be used to remove the ovarian cysts.	270 (72.4)	103 (27.6)

Table 4.2 highlighted that majority of the participants correctly answered 9 out of the 20 questions. Around two-thirds of the participants, 245 (65.7%), had heard about PCOS, and over four-fifths of the participants, 309 (82.8%), were aware of the androgen hormone. More than three-fifths of the participants, 231 (61.9%), were not aware that PCOS increases androgen levels. Approximately three-fourths of the participants, 269 (72.1%), correctly identified that PCOS patients exhibit small, multiple cysts in their ovaries. Nearly one-third of the participants, 138 (37.0%) and 116 (31.1%), were aware of obesity and prediabetes as possible causes of PCOS, respectively.

Around four-fifths of the participants, 301 (80.7%), agreed that irregular menstruation is a symptom of PCOS. Conversely, nearly half of the participants, 199 (53.4%) and 191 (51.2%), were unaware of signs like atypical hair growth on different body areas and severe acne throughout the menstrual cycle, respectively. More than three-fifths of the participants, 240 (64.3%), did not know hair loss was a symptom of PCOS. Over two-thirds of the participants, 255 (68.4%), acknowledged that abdominal ultrasound is a diagnostic test to confirm PCOS, while almost half of the participants, 193 (51.7%), reported they were not aware that some specific blood tests are used to diagnose PCOS.

Items 13, 14, and 18, related to PCOS complications and treatments, had the highest number of incorrect responses. Over one-fifth, 85 (22.8%), and more than one-tenth, 51 (13.7%), of the participants were aware that PCOS can result in diabetes and heart disease, respectively. More than three-fourths of the participants, 333 (89.3%), know that PCOS may cause infertility, and approximately three-fourths of the participants, 273 (73.2%), indicated that PCOS might lead to anxiety and depression. Around two-thirds of the participants, 245 (65.7%), knew that hormonal treatment can treat PCOS. Approximately one-fourth of the participants, 83 (22.3%), believed that PCOS may be treated with anti-diabetic drugs. More than two-fifths of the participants, 162 (43.4%), knew that treatments such as clomiphene, letrozole, and acne topical cream can be used to alleviate PCOS symptoms. Nearly three-fourths of the participants, 270 (72.4%), were aware that ovarian cysts can be removed surgically.

4.3.2.2 FREQUENCY AND PERCENTAGE OF PARTICIPANTS' KNOWLEDGE LEVEL TOWARDS PCOS

Participants' knowledge levels were determined based on the scores given for their answers in the questionnaire. Subsequently, the scores were categorized as good knowledge (14-20 points), moderate knowledge (10-13 points) and poor knowledge (0-9 points) (Thabet, et al., 2021). The distribution of participants' knowledge level was displayed in frequency and percentage, as shown in **Figure 4.1**.

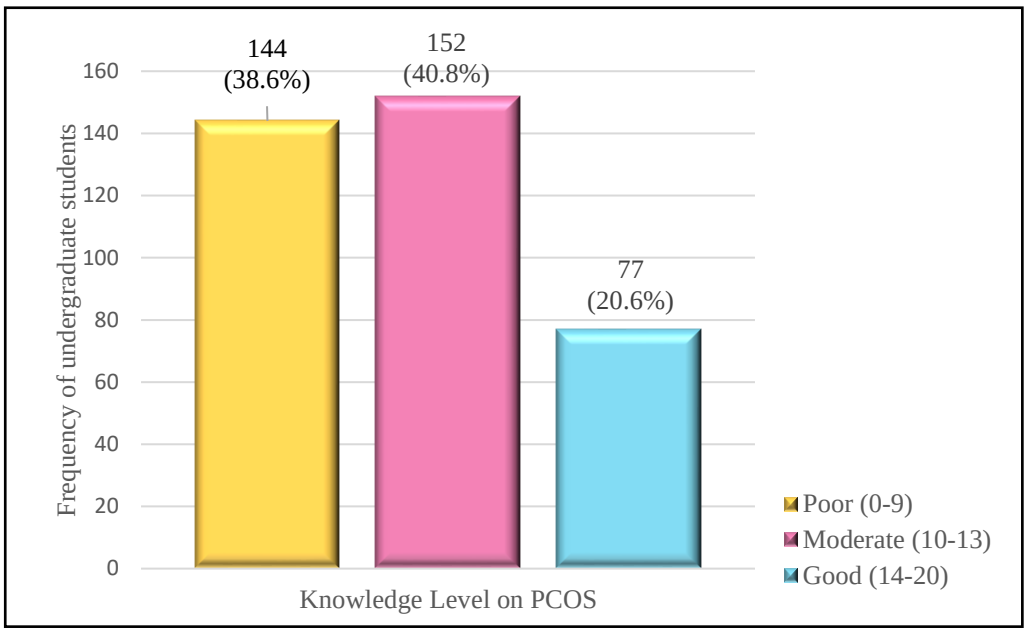


Figure 4.1: Frequency and percentage of participants' knowledge level towards PCOS (n=373)

Based on **Figure 4.1**, majority of the participants, 152 (40.8%), demonstrated moderate knowledge of PCOS. Approximately one-third of the participants, 144 (38.6%), have poor knowledge. One-fifth of the participants, 77 (20.6%), had good knowledge.

4.3.3 ATTITUDE TOWARDS PCOS

This section answered research question two: 'What is the attitude towards PCOS among female undergraduate students in a private university in Kajang?'.

4.3.3.1 FREQUENCY AND PERCENTAGE OF PARTICIPANTS' RESPONSES REGARDING ATTITUDE TOWARDS PCOS

A total of 8 items assessed participants' attitudes towards PCOS using a 5-point Likert scale. The frequency and percentage of participants' responses on this scale are illustrated in **Table 4.3**.

Table 4.3: Frequency and percentage of participants' responses on attitude towards PCOS (n=373)

	Items	Frequency (Percentage) f (%)				
	In case I or someone I know was diagnosed with polycystic ovary syndrome, I would	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
3.1	Take it seriously and will consult a doctor.	0 (0.0)	2 (0.5)	9 (2.4)	88 (23.6)	274 (73.5)
3.2	Use hormone regulating herbs.	4 (1.1)	35 (9.4)	154 (41.3)	126 (33.8)	54 (14.5)
3.3	Need a lifetime treatment.	2 (0.5)	37 (9.9)	119 (31.9)	149 (39.9)	66 (17.7)
3.4	Need emotional support.	2 (0.5)	6 (1.6)	28 (7.5)	131 (35.1)	206 (55.2)
3.5	Have difficulty in conceiving a child in later life.	3 (0.8)	15 (4.0)	116 (31.1)	168 (45.0)	71 (19.0)
3.6	Will develop low self-esteem.	16 (4.3)	47 (12.6)	118 (31.6)	141 (37.8)	51 (13.7)
3.7	Feel depressed.	10 (2.7)	29 (7.8)	88 (23.6)	180 (48.3)	66 (17.7)
3.8	Have affect my study negatively.	31 (8.3)	69 (18.5)	105 (28.2)	121 (32.4)	47 (12.6)

Table 4.3 demonstrated that approximately three-fourths, 274 (73.5%), and one-fifth (23.6%), of the participants strongly agreed and agreed, respectively, with taking a PCOS diagnosis seriously and seeking medical advice. More than two-fifths, 154 (41.3%), and one-third, 126 (33.8%), of the participants opted for a neutral stance and agreed, respectively, towards the usage of hormone-regulating herbs for PCOS treatment. More than half of the participants either agreed or strongly agreed, 149 (39.9%), and 66 (17.7), and another one-third, 119 (31.9%), took a neutral stance to undergo lifetime treatment for PCOS. Majority of the participants, 206 (55.2%) strongly agreed and 131 (35.1%) agreed on the necessity of receiving emotional support following a PCOS diagnosis.

Despite the four good responses to the above statements, the participants similarly scored higher for negative attitude too. More than half of the participants, 168 (45%) agreed and 71 (19%) strongly agreed with the statement that they might encounter difficulties in conceiving a child in later part of their lives. Another negative statement that the diagnosis of PCOS reduce the self-esteem similarly half of the participants, 141 (37.8%) and 51 (13.7%) agreed and strongly agreed, respectively. More than three-fifths of the participants, 180 (43.3%) agreed and 66 (17.7%) strongly agreed that a PCOS diagnosis could trigger feelings of depression. Around two-thirds of the participants, 121 (32.4%) agreed and 47 (12.6%) strongly agreed that PCOS could adversely affect their academic pursuits. While more than one-fifth of the participants, 105 (28.2%), took a neutral stance on this statement.

4.3.3.2 FREQUENCY AND PERCENTAGE OF PARTICIPANTS' ATTITUDE TOWARDS PCOS

Participants' attitudes were assessed based on their attitude scores from the questionnaire and subsequently categorised into good attitude (24-40 points) and poor attitude (8-23 points) (Mohamed Reda, et al., 2022). The distribution of participants' attitudes was displayed in frequency and percentage, as shown in **Figure 4.2**.

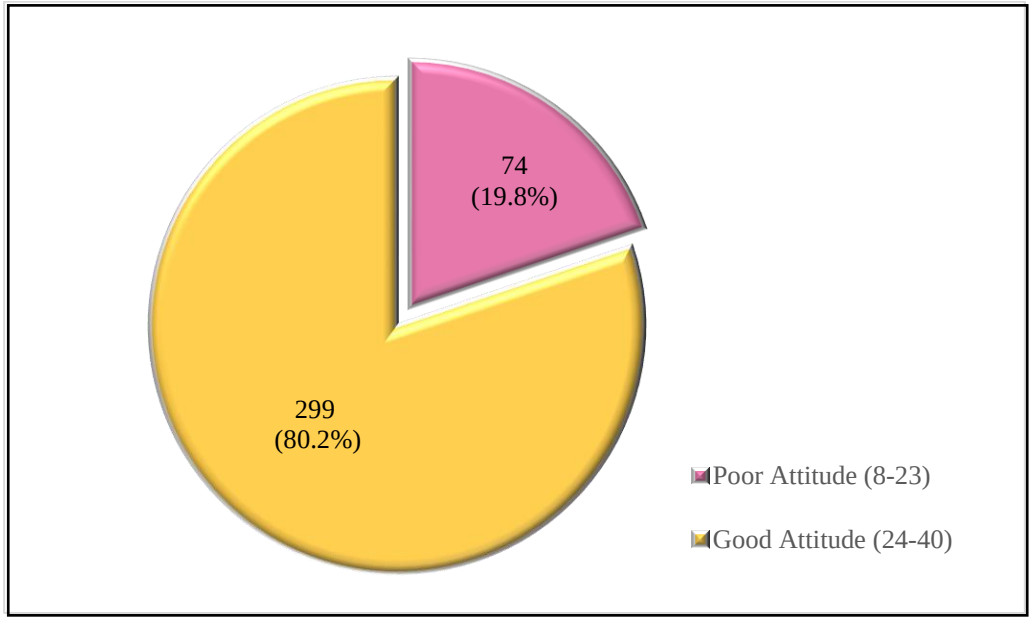


Figure 4.2: Frequency and percentage of participants' attitude towards PCOS (n=373)

Figure 4.2 showed majority of the participants, 299 (80.2%), demonstrated good attitude towards PCOS while around one-fifth of the participants, 74 (19.8%), exhibited poor attitude.

4.3.4 ASSOCIATION BETWEEN KNOWLEDGE LEVEL TOWARDS PCOS AND SOCIO-DEMOGRAPHIC CHARACTERISTICS

This section answered research question three: 'What is the association between knowledge level towards PCOS and socio-demographic characteristics (year and field of study, medical and family history of PCOS) among female undergraduate students in a private university in Kajang?'. Data was analysed using chi-square test and presented in a cross-tabulation as frequency, percentage, chi-square value (x^2) and p value, as shown in **Table 4.4**.

