UNIVERSITI PUTRA MALAYSIA

BREAST CANCER KNOWLEDGE AND ATTITUDE AMONG UNDERGRADUATE STUDENTS IN FACULTY OF MEDICINE & HEALTH SCIENCES, UNIVERSITI PUTRA MALAYSIA (UPM)

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BY

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A project paper submitted as partial fulfillment of the requirement for the degree of Bachelor of Science in Dietetics With Honours from the Faculty of Medicine and Health Sciences, Universiti Putra Malaysia.

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ABSTRACT

BREAST CANCER KNOWLEDGE AND ATTITUDE AMONG UNDERGRADUATE STUDENTS IN FACULTY OF MEDICINE AND HEALTH SCIENCES, UNIVERSITI PUTRA MALAYSIA

DALILATI DAYANA BINTI ABDUL GAFAR

Recognizing lifestyle factors including diet and physical activity that are