Table 4.4 Association between knowledge level towards PCOS and socio-demographic characteristics (n=373)

Socio-demographic characteristics	Knowledge level Frequency (Percentage)			x^2	*P* value
	Poor f (%)	Moderate f (%)	Good f (%)		
Year of Study					
Y1	62 (62.6)	26 (26.3)	11 (11.1)	57.744	<0.001*
Y2	37 (37.4)	50 (50.5)	12 (12.1)		
Y3	26 (28.9)	45 (50.0)	19 (21.1)		
Final Year	19 (22.4)	31 (36.5)	35 (41.2)		
Field of Study					
Health Sciences	31 (16.7)	88 (47.3)	67 (36.0)	92.677	<0.001*
Non-Health Sciences	113 (60.4)	64 (34.2)	10 (5.3)		
Medical history of PCOS					
No	141 (39.8)	146 (41.2)	67 (18.9)	13.036	0.001*
Yes	3 (15.8)	6 (31.6)	10 (52.6)		
Family History of PCOS					
No	141 (39.2)	149 (41.4)	70 (19.4)	9.067	0.011*
Yes	3 (23.1)	3 (23.1)	7 (53.8)		

** Chi-square test, significance level at p<0.05*

Based on **Table 4.4**, nearly two-thirds of the Year 1 students, 62 (62.6%), had poor knowledge, whereas exactly half of the Year 2 and Year 3 students, 50 (50.5%) and 45 (50.0%), respectively, exhibited moderate knowledge. Conversely, more than two-fifths of the final-year students, 35 (41.2%), had good knowledge. The highest prevalence of good knowledge was among final-year students, 35 (41.2%), followed by Year 3 students, 19 (21.1%), Year 2 students, 12 (12.1%), and Year 1 students, 11 (11.1%). Findings showed there was statistically significant association between knowledge level and year of study [x^2 (1, n=373) =57.744, p<0.001], as the p-value, <0.001, was below the tabulated value.

Approximately half of the participants from the health sciences field, 88 (47.3%), had moderate knowledge, whereas 31 (16.7%) had poor knowledge and the remaining 67 (36.0%) exhibited good knowledge. Conversely, three-fifths of participants from the non-health sciences, 113 (60.4%), possessed poor knowledge, while 10 (5.3%) had good knowledge and the remaining 64 (34.2%) had moderate knowledge. A higher prevalence of good knowledge was observed among health sciences participants, 67 (36.0%), compared to non-health sciences participants, 10 (5.3%). Findings demonstrated there was statistically significant association between knowledge level and field of study [x^2 (1, n=373) =92.677, p<0.001], as the p-value, <0.001, was below the tabulated value.

In terms of medical history of PCOS, more than two-fifths of the participants without a PCOS diagnosis, 146 (41.2%), exhibited moderate knowledge, while 67 (18.9%) had good knowledge and the remaining 141 (39.8%) showed poor knowledge. In contrast, participants with a medical diagnosis of PCOS displayed different trends, with majority of them, 10 (52.6%), demonstrated good knowledge, whereas 3 (15.8%) had poor knowledge and the remaining 6 (31.6%) had moderate knowledge. There was a higher prevalence of good knowledge among participants with PCOS, 10 (52.6%), compared to those without PCOS, 67 (18.9%). Findings highlighted there was statistically significant association between knowledge level and medical history of PCOS [x^2 (1, n=373) =13.036, p=0.001], as the p-value, 0.001, was below the tabulated value.

Nearly two-fifths of the participants without a family history of PCOS, 149 (41.4%), demonstrated moderate knowledge, while 70 (19.4%) had good knowledge and the remaining 141 (39.2%) had poor knowledge. In contrast, over half of the participants with a family history of PCOS, 7 (53.8%), demonstrated good knowledge, while 3 (23.1%) had poor and moderate knowledge each. Participants with a family history of PCOS, 7 (53.8%), had a higher prevalence of good knowledge compared to those without a family history of PCOS, 70 (19.4%). Findings showed there was statistically significant association between knowledge level and family history of PCOS [x^2 (1, n=373) =9.067, p=0.011], as the p-value, 0.011, was below the tabulated value.

Overall, all four socio-demographic characteristics (year and field of study, medical and family history of PCOS) were significantly associated with the knowledge level as each p-value was below the tabulated value. Hence, the first null hypothesis was rejected, indicating that there was a statistically significant association between knowledge level towards PCOS and socio-demographic characteristics.

4.3.5 ASSOCIATION BETWEEN ATTITUDE TOWARDS PCOS AND SOCIO-DEMOGRAPHIC CHARACTERISTICS

This section answered research question four: 'What is the association between attitude towards PCOS and socio-demographic characteristics (year and field of study, medical and family history of PCOS) among female undergraduate students in a private university in Kajang?'. The data underwent analysis through chi-square test and were displayed in a cross-tabulation, as shown in **Table 4.5**.

Table 4.5 Association between attitude towards PCOS and socio-demographic characteristics (n=373)

Socio-demographic characteristics	Attitude Frequency (Percentage)		x^2	*P* value
	Poor f (%)	Good f (%)		
Year of Study				
Y1	22 (22.2)	77 (77.8)	0.670	0.871
Y2	20 (20.2)	79 (79.8)		
Y3	17 (18.9)	73 (81.1)		
Final Year	15 (17.6)	70 (82.4)		
Field of Study				
Health Sciences	21 (11.3)	165 (88.7)	17.049	<0.001*
Non-Health Sciences	53 (28.3)	134 (71.7)		
Medical history of PCOS				
No	70 (19.8)	284 (80.2)	0.019	1.000
Yes	4 (21.1)	15 (78.9)		
Family History of PCOS				
No	70 (19.4)	290 (80.6)	1.012	0.478
Yes	4 (30.8)	9 (69.2)		

** Chi-square test, significance level at p<0.05*

Based on **Table 4.5**, over three-fourths of the participants, 77 (77.8%) 79 (79.8%),73 (81.1%) and 70 (82.4%), from Year 1, Year 2, Year 3 and final year, respectively, had good attitude. Conversely, the remaining participants, 22 (22.2%), 20 (20.2%), 17 (18.9%) and 15 (17.6%), from Year 1, Year 2, Year 3 and final year, respectively, had poor attitudes. Findings indicated there was no statistically significant association between attitude and year of study [x^2 (1, n=373) =0.670, p=0.871], as the p-value, 0.871, exceeded the tabulated value.

In terms of field of study, more than four-fifths of the participants from the health sciences, 165 (88.7%), exhibited good attitude, while one-tenth of them, 21 (11.3%), displayed poor attitude. Similarly, among participants from non-health sciences, nearly three-fourths of them, 134 (71.7%), possessed good attitude, while one-fourth of them, 53 (28.3%), exhibited poor attitude. The prevalence of participants with good attitudes from the health sciences, 165 (88.7%), was higher than non-health sciences, 134 (71.7%). Findings showed there was statistically significant association between attitude and field of study [x^2 (1, n=373) =17.049, p<0.001], as the p-value, <0.001, was below the tabulate value.

Approximately four-fifths of the participants who did not have PCOS, 284 (80.2%), exhibited good attitude, while the remaining 70 (19.8%) displayed poor attitude. Similarly, three-fourths of the participants who had been diagnosed with PCOS, 15 (78.9%), demonstrated good attitude, while the remaining 4 (21.1%) had poor attitude. The prevalence of good attitude was roughly equivalent in both groups. Findings highlighted that there was no statistically significant association between attitude and medical history of PCOS [x^2 (1, n=373) =0.019, p=1.000], as the p-value, 1.000, exceeded the tabulated value.

Four-fifths of the participants who did not have a family history of PCOS, 290 (80.6%), demonstrated good attitude, while nearly one-fifth of the participants, 70 (19.4%), displayed poor attitude. Similarly, among participants with a family history of PCOS, more than three-fifths of them, 9 (69.2%), demonstrated good attitude, while 4 (30.8%) participants had poor attitude. The prevalence of good attitude was found to be similar between these two groups. Findings revealed there was no statistically significant association between attitude and family history of PCOS [x^2 (1, n=373) =1.012, p=0.478], as the p-value, 0.478, exceeded the tabulated p value.

Overall, one out of the four socio-demographic characteristics was found to be significantly associated with the attitude towards PCOS (field of study) as the p-value for the field of study was below the tabulated value. Hence, the second null hypothesis failed to be rejected, indicating there was no statistically significant association between attitude towards PCOS and socio-demographic characteristics.

4.3.6 ASSOCIATION BETWEEN ATTITUDE AND KNOWLEDGE LEVEL TOWARDS PCOS

This section answered research question five: 'What is the association between attitude and knowledge level towards PCOS among female undergraduate students in a private university in Kajang?'. The Chi square test was used, and the data were presented in cross-tabulation, as shown in **Table 4.6**.

Table 4.6 Association between attitude and knowledge level towards PCOS (n=373)

Knowledge level towards PCOS	Attitude towards PCOS Frequency (Percentage)		x^2	*P* value
	Poor f (%)	Good f (%)		
Poor	45 (31.3)	99 (68.8)		
Moderate	22 (14.5)	130 (85.5)	20.135	<0.001*
Good	7 (9.1)	70 (90.9)		

** Chi-square test, significance level at p<0.05*

Based on **Table 4.6**, nearly all the participants with good knowledge, 70 (90.9%), exhibited good attitude towards PCOS. The trend showed a gradual decrease, with more than four-fifths of the participants with moderate knowledge, 130 (85.5%), showed good attitude, while around one-third of the participants with poor knowledge, 130 (85.5%), had good attitude. Findings revealed that there was statistically significant association between attitude and knowledge level towards PCOS [x^2 (1, n=373) =20.135, p<0.001], as the p-value, <0.001, was below the tabulated value. Therefore, the third null hypothesis was rejected.

4.4 SUMMARY

The findings of the study were explained and demonstrated in tables in accordance with the research questions. Analysis revealed that majority of the female undergraduate students possessed moderate knowledge and good attitude towards PCOS. There was statistically significant association between knowledge level and all socio-demographic characteristics (year and field of study, medical and family history of PCOS). Nevertheless, there was no statistically significant association between attitude and socio-demographic characteristics except in the field of study. As for the association between attitude and knowledge level towards PCOS, there is statistically significant association.

CHAPTER FIVE

DISCUSSION

CHAPTER 5: DISCUSSION

5.0 CHAPTER OVERVIEW

Chapter five discusses the findings in accordance with the research questions and specific objectives. The findings will be interpreted and discussed by comparing them with the results of previous studies.

5.1 DISCUSSION OF MAJOR FINDINGS

5.1.1 KNOWLEDGE LEVEL TOWARDS PCOS

Findings of the present study revealed 77 (20.6%) of the participants had good knowledge, whereas 152 (40.8%) and 144 (38.6%) of them had moderate and poor knowledge, respectively.

The findings are in line with a quasi-experimental study done among 900 female undergraduate students in Egypt. The study in Egypt revealed that only 23.3% of the participants were sufficiently aware of PCOS, while 76.7% were not aware of PCOS in the pre-test (El Sayed, El Sayed and Michael, 2020). Similarly, another study conducted in Malaysia and India among female undergraduate students highlighted that only 17.1% and 3% of the participants, respectively, possessed good knowledge regarding PCOS (Lee, et al., 2021; Karkar, et al., 2019). The relatively low levels of PCOS knowledge can be attributed to the absence of reproductive health topics in school curricula, coupled with the lack of easily accessible information resources (Radwan, et al., 2023; Alshadaifat, et al., 2021). This lack of educational coverage and accessible resources becomes

evident when considering that majority of the participants (37.4%) relied on doctors as their primary source of information, while only 7.37% obtained information from school (Chainani, 2019).

Conversely, a cross-sectional study conducted in Malaysia, which involved 245 female undergraduate students from the faculties of nursing, pharmacy, dentistry, medicine, allied health science, and science. The previous study showed majority of the participants (58%) had good knowledge and the remaining 42% had poor knowledge of PCOS (Azlan, Bustaman and Razak, 2022). This discrepancy could be attributed to the differences in the composition of the study participants. The current study encompassed participants from both health and non-health sciences, whereas the participants from the previous study in Malaysia were health sciences students only.

5.1.2 ATTITUDE TOWARDS PCOS

Findings of the present study showed that 299 (80.2%) of the participants had good attitude towards PCOS, while 74 (19.8%) had poor attitude.

A descriptive study conducted by Fortuna and Herdiman (2023) among 696 female undergraduate students in Indonesia reported that nearly all the participants (95%) had good attitude towards PCOS. Similarly, a cross-sectional study conducted in India among 154 nursing students showed majority of the

participants (57.1%) had neutral attitude while 40.9% had positive attitude and the remaining 1.9% had negative attitude (Devi and Susila, 2022).

These findings are in line with the results in the current study. The relatively positive attitude observed across these studies could be due to participants having some information about PCOS. This can be seen in the previous study conducted in Indonesia (Fortuna and Herdiman, 2023) and India (Devi and Susila, 2022) whereby the participants who had good knowledge similarly had good attitude towards PCOS. The existing knowledge likely contributed to their positive attitudes towards PCOS.

Conversely, studies conducted by Patel (2017) and Chauhan, Ritta and Sharma (2023) in India found incongruent results whereby majority of the participants, 80% and 75%, respectively, exhibited unfavourable attitude towards PCOS. This could be due to the influence of societal misconceptions and stigma surrounding PCOS. According to Rajkumar, et al. (2022) and Sharma and Mishra (2018), cultural contexts and societal norms can contribute to misunderstandings about PCOS, further deepening the existing stigma and leading to negative attitudes towards PCOS. Therefore, distinct socio-cultural contexts and life experiences can significantly influence an individual's attitude towards PCOS, resulting in differing viewpoints on the matter.

5.1.3 ASSOCIATION BETWEEN KNOWLEDGE LEVEL TOWARDS PCOS AND SOCIO-DEMOGRAPHIC CHARACTERISTICS

Findings of the present study showed that there was statistically significant association between knowledge level towards PCOS and socio-demographic characteristics (year and field of study, medical and family history of PCOS).

Studies from Jordan and Saudi Arabia reported that knowledge of PCOS was significantly influenced by the year of study ($p<0.05$) (Alshdaifat, et al., 2021; Thabet, et al., 2021). These findings were consistent with the present study. The curriculum for medical students generally introduces lower-year students to subjects like anatomy and physiology, while higher-year students engaging in disease management and clinical attachments (Shariff, et al., 2016). This potentially could have contributed to their higher knowledge scores. Non-medical students' knowledge could have increased through awareness campaigns and academic resources related to medical topics during their study period (Alshdaifat, et al., 2021). According to Seymour (2018), campaigns and resources serve as effective communication channels, enhancing comprehension by delivering key messages. Hence, prolonged involvement potentially leads to deeper understanding of the topic throughout their academic journey.

Nevertheless, the present study contradicts the findings of a cross-sectional study conducted among 451 female undergraduate students in Pakistan. The previous study reported there was no statistically significant association between the year of study and knowledge (Haq, et al., 2017). The difference might be attributed to the distribution of participants across different year of study was not equal in the previous study. Specifically, majority of the participants were in their first year (44.6%), while the minority of the participants were in their third (9.5%) and fifth (3.3%) years, respectively.

Both studies conducted in India among female university students showed that there was a statistically significant association between knowledge of PCOS and field of study, with p-values of <0.001 and <0.05, respectively (Patil, et al., 2023; John, 2021). This outcome could be attributed to the fact that the participants from the health-sciences field possessed prior knowledge from obstetric and gynaecological courses as well as clinical experiences (Thabet, et al., 2021; Halle-Ekane, et al., 2018).

The present study is parallel with earlier research conducted in Sudan, which emphasized that the presence of PCOS significantly influences knowledge regarding PCOS ($p<0.001$) (Alfanob, et al., 2022). A possible explanation for this finding is that individuals with PCOS often experience the signs and symptoms of the condition. They tend to acquire accurate information from gynaecologists upon diagnosis and during follow-up sessions (Goh, et al., 2022;

Alshadaifat, et al., 2021). In contrast, a pre-experimental study involving 55 female students in India showed inconsistent findings with the present study (Khurshid, et al., 2021). The previous study found there was no significant association between the medical history of PCOS and knowledge. The variation in results might be explained by the smaller sample size in the previous study, as a smaller sample size can lead to less accuracy and statistical power, making it more difficult to establish robust conclusions (Anderson, Kelley and Maxwell, 2017).

A cross-sectional study conducted by Rizvi, et al. (2023) in Pakistan among 646 female undergraduate students using a self-developed questionnaire showed that knowledge of PCOS was significantly associated with family history of PCOS ($p<0.001$). The findings from Pakistan are in line with the present study results. The reason could be that having a family member with PCOS could potentially expose participants to the disease, making them more familiar with its nature, signs and symptoms and management (Zaitoun, et al., 2023). Consequently, these participants appeared to possess a higher level of knowledge on the subject.

5.1.4 ASSOCIATION BETWEEN ATTITUDE TOWARDS PCOS AND SOCIO-DEMOGRAPHIC CHARACTERISTICS

Findings of the present study showed that there were no statistically significant association between attitude towards PCOS and socio-demographic characteristics (year of study, medical and family history of PCOS) except field of study.

A cross-sectional study conducted in India among 154 nursing students showed there was no association between year of study and attitude (Devi and Susila, 2022), which is parallel with the present study. However, the current findings are in contrast with a descriptive study conducted among 239 late adolescent girls in Egypt, which reported a statistically significant association between year of study and attitude towards PCOS ($p<0.001$) (Mohamed Reda, et al., 2022). The positive attitudes among senior students in the study conducted in Egypt might be due to their years in the academic journey, which enhance knowledge and maturity over time. This discrepancy between the present study and the study conducted in Egypt may be explained by the diverse participant characteristics. The present study included 18–25-year-old students from health and non-health sciences. Conversely, the study in Egypt focused only on 18- and 19-year-old nursing students, resulting in distinct findings due to their homogenous group.

Findings of the present study are consistent with a pre-experimental study conducted by John (2021) involving 60 female college students using a convenient sampling technique, which demonstrated a significant association between field of study and pre-test attitude scores towards PCOS ($p<0.001$). This finding was expected as participants enrolled in health sciences faculty often possess a medical background and comprehensive knowledge of the disease, thus fostering a more positive attitude. This idea finds further reinforcement in the findings of Ariani, et al. (2022) and Kumari, et al. (2017), both of which emphasize that having a better understanding of PCOS is associated with positive attitude.

The present study showed that there was no significant association between the medical history of PCOS and attitude towards PCOS. However, the researcher encountered challenges in supporting and comparing this finding with other studies, primarily due to the absence of previous studies that had explored this aspect.

A cross-sectional study conducted in India among 106 females aged 14-45 years demonstrated a statistically significant association between presence of PCOS and overall KAP scores ($p<0.001$) (Vinaykumar, et al., 2023). However, this finding was in contrast with the present study, which showed no significant association between medical history of PCOS and attitude towards PCOS. This variation can be due to the differences in the studies target groups and scoring

methods. The previous study focusing on the community and assessed overall KAP scores while the present study targeted undergraduate students and examined attitude only.

Devi and Susila (2022) conducted a cross-sectional study in India among 154 nursing students using a self-developed questionnaire, which revealed that the attitude towards PCOS was not associated with a history of PCOS in the family (p=0.398). The findings are parallel with the present study. The similarity in outcomes could be due to cultural factors, as cultural norms in both countries often exert influence on individual's attitude towards health and illness (Hadjiconstantinou, et al., 2017; Ismail and Abd Hamid, 2016). According to Rajkumar, et al. (2022), cultural norms deeply embed stigma and misconceptions surrounding PCOS, discouraging open discussions about health matters within families. Consequently, this cultural influence may diminish the perceived impact of family connections on individual attitudes towards PCOS.

5.1.5 ASSOCIATION BETWEEN ATTITUDE AND KNOWLEDGE LEVEL TOWARDS PCOS

Findings of the present study showed that there was statistically significant association between attitude and knowledge level towards PCOS.

The present findings correspond with a descriptive study conducted by Mohamed Reda, et al. (2022) among 239 late adolescent girls, which reported a moderately positive correlation between total knowledge and attitude scores regarding PCOS ($r=0.413$, $p<0.001$). Similarly, a quasi-experimental study conducted among 100 female university students using a convenient sampling technique demonstrated a highly statistically significant positive correlation between total knowledge and total attitude scores both before and after educational sessions on PCOS, as well as during the follow-up phase, with $r=0.682$, 0.615 and 0.438, respectively and $p<0.001$ (Gouda, Mohamady and El-Fattah, 2023). The study findings suggest that the participants developed a more favourable attitude towards PCOS following their educational sessions. The improved understanding gained from these sessions highlights the need to promote PCOS knowledge to foster positive attitudes.

In contrast, a cross-sectional study carried out among 154 nursing students in India revealed a weak negative relationship between knowledge and attitude scores towards PCOS ($r=-0.268$, $p<0.001$), using Pearson's correlation test (Devi and Susila, 2022). Notably, the study highlighted that despite a decrease in knowledge levels, the nursing students exhibited a relatively more favourable attitude. This finding can be attributed to the possibility that nursing students might have encountered subjects related to PCOS within their curriculum and the introduction of relevant information during the educational session could have dispelled misconceptions. Consequently, this intervention may have

instilled a more positive perspective, even as the knowledge level remained comparatively low.

5.2 SUMMARY

Overall, there is limited comparison between the present study's findings and the local research. This is due to only one research was done on knowledge and attitude among university students in Malaysia and two research was done on assessing the knowledge on PCOS. However, other research done in Asian and middle east countries showed that some findings are parallel, and some differ from the present findings.

CHAPTER SIX

CONCLUSION AND RECOMMENDATION

CHAPTER 6: CONCLUSION AND RECOMMENDATION

6.0 CHAPTER OVERVIEW

Chapter 6 illustrates the strengths, limitations, implications, and recommendations of the study, followed by a brief conclusion to conclude the whole research study.

6.1 STRENGTH AND LIMITATION OF THE STUDY

6.1.1 STRENGTHS OF THE STUDY

This research is the first study conducted among undergraduate students at the present university to assess knowledge and attitude towards PCOS. This underscores its significance due to the limited existing research in Malaysia, as till date there has been only one published research, especially among university students. Thus, the study's findings hold substantial value in providing valuable information about the knowledge and attitude towards PCOS among this specific group.

Moreover, the questionnaire was distributed using a face-to-face approach, providing participants with the opportunity to seek direct clarification on any questions regarding the research and the questionnaire (Ball, 2019). This method also prevented them from searching for information on the Internet, effectively minimising potential response bias as the researcher is physically present to observe the participants filling out the questionnaire (Brace, 2018). Once the questionnaires were received, the researcher checked them for completeness,

ensuring comprehensive data collection and reducing the chances of missing data.

Besides, the implementation of the quota sampling technique guarantees an equal representation of participants from both health and non-health sciences (Iliyasu and Etikan, 2021). This approach enhances the robustness of the study's findings and promotes comparability across these two fields, signifying a notable improvement over the use of convenience sampling. Furthermore, the study attained a satisfactory response rate, aligning with the calculated sample size and reinforcing the credibility of the research findings (Brtnikovo, et al., 2018).

6.1.2 LIMITATIONS OF THE STUDY

There are a few limitations in the present study. One of the limitations is that the present study was solely conducted at one university. This may limit the generalizability of the findings to the broader population in various academic settings across Malaysia. The present study used a population proportion of 0.48 in the Krejcie and Morgan (1970) formula, which closely approximates 0.50 to address this limitation (Adam, 2020). This choice was made to maximise variance and sample size, thereby enhancing the representativeness of the present study's findings (Adam, 2020).

Additionally, the study setting predominantly consists of students from Chinese ethnicity, this could affect the generalisability as it does not represent the diverse ethnic groups within Malaysian population. As a result, the present study decided not to include ethnicity as one of the socio-demographic variables to prevent potential bias arising from an overrepresentation of a single ethic group. Moreover, present study was entirely contingent on the research findings and logical inference to determine the categorization of attitudes as either poor or good. Therefore, it may differ from approaches employed in similar studies due to the lack of support from existing literature.

6.2 IMPLICATIONS OF THE STUDY

The present study provides valuable insights into the knowledge level and attitude towards PCOS among female undergraduate students, offering a resource for future research and guiding the development of effective health promotion initiatives. The study's findings revealed there was a statistically significant association between knowledge level and socio-demographic characteristics (year of study, field of study and medical and family history of PCOS) as well as there was a statistically significant association between attitude and field of study. Therefore, it is recommended to tailor interventions to specific student groups, focusing on first-year students, non-health science students and individuals with no medical or family history of PCOS.

Additionally, the present study revealed that there was a statistically significant association between attitude and knowledge level towards PCOS. This emphasises the need for universities and government agencies to initiate educational programs and campaigns. Wide dissemination of information about PCOS risks and preventive measures is needed, as it can actively promote early detection thus reducing its impact on women's health.

Gibson-Helm, et al. (2017) highlighted that many women with PCOS receive inadequate information during diagnosis, leaving them with unmet information needs and potentially impacting their future involvement in management and care. Given that health science students represent future healthcare providers and advocates, it becomes clear that well-informed healthcare providers can empower patients with the information they need to manage their well-being and address PCOS-related health complications. However, the current study revealed that nearly half of these students, 88 (47.3%), possess only moderate knowledge of PCOS. Therefore, it is crucial to review and enhance the existing curriculum to ensure students receive a more comprehensive education on PCOS.

6.3 RECOMMENDATIONS FOR FUTURE RESEARCH

Future research should consider stratified random sampling methods to reduce selection bias. This approach ensures that every individual within the population has an equal opportunity for selection, resulting in a more representative and unbiased sample (Etikan, and Babtope, 2019). Moreover, it is recommended to conduct future research on a larger scale and to include multiple universities to enhance the generalizability of the findings to the entire population of Malaysia.

Furthermore, future research should consider a broader spectrum of sociodemographic variables, such as ethnicity, religion, and sources of information regarding PCOS. These additional factors can yield a comprehensive understanding of the variables influencing knowledge and attitude towards PCOS, facilitating the development of targeted interventions to meet the specific needs of diverse populations.

Besides, in the present study, some of the participants began to wonder if they were having PCOS as they were experiencing the symptoms described in the questionnaire after completing it. Therefore, future research is recommended to conduct an extensive survey focused on screening individuals who may be at high risk for PCOS based on the manifestation of relevant signs and symptoms. This proactive approach not only facilitates early detection but also assists in determining the prevalence of PCOS in Malaysia.

In addition, further research should conduct a pre-experimental study to assess the effectiveness of interventions on knowledge and attitude towards PCOS, especially among those in the medical field. This research could provide evidence to support the inclusion of PCOS topics in the medical and nursing curriculum.

6.4 CONCLUSION

In conclusion, PCOS is a common endocrine disorder affecting adolescent girls during their reproductive years, and it remains one of the least understood and underdiagnosed conditions. This study was conducted to investigate the knowledge level and attitude towards PCOS, along with the socio-demographic characteristics of undergraduate students in this university.

Overall, majority of participants had moderate knowledge level, 152 (40.8%), and good attitude, 299 (80.2%), towards PCOS. Besides, there was a statistically significant association between knowledge level towards PCOS and socio-demographic characteristics (year and field of study, medical and family history of PCOS). However, there was no statistically significant association between attitude towards PCOS and socio-demographic characteristics except for the field of study. These findings emphasise the need for tailored educational interventions to address knowledge gaps and attitudes observed among students in different academic years and fields of study.

The present study also found there was a statistically significant association between attitude and knowledge level towards PCOS. These findings underscore the necessity of addressing the issue of inadequate knowledge about PCOS, as it has a direct impact on students' attitudes. Therefore, educational efforts should prioritise enhancing understanding and dispelling misconceptions and myths surrounding the condition. This approach can facilitate early detection and proactive management of PCOS, ultimately resulting in improved health outcomes and a higher QoL.

REFERENCES

Abinaya, S., Siva, D., Sabitha, R. and Achiraman, S., 2019. An overview of hyperandrogenism in PCOS and the prospective underlying factors. *Research Journal of Life Sciences, Bioinformatics, Pharmaceutical and Chemical Science*, [e-journal] 1(5), pp.179-186. https://dx.doi.org/10.26479/2019.0501.18.

Abu-Taha, M., Daghash, A., Daghash, R. and Abu Farha, R., 2020. Evaluation of women knowledge and perception about polycystic ovary syndrome and its management in Jordan: A survey-based study. *International Journal of Clinical Practice*, [e-journal] 74(10), p.e13552. https://dx.doi.org/10.1111/ijcp.13552.

Adam, A.M., 2020. Sample size determination in survey research. *Journal of Scientific Research and Reports*, [e-journal] 26(5), pp.90-97. https://dx.doi.org/10.9734/JSRR/2020/v26i530263.

Ajmal, N., Khan, S.Z. and Shaikh, R., 2019. Polycystic ovary syndrome (PCOS) and genetic predisposition: A review article. *European Journal of Obstetrics & Gynecology and Reproductive Biology: X*, [e-journal] 3, p.100060. https://dx.doi.org/10.1016/j.eurox.2019.100060.

Al Bassam, N.M., Ali, S. and Rahman, S.R., 2018. Polycystic ovarian syndrome (PCOS), awareness among female students, Qassim University, Qassim Region, Saudi Arabia. *International Journal of Research-Granthaalayah*, [e-journal] 6, pp.395-406. https://dx.doi.org/10.5281/zenodo.1451882.

Alfanob, Z.O., Ahmed, M.H., Ahmed, M., Badi, S. and Elkheir, H.K., 2022. Knowledge, prevalence and practice of polycystic ovary syndrome among Sudanese women in Khartoum State, Sudan: The need for health education. *Sudan Journal of Medical Sciences*, [e-journal] 17(2), pp.204-217. https://dx.doi.org/10.18502/sjms.v17i2.11455.

Almeshari, W.K., Alsubaie, A.K., Alanazi, R.I., Almalki, Y.A., Masud, N. and Mahmoud, S.H., 2021. Depressive and anxiety symptom assessment in adults with polycystic ovarian syndrome. *Depression Research and Treatment*, [e-journal] 2021(1), pp.1-8. https://dx.doi.org/10.1155/2021/6652133.

Alshadaifat, E., Sindiani, A., Amarin, Z., Absy, N., AlOsta, N., Abuhayyeh, H.A. and Alwani, M., 2021. Awareness of polycystic ovary syndrome: A university students' perspective. *Annals of Medicine and Surgery*, [e-journal] 72, p.103123. https://dx.doi.org/10.1016/j.amsu.2021.103123.

Anderson, S.F., Kelley, K. and Maxwell, S.E., 2017. Sample-size planning for more accurate statistical power: A method adjusting sample effect sizes for publication bias and uncertainty. *Psychological Science*, [e-journal] 28(11), pp.1547-1562. https://dx.doi.org/10.1177/0956797617723724.

Andrade, C., 2020. Sample size and its importance in research. *Indian Journal of Psychological Medicine*, [e-journal] 42(1), pp.102-103. https://dx.doi.org/10.4103/IJPSYM.IJPSYM_504_19.

Ariani, N.K.S., Susanti, N.L.P.D., Parwati, N.W.M. and Haryati, N.P.S., 2022. The influence of video-based health education in modifying early screening efforts for polycystic ovary syndrome (PCOS). *Asian Journal of Health Research*, [e-journal] 1(3), pp.24-30. https://dx.doi.org/10.55561/ajhr.v1i3.54.

Azlan, N.Z., Bustaman, S.Z. and Razak, R.N.H.A, 2022. Knowledge level on the association between body mass index (BMI), menstrual cycle and lifestyle patterns in contributing the development of polycystic ovarian syndrome (PCOS) among female university students. *International Journal of Care Scholars*, 5(2), pp.58-74.

Ball, H.L., 2019. Conducting online surveys. *Journal of Human Lactation*, [e-journal] 35(3), pp.413-417. https://dx.doi.org/10.1177/0890334419848734.

Brace, I., 2018. *Questionnaire design: How to plan, structure and write survey material for effective market research*. London: Kogan Page Publishers.

Brtnikova, M., Crane, L.A., Allison, M.A., Hurley, L.P., Beaty, B.L. and Kempe, A., 2018. A method for achieving high response rates in national surveys of US primary care physicians. *PloS one*, [e-journal] 13(8), p.e0202755. https://dx.doi.org/10.1371/journal.pone.0202755.

Bulsara, J., Patel, P., Soni, A. and Acharya, S., 2021. A review: Brief insight into polycystic ovarian syndrome. *Endocrine and Metabolic Science*, [e-journal] 3, p.100085. https://dx.doi.org/10.1016/j.endmts.2021.100085.

Cambridge Dictionary, 2022a. *Meaning of knowledge in English.* [online] Available at: <https://dictionary.cambridge.org/dictionary/english/knowledge> [Accessed 13 November 2022].

Cambridge Dictionary, 2022b. *Definition of 'undergraduate'.* [online] Available at: <https://dictionary.cambridge.org/dictionary/english/undergraduate> [Accessed 13 November 2022].

Celik, H.G., Celik, E. and Polat, I., 2018. Evaluation of biochemical hyperandrogenism in adolescent girls with menstrual irregularities. *Journal of Medical Biochemistry*, [e-journal] 37(1), p.7. https://dx.doi.org/10.1515/jomb-2017-0037.

Chainani, E.G., 2019. Awareness of polycystic ovarian syndrome among young women in Western India. *International Journal of Reproduction, Contraception, Obstetrics and Gynecology*, [e-journal] 8(12), pp.4716-4721. https://dx.doi.org/10.18203/2320-1770.ijrcog20195307.

Chauhan, K., Rilta, R. and Sharma, S., 2023. Assessment of the attitude regarding polycystic ovarian syndrome among B. Sc. nursing students in selected nursing colleges of Shimla: A quasi experimental study. *International Journal of Advances in Health Sciences (IJHS)*, [e-journal] 10(1), pp.1-9. https://dx.doi.org/10.5281/zenodo.7904665.

Chauhan, P., Siddiqui, M.I. and Chauhan, A.S., 2021. A study to evaluate the effectiveness of structured teaching programme on knowledge regarding polycystic ovarian syndrome and related infertility among female students in Isabella Thoburn College at Lucknow. *Asian Journal of Nursing Education and Research*, [e-journal] 11(1), pp.71-78. https://dx.doi.org/10.5958/2349-2996.2021.00019.7.

Chen, H., Zhang, Y., Li, S., Tao, Y., Gao, R., Xu, W., Yang, Y., Cheng, K., Wang, Y. and Qin, L., 2021. The genetic association of polycystic ovary syndrome and the risk of endometrial cancer: A mendelian randomization study. *Frontiers in Endocrinology*, [e-journal] 12, p.756137. https://dx.doi.org/10.3389/fendo.2021.756137.

Coban, O.G., Tulaci, O.D., Adanir, A.S. and Onder, A., 2019. Psychiatric disorders, self-esteem, and quality of life in adolescents with polycystic ovary syndrome. *Journal of Pediatric and Adolescent Gynecology*, [e-journal] 32(6), pp.600-604. https://dx.doi.org/10.1016/j.jpag.2019.07.008.

Collins, 2022. *Definition of 'attitude'.* [online] Available at: <https://www.collinsdictionary.com/dictionary/english/attitude> [Accessed 13 November 2022].

Deswal, R., Narwal, V., Dang, A. and Pundir, C.S., 2020. The prevalence of polycystic ovary syndrome: A brief systematic review. *Journal of Human Reproductive Sciences*, [e-journal] 13(4), pp.261-271. https://dx.doi.org/10.4103/jhrs.JHRS_95_18.

Devi, S.B. and Susila, C., 2022. Assess the level of knowledge and attitude regarding polycystic ovarian syndrome (PCOS) among nursing students. *Annals of Forest Research*, 65(1), pp.6620-6629.

Ding, T., Hardiman, P.J., Petersen, I., Wang, F.F., Qu, F. and Baio, G., 2017. The prevalence of polycystic ovary syndrome in reproductive-aged women of different ethnicity: A systematic review and meta-analysis. *Oncotarget*, [e-journal] 8(56), p.96351. https://dx.doi.org/10.18632/oncotarget.19180.

El Sayed, S.L.M., El Sayed, M.L.M. and Michael, G.C., 2020. Screening for polycystic ovarian syndrome and effect of health education on its awareness among adolescents: A pre-post study. *International Journal of Nursing Education*, 12(4), pp. 227-236.

Etikan, I. and Babtope, O., 2019. A basic approach in sampling methodology and sample size calculation. *MedLife Clinics*, 1(2), pp.50-54.

Etikan, I. and Bala, K., 2017. Sampling and sampling methods. *Biometrics & Biostatistics International Journal*, [e-journal] 5(6), p.00149. https://dx.doi.org/10.15406/bbij.2017.05.00149.

Farooq, R., 2018. Short review on polycystic ovarian syndrome. *Journal of Medicine*, [e-journal] 19(1), pp.49-53. https://dx.doi.org/10.3329/jom.v19i1.34843.

Fazleen, N.E., Whittaker, M. and Mamun, A., 2018. Risk of metabolic syndrome in adolescents with polycystic ovarian syndrome: A systematic review and meta-analysis. *Diabetes & Metabolic Syndrome: Clinical Research & Reviews*, [e-journal] 12(6), pp.1083-1090. https://dx.doi.org/10.1016/j.dsx.2018.03.014.

Fortuna, M.E. and Herdiman, J., 2023. Knowledge and attitudes of non-medical faculty students batch 2020 about polycystic ovarian syndrom (PCOS) at Tarumanagara University. *Contagion: Scientific Periodical Journal of Public Health and Coastal Health*, 5(1), pp.79-86.

Gallais, B., Gagnon, C., Forgues, G., Cote, I. and Laberge, L., 2017. Further evidence for the reliability and validity of the Fatigue and Daytime Sleepiness Scale. *Journal of the Neurological Sciences*, [e-journal] 375, pp.23-26. https://dx.doi.org/10.1016/j.jns.2017.01.032.

Gibson-Helm, M., Teede, H., Dunaif, A. and Dokras, A., 2017. Delayed diagnosis and a lack of information associated with dissatisfaction in women with polycystic ovary syndrome. *The Journal of Clinical Endocrinology & Metabolism*, [e-journal] 102(2), pp.604-612. https://dx.doi.org/10.1210/jc.2016-2963.

Goh, J.E., Farrukh, M.J., Keshavarzi, F., Yap, C.S., Saleem, Z., Salman, M., Ramatillah, D.L., Goh, K.W. and Ming, L.C., 2022. Assessment of prevalence, knowledge of polycystic ovary syndrome and health-related practices among women in Klang Valley: A cross-sectional survey. *Frontiers in Endocrinology*, [e-journal] 13, p.985588. https://dx.doi.org/10.3389/fendo.2022.985588.

Gouda, S.Z., Mohamady, S.H. and El-Fattah, N.A., 2023. Perception of female university students towards polycystic ovarian syndrome. *European Chemical Bulletin 2023*, 12(5), pp.6109-6117.

Hadjiconstantinou, M., Mani, H., Patel, N., Levy, M., Davies, M., Khunti, K. and Stone, M., 2017. Understanding and supporting women with polycystic ovary syndrome: a qualitative study in an ethnically diverse UK sample. *Endocrine Connections*, [e-journal] 6(5), pp.323-330. https://dx.doi.org/10.1530/EC-17-0053.

Halle-Ekane, G.E., Nembulefack, D.K., Orock, G.E., Fon, P.N., Tazinya, A.A. and Tebeu, P.M., 2018. Knowledge of cervical cancer and its risk factors, attitudes and practices towards pap smear screening among students in the University of Buea, Cameroon. *Journal of Cancer and Tumor International*, 7(4), pp.1-11. https://dx.doi.org/10.9734/JCTI/2018/43965.

Haq, N., Khan, Z., Riaz, S., Nasim, A., Shahwani, R. and Tahir, M., 2017. Prevalence and knowledge of polycystic ovary syndrome (PCOS) among female science students of different public Universities of Quetta, Pakistan. *Imperial Journal of Interdisciplinary Research*, 35(6), pp.385-92.

Hinkle, J.L. and Cheever, K.H., 2018. *Brunner and Suddarth's Textbook of Medical-Surgical Nursing*. 14th ed. Philadelphia: Wolters Kluwer.

Ignatov, A. and Ortmann, O., 2020. Endocrine risk factors of endometrial cancer: Polycystic ovary syndrome, oral contraceptives, infertility, tamoxifen. *Cancers*, [e-journal] 12(7), p.1766. https://dx.doi.org/10.3390/cancers12071766.

Iliyasu, R. and Etikan, I., 2021. Comparison of quota sampling and stratified random sampling. *Biometrics & Biostatistics International Journal*, [e-journal] 10(1), pp.24-27. https://dx.doi.org/10.15406/bbij.2021.10.00326.

In, J., 2017. Introduction of a pilot study. *Korean Journal of Anesthesiology*, [e-journal] 70(6), pp.601-605. https://dx.doi.org/10.4097/kjae.2017.70.6.601.

Ismail, K. and Abd Hamid, S.R., 2016. Communication about sex-reproductive health issues with adolescents: A taboo among Malaysian parents. *European Journal of Social Sciences Education and Research*, 3(1), pp.26-40.

Ismayilova, M. and Yaya, S., 2022. What can be done to improve polycystic ovary syndrome (PCOS) healthcare? Insights from semi-structured interviews with women in Canada. *BMC women's health*, [e-journal] 22(1), pp.1-15. https://dx.doi.org/10.1186/s12905-022-01734-w.

Jaber, R.M., Aripin, A., Allias, N., Omar, S., Kamal, N.R. and Dwekat, O., 2022. Knowledge and attitudes towards polycystic ovary syndrome. *African Journal of Reproductive Health*, [e-journal] 26(1), pp.92-102. https://dx.doi.org/10.29063/ajrh2022/v26i1.10.

Jakhar, R., Sen, E.D. and Dutt, R., 2022. Awareness of polycystic ovarian syndrome among college going females in Gurgaon: A cross-sectional study. *Annals of the National Academy of Medical Sciences (India)*, [e-journal] 1(58), pp.149-156. https://dx.doi.org/10.1055/s-0042-1750359.

Joham, A.E., Norman, R.J., Stener-Victorin, E., Legro, R.S., Franks, S., Moran, L.J., Boyle, J. and Teede, H.J., 2022. Polycystic ovary syndrome. *The Lancet Diabetes & Endocrinology*, [e-journal] 10(9), pp.668-680. https://dx.doi.org/10.1016/S2213-8587(22)00163-2.

John, S., 2021. A study to assess the effectiveness of structured teaching programme on knowledge and attitude regarding polycystic ovarian syndrome among female students in selected colleges of Ahmedabad. *Journal of Emerging Technologies and Innovative Research*, 8(12), pp.c262-c275.

Kamboj, M.K. and Bonny, A.E., 2017. Polycystic ovary syndrome in adolescence: Diagnostic and therapeutic strategies. *Translational Pediatrics*, [e-journal] 6(4), p.248. https://dx.doi.org/10.21037/tp.2017.09.11.

Karkar, M., Abraham, F., Joseph, D., Thomas, A., Bharam, D. and Mathew, B., 2019. A study to assess the knowledge regarding polycystic ovarian syndrome among undergraduate students in selected colleges of Pune city. *The Pharma Innovation Journal*, 8(6), pp.192-194.

Khurshid, A., Parveen, A., Bashir, M., Rashid, N., Rashid, A., Nissa, S. N., Jan, H., Faizan, S. and Bashir, I., 2021. A study to assess the effectiveness of structured teaching programme regarding knowledge on prevention of polycystic ovarian syndrome among the students of girl's hostel of IUST Awantipora. *International Journal of All Research Education and Scientific Methods*, 9(9), pp.1953-1961.

Krejcie, R.V. and Morgan, D.W., 1970. Determining sample size for research activities. *Educational and Psychological Measurement*, [e-journal] 30(3), pp.607-610. https://dx.doi.org/10.1177/0013164470030003.

Kumari, D., Gupta, D., Sharma, D., Dhiman, D., Sharma, D.J., Gautam, D., Chauhan, I., Bhardwa, K. and Sharma, D., 2017. A study to evaluate the effectiveness of structured teaching programme on polycystic ovarian syndrome in terms of knowledge and attitude among nursing students of Shimla nursing college, Annandale, Shimla (HP). *International Journal of Applied Research*, 3(8), pp.748-51.

Lee, S.A.A., Raman, T., Muniandi, S. and Rajaretnam, T., 2021. The prevalence of polycystic ovary syndrome knowledge and awareness among medical students. *Public Health and Preventive Medicine*, 7(3), pp.47-60.

Liu, J., Wu, Q., Hao, Y., Jiao, M., Wang, X., Jiang, S. and Han, L., 2021. Measuring the global disease burden of polycystic ovary syndrome in 194 countries: Global burden of disease study 2017. *Human Reproduction*, [e-journal] 36(4), pp.1108-1119. https://dx.doi.org/10.1093/humrep/deaa371.

Maghraby, E.A., Ahmed, N.T., Ahmed, A.A.E. and Hassan, M.M., 2022. Assessment of female nursing student's knowledge regarding polycystic ovarian syndrome at South Valley University. *Assiut Scientific Nursing Journal*, [e-journal] 10(33), pp.170-177. https://dx.doi.org/10.21608/ASNJ.2023.173880.1450.

Merriam-Webster, 2022. *Sociodemographic.* [online] Available at: <https://www.merriam-webster.com/dictionary/sociodemographic> [Accessed 13 November 2022].

Mishra, P., Pandey, C.M., Singh, U., Gupta, A., Sahu, C. and Keshri, A., 2019. Descriptive statistics and normality tests for statistical data. *Annals of Cardiac Anaesthesia*, [e-journal] 22(1), p.67. https://dx.doi.org/10.4103/aca.ACA_157_18.

Moghadam, Z.B., Fereidooni, B., Saffari, M. and Montazeri, A., 2018. Measures of health-related quality of life in PCOS women: A systematic review. *International Journal of Women's Health*, [e-journal] 10, p.397. https://dx.doi.org/10.2147/IJWH.S165794.

Mohamed Reda, A., Ahmed Hassan, A., Abdalla El Sayed, H. and Mohammed Salama, A., 2022. Knowledge and attitude of late adolescent girls regarding polycystic ovarian syndrome. *Journal of Nursing Science Benha University*, [e-journal] 3(1), pp.889-906. https://dx.doi.org/10.21608/jnsbu.2022.215660.

Motlagh Asghari, K., Nejadghaderi, S.A., Alizadeh, M., Sanaie, S., Sullman, M.J., Kolahi, A.A., Avery, J. and Safiri, S., 2022. Burden of polycystic ovary syndrome in the Middle East and North Africa region, 1990–2019. *Scientific Reports*, [e-journal] 12(1), pp.1-11. https://dx.doi.org/10.1038/s41598-022-11006-0.

Naz, M.S.G., Tehrani, F.R., Majd, H.A., Ahmadi, F., Ozgoli, G., Fakari, F.R. and Ghasemi, V., 2019. The prevalence of polycystic ovary syndrome in adolescents: A systematic review and meta-analysis. *International Journal of Reproductive BioMedicine*, [e-journal] 17(8), p.533. https://dx.doi.org/10.18502/ijrm.v17i8.4818.

Nelson, A.M, Viswanath, L. and Philip, A., 2017. Awareness and predictors of PCOD among undergraduate students. *Indian Journal of Public Health Research & Development*, [e-journal] 8(4), pp.18-22. https://dx.doi.org/10.5958/0976-5506.2017.00305.9.

Nihan, S.T., 2020. Karl Pearson's chi-square tests. *Educational Research and Reviews*, [e-journal] 15(9), pp.575-580. https://dx.doi.org/10.5897/ERR2019.3817.

Oriji, V.K. and Onwuegbulam, C., 2019. Prevalence of polycystic ovary syndrome (PCOS) among infertile women attending fertility clinic at a university teaching hospital in Nigeria. *Journal of Gynecology and Women Health*, [e-journal] 15(5), p.555922. https://dx.doi.org/10.19080/JGWH.2019.15.555922.

Pasquali, R., 2018. Contemporary approaches to the management of polycystic ovary syndrome. *Therapeutic Advances in Endocrinology and Metabolism*, [e-journal] 9(4), pp.123-134. https://dx.doi.org/10.1177/ 2042018818756790.

Patel, K., 2017. A study to assess the effectiveness of planned teaching program on polycystic ovarian syndrome in terms of knowledge and attitude among adolescent girls in selected higher secondary schools of Ahmedabad city. *Journal Nursing Today*, 3(2), pp.50-61.

Patil, N., Jammalamadaka, A., Hindodi, A. and Patel, M.I., 2023. Assessment of knowledge and prevalence of risk factors of polycystic ovarian syndrome among undergraduate women: A cross-sectional study. *Journal of Scientific Research in Medical and Biological Sciences*, [e-journal] 4(2), pp.10-18. https://dx.doi.org/10.47631/jsrmbs.v4i2.571.

Polit, D. F., and Beck, C. T., 2017. *Nursing research: Generating and assessing evidence for nursing practice.* 10th ed. Philadelphia: Wolters Kluwer.

Polit, D. F. and Beck, C.T., 2018. *Essentials of nursing research: Appraising evidence for nursing practice*. 9th ed. Philadelphia: Wolters Kluwer.

Radwan, A., Alharbi, R., Albeladi, F., Alzahrani, A., Alnfaiei, J., Abualhamael, M., Hazem, R., Aldalbhi, W., Bajouh, O.S., Abdou, A.A., Sabban, H. and Alzahrani, K., 2023. Knowledge and awareness level assessment of PCOS among females in Saudi Arabia. *Medical Science*, [e-journal] 27, p.e303ms3149. https://dx.doi.org/10.54905/disssi/v27i137/e303ms3149.

Rajkumar, E., Ardra, A., Prabhu, G., Pandey, V., Sundaramoorthy, J., Manzoor, R., Sooraj, K.V., Manikandaprabu, M. and Badiger, T., 2022. Polycystic ovary syndrome: An exploration of unmarried women's knowledge and attitudes. *Heliyon*, [e-journal] 8(7), p.e09835. https://dx.doi.org/10.1016/j.heliyon.2022.e09835.

Rizvi, M., Islam, M.A., Aftab, M.T., Naqvi, A.A., Jahangir, A., Ishaqui, A.A., Iqbal, M.Z. and Iqbal, M.S., 2023. Knowledge, attitude, and perceptions about polycystic ovarian syndrome, and its determinants among Pakistani undergraduate students. *Plos One*, [e-journal] 18(5), p.e0285284. https://dx.doi.org/10.1371/journal.pone.0285284.

Rosenfield, R.L., 2020. Current concepts of polycystic ovary syndrome pathogenesis. *Current Opinion in Pediatrics*, [e-journal] 32(5), p.698. https://dx.doi.org/10.1097/MOP.0000000000000945.

Sarstedt, M., Bengart, P., Shaltoni, A.M. and Lehmann, S., 2018. The use of sampling methods in advertising research: A gap between theory and practice. *International Journal of Advertising*, [e-journal] 37(4), pp.650-663. https://dx.doi.org/10.1080/02650487.2017.1348329.

Seymour, J., 2018. The impact of public health awareness campaigns on the awareness and quality of palliative care. *Journal of Palliative Medicine*, [e-journal] 21(S1), pp.S-30. https://dx.doi.org/10.1089/jpm.2017.0391.

Schober, P. and Vetter, T.R., 2019. Chi-square tests in medical research. *Anesthesia & Analgesia*, [e-journal] 129(5), p.1193. https://dx.doi.org/10.1213/ANE.0000000000004410.

Shariff, A., Begum, G.S., Ayman, G., Mohammad, B., Housam, R. and Khaled, N., 2016. An interventional study on effectiveness of structured education programme in improving the knowledge of polycystic ovarian syndrome among female students of Ras Al Khaimah Medical & Health Sciences University. *International Journal of Science and Research*, 5(1), pp.1659-1663.

Sharma, S. and Mishra, A.J., 2018. Tabooed disease in alienated bodies: A study of women suffering from polycystic ovary syndrome (PCOS). *Clinical Epidemiology and Global Health*, [e-journal] 6(3), pp.130-136. https://dx.doi.org/10.1016/j.cegh.2017.09.001.

Siam, S.G., Soliman, B.S., Ali, M.R. and Abdallah, O.A.M., 2020. Prevalence of polycystic ovarian syndrome in young adult unmarried females attending Zagazig University hospital outpatient clinic. *The Egyptian Journal of Hospital Medicine,* [e-journal] 81(6), pp.2152-2159. https://dx.doi.org/10.21608/ejhm.2020.127954.

Sindhu, S. and Linson, C., 2021. A study to evaluate the knowledge and attitude regarding polycystic ovarian syndrome among adolescent girls in selected higher secondary schools at Trivandrum with a view to develop a self-instructional module. *Journal of Pharmaceutical Research International* [e-journal] 30(50A), pp.33-39. https://dx.doi.org/10.9734/JPRI/2021/v33i50A33379.

Singh, A.S., 2017. Common procedures for development, validity and reliability of a questionnaire. *International Journal of Economics, Commerce and Management*, 5(5), pp.790-801.

Siti Normiyah Hussin and Nur Hafizah Kadir, 2020. A study on knowledge, attitude and perception of polycystic ovary syndrome (PCOS) among young students in higher educational institutions, Perak. *Journal of Social Science Advanced Research*, 1(2), pp.160-181.

Srujana, C., Vasundhara, R. and Miryani, J., 2018. A study to assess the knowledge of nursing college students regarding polycystic ovarian syndrome in selected college at Guntur District, Andhra Pradesh. *International Journal of Advances in Nursing Management*, [e-journal] 6(3), pp.210-214. https://dx.doi.org/10.5958/2454-2652.2018.00046.X.

Story, D.A. and Tait, A.R., 2019. Survey research. *Anesthesiology,* [e-journal] 130(2), pp.192-202. https://dx.doi.org/10.1097/ALN.0000000000002436.

Taber, K.S., 2018. The use of Cronbach's alpha when developing and reporting research instruments in science education. *Research in Science Education,* [e-journal] 48, pp.1273-1296. https://dx.doi.org/10.1007/s11165-016-9602-2.

Taherdoost, 2016. Validity and reliability of the research instrument: How to test the validation of a questionnaire/survey in a research. *International Journal of Academic Research in Management*, 5(3), pp.28-36.

Tahir, H., Hassan, A., Khan, Q.U. and Hafeez, F., 2020. Prevalence of polycystic ovary syndrome awareness among female medical students. *Discoveries Reports*, [e-journal] 3, p.e10. https://dx.doi.org/10.15190/drep.2020.4.

Thabet, H., Alsharif, F., Garoot, L., Yousef, M., Almutairi, L. and Kutbi, R., 2021. The level of awareness of nursing students regarding polycystic ovarian syndrome in King Abdulaziz University. *Assiut Scientific Nursing Journal*, [e-journal] 9(26), pp.172-181. https://dx.doi.org/10.21608/ASNJ.2022.99698.1242.

Umaisa, S., Devi, A.M., Yadav, S. and Devi, H.M., 2021. Effectiveness of planned teaching program regarding polycystic ovarian disease in terms of knowledge and attitude among students of SGT University. *Indian Journal of Forensic Medicine & Toxicology*, [e-journal] 15(3), pp.4332-4338. https://dx.doi.org/10.37506/ijfmt.v15i3.15972.

Vallejo, G., Ato, M., Fernandez, M.P. and Livacic-Rojas, P.E., 2019. Sample size estimation for heterogeneous growth curve models with attrition. *Behavior Research Methods*, [e-journal] 51(3), pp.1216-1243. https://dx.doi.org/10.3758/s13428-018-1059-y.

Vaske, J.J., Beaman, J. and Sponarski, C.C., 2017. Rethinking internal consistency in Cronbach's alpha. *Leisure Sciences*, [e-journal] 39(2), pp.163-173. https://dx.doi.org/10.1080/01490400.2015.1127189.

Vinaykumar, K., Milanakumar, D.K., Hithesh Kumar, R., Bhavani, K.C. and Choudhary, R.P., 2023. Assessment of risk factors, prevalence, knowledge, attitude, and practice of polycystic ovary syndrome in a community. *IOSR Journal of Pharmacy*, 13(1), pp.13-20.

Wang, X. and Cheng, Z., 2020. Cross-sectional studies: Strengths, weaknesses, and recommendations. *Chest*, [e-journal] 158(1), pp.S65-S71. https://dx.doi.org/10.1016/j.chest.2020.03.012.

Yan, D., Yan-Fang, W., Shi-Yang, Z., Rui-Lin, M., Xue-Song, D., Xiao, M., Wei, X. and Aijun, S., 2021. Is polycystic ovary syndrome appropriately diagnosed by obstetricians and gynaecologists across China: A nationwide survey. *Journal of Ovarian Research*, [e-journal] 14(1), pp.1-9. https://dx.doi.org/10.1186/s13048-021-00780-6.

Yusof, M.S.B., 2019. ABC of content validation and content validity index calculation. *Education in Medicine Journal*, [e-journal] 11(2), pp.49-54. https://dx.doi.org/10.21315/eimj2019.11.2.6.

Zaitoun, B., Al Kubaisi, A., Al Qattan, N., Alassouli, Y., Mohammad, A., Alameeri, H. and Mohammed, G., 2023. Polycystic ovarian syndrome awareness among females in the UAE: A cross-sectional study. *BMC Women's Health*, [e-journal] 23(1), pp.1-12. https://dx.doi.org/10.1186/s12905-023-02318-y.

APPENDICES

APPENDIX A: CONSENT DECLARATION FORM

PARTICIPANT CONSENT FORM

Research title: Knowledge and Attitude towards Polycystic Ovary Syndrome among Undergraduate Students in A Private University in Kajang.

- I confirm that I have read and understand the information and cover letter of recruitment explaining the above research.
- I confirm that the purpose of the research, risk and benefits have been explained to me.
- I understand my participation is strictly voluntary and I am free to withdraw at any time without consequence.
- I understand my identity will be maintained anonymous and my responses will be kept private and confidential.
- I understand I am entitled to ask questions and to receive information and feedback for educational purpose after the study.
- I agree the data collected from me will be used in future research.
- I permit members of the research team to access my responses.
- I hereby give my consent to participate in the above research.

Signature of Participant,	Signature of Researcher,
_____	_____
Name:	Name:
Date:	Date:

APPENDIX B: RESEARCH INSTRUMENT

SURVEY ON THE KNOWLEDGE AND ATTITUDE TOWARDS POLYCYSTIC OVARY SYNDROME AMONG FEMALE UNDERGRADUATE STUDENTS IN A PRIVATE UNIVERSITY IN KAJANG.

This questionnaire consists of 3 sections.

Section A: Socio-demographic; **Section B:** Knowledge on polycystic ovary syndrome and **Section C:** Attitude towards polycystic ovary syndrome. Participants are required to complete **ALL** sections.

SECTION A: SOCIO-DEMOGRAPHIC CHARACTERISTIC

1.1 Age

_____

1.2 Year of study

- ☐ 1. Year 1
- ☐ 2. Year 2
- ☐ 3. Year 3
- ☐ 4. Final Year

1.3 Faculty of study

- ☐ 1. M. Kandiah Faculty of Medicine and Health Sciences (MK FMHS)
- ☐ 2. Lee Kong Chian Faculty of Engineering and Science (LKC FES)
- ☐ 3. Faculty of Accountancy and Management (FAM)
- ☐ 4. Faculty of Creative Industries (FCI)

1.4 Have you been diagnosed with PCOS by a medical professional?

☐ 1. No ☐ 2. Yes

1.5 Do you have any history of PCOS in family members?

☐ 1. No ☐ 2. Yes

SECTION B: KNOWLEDGE ON POLYCYSTIC OVARY SYNDROME (PCOS)

** Please tick where applicable.*

2.		***Yes***	***No***	***Not Sure***
2.1	Have you heard about the term called "polycystic ovary syndrome" (PCOS)?			
2.2	Have you heard about androgen (male) hormone (e.g. testosterone)?			
2.3	In PCOS there is an increased level of androgen hormone.			
2.4	Patient suffering from PCOS have small multiple cysts (a growth filled with liquid) in their ovaries.			
2.5	Obesity may cause PCOS.			
2.6	Prediabetes condition (due to decreased insulin action in body/ increase level of insulin) may cause PCOS.			
2.7	Irregular or absence of menstrual (periods) cycle is a symptom of PCOS			
2.8	Unusual amount of hair growth on different body parts (upper lip, chin, abdomen, breast, thighs etc.) is a symptom of PCOS.			
2.9	Severe acne problem during menstrual (periods) cycle is a symptom of PCOS.			
2.10	Hair loss from scalp more than normal is a symptom of PCOS.			
2.11	PCOS diagnosis can be confirmed by vaginal ultrasound.			
2.12	Specific blood test can be used for diagnosis of PCOS.			
2.13	PCOS may leads to diabetes (long-term high blood sugar level).			
2.14	PCOS may leads to heart diseases.			
2.15	PCOS may leads to infertility (inability to have children) or reduced fertility (reduced chance to get pregnant).			
2.16	PCOS may leads to anxiety and depression.			
2.17	Hormonal therapy (oral contraceptives, hormone intrauterine device etc.) may be used to treat PCOS.			
2.18	Anti-diabetic medications (metformin) may be used to treat PCOS.			
2.19	Symptomatic treatment (clomiphene, letrozole, acne topical cream etc.) may be given to relief the symptoms of PCOS.			
2.20	Surgery may be used to remove the ovarian cysts.			

SECTION C: ATTITUDE TOWARDS POLYCYSTIC OVARY SYNDROME (PCOS)

** To what extent do you agree with the following statements. Please tick either one for each of the statement below.*

3.	*In case I or someone I know was diagnosed with polycystic ovary syndrome, I would*	**Strongly disagree**	**Disagree**	**Neutral**	**Agree**	**Strongly agree**
3.1	Take it seriously and will consult a doctor.					
3.2	Use hormone regulating herbs.					
3.3	Need a lifetime treatment.					
3.4	Need emotional support.					
3.5	Have difficulty in conceiving a child in later life.					
3.6	Have bring down my confidence level					
3.7	Feel depressed.					
3.8	Have affect my study negatively.					

APPENDIX C: COVER LETTER OF RECRUITMENT

COVER LETTER OF RECRUITMENT

Dear participants,

I am Teh Sin Yie, a final year student currently pursuing Bachelor of Nursing (Honours) from M. Kanadiah Faculty of Medicine and Health Sciences in Universiti Tunku Abdul Rahman, Sungai Long Campus. I would like to invite you to participate in my research study titled "Knowledge and Attitude Towards Polycystic Ovary Syndrome Among Female Undergraduate Students in A Private University in Kajang".

The purpose of the study is to determine the level of knowledge and attitude towards polycystic ovary syndrome among female undergraduate students in a private university in Kajang. Findings of this study may be a reference for the university to organize awareness activities such as talks and webinars among students, so that they have in depth understanding regarding polycystic ovary syndrome and to implement topics related to polycystic ovary syndrome in the medical and health sciences curriculum.

The study will take about 10-15 minutes. Any female undergraduate students from health sciences and non-health sciences programs who are 18 years old and above, consent and willing to participate in this study voluntarily are considered eligible for this study. You may choose to withdraw at any time. Questionnaires are completely anonymous, and data collected will be kept private and confidentially. We urge you to complete the questionnaire with honest.

If you need further explanation regarding the research, you may contact the researcher, Ms Teh Sin Yie at sinyie31@1utar.my Or research supervisor, Dr. Thavamalar a/p Paramasivam at thavamalarp@utar.edu.my.

Thank you very much for participating in this survey. Your participation is greatly appreciated.

Yours sincerely,

TEH SIN YIE

TEH SIN YIE

APPENDIX D: PERMISSION TO USE INSTRUMENT

SIN YIE TEH <sinyie31@1utar.my>

Request Permission to use of Research Questionnaire Tool
5 messages

SIN YIE TEH <sinyie31@1utar.my> Thu, Dec 1, 2022 at 12:19 AM
To: nomanhaq79@gmail.com
Cc: Thavamalar a/p Paramasivam <thavamalarp@utar.edu.my>

Dear Professor,

I am Teh Sin Yie, a year 4 student studying Bachelor of Nursing (Honours) in Universiti Tunku Abdul Rahman, Malaysia. Currently I am doing my final year research titled 'Knowledge and attitude on polycystic ovary syndrome among undergraduate female students in a private university in Kajang'.

I came across your research paper, "Prevalence and Knowledge of Polycystic Ovary Syndrome (PCOS) Among Female Science Students of Different Public Universities of Quetta, Pakistan", and I am interested to adapt and modify the questionnaire to suit my study setting. Thus, I am writing this email to request your permission to have a look on the questionnaire.

Thank you in advance for your kind understanding and cooperation.

Yours sincerely,
Teh Sin Yie
Nursing Student
Department of Nursing
M. Kandiah Faculty of Medicine and Health Sciences
Universiti Tunku Abdul Rahman (UTAR).

Noman Haq <nomanhaq79@gmail.com> Tue, Feb 7, 2023 at 6:19 PM
To: SIN YIE TEH <sinyie31@1utar.my>

You are allowed to use the questionnaire and can do any changes to use accordingly

SIN YIE TEH <sinyie31@1utar.my>

Request Permission to use of Research Questionnaire Tool
15 messages

SIN YIE TEH <sinyie31@1utar.my> Wed, Nov 30, 2022 at 9:07 AM
To: dr.jaber_ruba@ymail.com
Cc: Thavamalar a/p Paramasivam <thavamalarp@utar.edu.my>

Dear Professor/ Dr,

Good day, I hope I can get permission and a copy of the questionnaire including how to categorize the knowledge and attitude into positive and negative for your research article "Knowledge and attitudes towards polycystic ovary syndrome" I might either adapt or adopt the questionnaire. My research title is 'Knowledge and attitude on polycystic ovary syndrome among undergraduate female students in a private university in Kajang'.

Thanking you in advance for your kind understanding and cooperation.

Yours sincerely,
Teh Sin Yie
University Tunku Abdul Rahman (UTAR)
Year 4 Nursing student

Rubi Jaber <dr.jaber_ruba@ymail.com> Thu, Dec 8, 2022 at 1:24 PM
Reply-To: Rubi Jaber <dr.jaber_ruba@ymail.com>
To: SIN YIE TEH <sinyie31@1utar.my>

Dear Sin
It is ok, as long as you cite it in your methodology.
I will try ot send it to you over the next weekend ,
please send my reminder email on Saturday
Thanks
Ruba

Ruba M Jaber
M.B.B.S
General practitioner
Associate Professor Family medicine/ school of medicine, university of Jordan

APPENDIX E: ETHICAL BOARD APPROVAL LETTER

UNIVERSITI TUNKU ABDUL RAHMAN
Wholly Owned by UTAR Education Foundation (Company No. 578227-M)

Re: U/SERC/200/2023

3 August 2023

Ms Liew Siew Fun
Head, Department of Nursing
M. Kandiah Faculty of Medicine and Health Sciences
Universiti Tunku Abdul Rahman
Jalan Sungai Long
Bandar Sungai Long
43000 Kajang, Selangor

Dear Ms Liew,

Ethical Approval For Research Project/Protocol

We refer to your application for ethical approval for your students' research project from Bachelor of Nursing (Honours) programme enrolled in course UMNE4024. We are pleased to inform you that the application has been approved under Expedited Review.

The details of the research projects are as follows:

No	Research Title	Student's Name	Supervisor's Name	Approval Validity
1.	Prevalence of Polypharmacy and Quality of Life Among Institutionalized Older People Within Klang Valley	Yee Jia Jia	Ms Liew Siew Fun	3 August 2023 – 2 August 2024
2.	Perceptions of High School Students on Nursing as a Career of Choice: A Cross-sectional Study in Chinese High Schools in Klang Valley	Chuar Shi Wei	Prof Dr Hamidah Binti Hassan	
3.	Knowledge and Practice on Vaping Among Undergraduate Students in a Private University in Kajang	Sia Chee Yan		
4.	Symptoms of Dysmenorrhea and Their Impact on Quality of Life Among Female Undergraduate Students at a Private University in Kajang	Chia Shu Jing	Dr Thavamalar a/p Paramasivam Ms G K Sathiyavani a/p Karuppiah	
5.	Knowledge and Attitude Towards Polycystic Ovary Syndrome Among Female Undergraduate Students in a Private University in Kajang	Teh Sin Yie	Dr Thavamalar a/p Paramasivam	
6.	Post COVID-19 Pandemic Level of Depression and Quality of Life Among Undergraduate Students in Private University in Kajang	Neyllyniah binti Anil	Ms Thulasy a/p Perumal	

The conduct of this research is subject to the following:

(1) The participants' informed consent be obtained prior to the commencement of the research;

(2) Confidentiality of participants' personal data must be maintained; and

Kampar Campus : Jalan Universiti, Bandar Barat, 31900 Kampar, Perak Darul Ridzuan, Malaysia
Tel: (605) 468 8888 **Fax:** (605) 466 1313
Sungai Long Campus : Jalan Sungai Long, Bandar Sungai Long, Cheras, 43000 Kajang, Selangor Darul Ehsan, Malaysia
Tel: (603) 9086 0288 **Fax:** (603) 9019 8868
Website: www.utar.edu.my

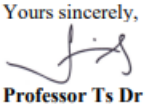
(3) Compliance with procedures set out in related policies of UTAR such as the UTAR Research Ethics and Code of Conduct, Code of Practice for Research Involving Humans and other related policies/guidelines.

(4) Written consent be obtained from the institution(s)/company(ies) in which the physical or/and online survey will be carried out, prior to the commencement of the research.

Should the students collect personal data of participants in their studies, please have the participants sign the attached Personal Data Protection Statement for records.

Thank you.

Yours sincerely,



Professor Ts Dr Faidz bin Abd Rahman
Chairman
UTAR Scientific and Ethical Review Committee

c.c Dean, M. Kandiah Faculty of Medicine and Health Sciences
Director, Institute of Postgraduate Studies and Research

Kampar Campus : Jalan Universiti, Bandar Barat, 31900 Kampar, Perak Darul Ridzuan, Malaysia
Tel: (605) 468 8888 **Fax**: (605) 466 1313
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Tel: (603) 9086 0288 **Fax**: (603) 9019 8868
Website: www.utar.edu.my

APPENDIX F: PERSONAL DATA PROTECTION STATEMENT

PERSONAL DATA PROTECTION STATEMENT

Please be informed that in accordance with Personal Data Protection Act 2010 ("PDPA") which came into force on 15 November 2013, Universiti Tunku Abdul Rahman ("UTAR") is hereby bound to make notice and require consent in relation to collection, recording, storage, usage and retention of personal information.

Notice:

1. The purposes for which your personal data may be used are inclusive but not limited to:-
   - For assessment of any application to UTAR
   - For processing any benefits and services
   - For communication purposes
   - For advertorial and news
   - For general administration and record purposes
   - For enhancing the value of education
   - For educational and related purposes consequential to UTAR
   - For the purpose of our corporate governance
   - For consideration as a guarantor for UTAR staff/ student applying for his/her scholarship/ study loan

2. Your personal data may be transferred and/or disclosed to third party and/or UTAR collaborative partners including but not limited to the respective and appointed outsourcing agents for purpose of fulfilling our obligations to you in respect of the purposes and all such other purposes that are related to the purposes and also in providing integrated services, maintaining and storing records. Your data may be shared when required by laws and when disclosure is necessary to comply with applicable laws.

3. Any personal information retained by UTAR shall be destroyed and/or deleted in accordance with our retention policy applicable for us in the event such information is no longer required.

4. UTAR is committed in ensuring the confidentiality, protection, security and accuracy of your personal information made available to us and it has been our ongoing strict policy to ensure that your personal information is accurate, complete, not misleading and updated. UTAR would also ensure that your personal data shall not be used for political and commercial purposes.

Consent:

1. By submitting this form you hereby authorise and consent to us processing (including disclosing) your personal data and any updates of your information, for the purposes and/or for any other purposes related to the purpose.

2. If you do not consent or subsequently withdraw your consent to the processing and disclosure of your personal data, UTAR will not be able to fulfill our obligations or to contact you or to assist you in respect of the purposes and/or for any other purposes related to the purpose.

3. You may access and update your personal data by writing to us at _____.

Acknowledgment of Notice

[ ] I have been notified by you and that I hereby understood, consented and agreed per UTAR above notice.

[ ] I disagree, my personal data will not be processed.

.....
Name:
Date:

APPENDIX G: RESEARCH INSTRUMENT CONTENT VALIDATION

SIN YIE TEH <sinyie31@1utar.my>

Suggestion of Experts for Establishing Content Validity of the Tool
4 messages

SIN YIE TEH <sinyie31@1utar.my> Thu, Jun 8, 2023 at 9:32 AM
To: hlong@utar.edu.my
Cc: Thavamalar a/p Paramasivam <thavamalarp@utar.edu.my>

Dear Dr,

Good day, I am Teh Sin Yie, a bachelor's nursing student at University Tunku Abdul Rahman, currently conducting research on 'Knowledge and Attitude towards Polycystic Ovary Syndrome Among Undergraduate Students in A Private University in Kajang'.

I kindly request your acceptance for being tool evaluator and provide expert opinions for the accuracy, appropriateness, relevancy and suggestions of the tool or modification if needed.

I am enclosing the summary of the research proposal and the tools for 'Knowledge and Attitude towards Polycystic Ovary Syndrome'

Thank you for your time and valid opinions.

Your sincerely,
Teh Sin Yie

Knowledge and Attitude on PCOS_Teh Sin Yie_Content Validation.docx
47K

Hai Lin Ong <hlong@utar.edu.my> Sun, Jun 25, 2023 at 9:36 PM
To: SIN YIE TEH <sinyie31@1utar.my>
Cc: Thavamalar a/p Paramasivam <thavamalarp@utar.edu.my>

Dear Sin Yie,

Thanks for your email.

My only comment is 2.4, as some samples might not understand the term "cyst" while answering your questionnaire.

Good luck.

Regards,

Ong

SIN YIE TEH <sinyie31@1utar.my>

Suggestion of Experts for Establishing Content Validity of the Tool
1 message

SIN YIE TEH <sinyie31@1utar.my> Thu, Jun 8, 2023 at 9:26 AM
To: N Ampihavathi a/p V Nagalingam <ampihavathi@utar.edu.my>
Cc: Thavamalar a/p Paramasivam <thavamalarp@utar.edu.my>

Dear Ms. Ampi,

Good day, I am Teh Sin Yie, a bachelor's nursing student at University Tunku Abdul Rahman, currently conducting research on 'Knowledge and Attitude towards Polycystic Ovary Syndrome Among Undergraduate Students in A Private University in Kajang'.

I kindly request your acceptance for being tool evaluator and provide expert opinions for the accuracy, appropriateness, relevancy and suggestions of the tool or modification if needed.

I am enclosing the summary of research proposal and the tools for 'Knowledge and Attitude towards Polycystic Ovary Syndrome'

Thank you for your time and valid opinions.

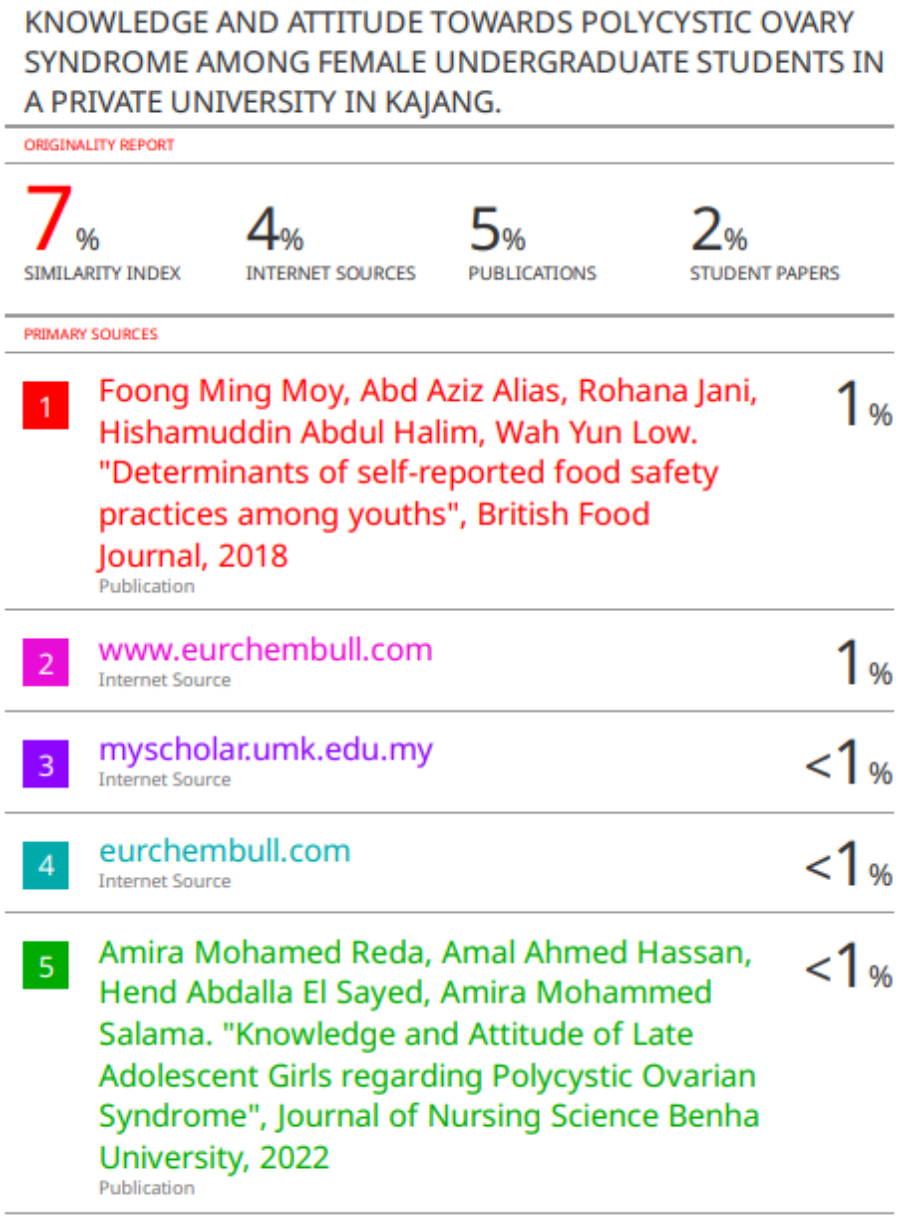
Your sincerely,
Teh Sin Yie

Knowledge and Attitude on PCOS_Teh Sin Yie_Content Validation.docx
47K

APPENDIX H: GANTT CHART

Month / Task	2022						2023													
	Oct		Nov		Dec		Jan-May		Jun		Jul		Aug		Sept					
Proposal writing & preparation							Not Taking research subject													
Proposal presentation																				
Proposal submission																				
Ethics procedures																				
Pilot study																				
Data collection and data entry																				
Data analysis																				
Result interpretation																				
Report writing																				
Report presentation																				
Thesis submission																				

APPENDIX I: TURNITIN ORIGINALITY REPORT



KNOWLEDGE AND ATTITUDE TOWARDS POLYCYSTIC OVARY SYNDROME AMONG FEMALE UNDERGRADUATE STUDENTS IN A PRIVATE UNIVERSITY IN KAJANG.

ORIGINALITY REPORT

7%	4%	5%	2%
SIMILARITY INDEX	INTERNET SOURCES	PUBLICATIONS	STUDENT PAPERS

PRIMARY SOURCES

1	Foong Ming Moy, Abd Aziz Alias, Rohana Jani, Hishamuddin Abdul Halim, Wah Yun Low. "Determinants of self-reported food safety practices among youths", British Food Journal, 2018 Publication	1%
2	www.eurchembull.com Internet Source	1%
3	myscholar.umk.edu.my Internet Source	<1%
4	eurchembull.com Internet Source	<1%
5	Amira Mohamed Reda, Amal Ahmed Hassan, Hend Abdalla El Sayed, Amira Mohammed Salama. "Knowledge and Attitude of Late Adolescent Girls regarding Polycystic Ovarian Syndrome", Journal of Nursing Science Benha University, 2022 Publication	<1%

6	Submitted to University of Sunderland Student Paper	<1%
7	Hu Jiang, Yongxia Mei, Xiaoxuan Wang, Zhixin Zhao, Beilei Lin, Wenna Wang, Zhenxiang Zhang. "Professional calling among nursing students: A Latent Profile Analysis", Research Square Platform LLC, 2023 Publication	<1%
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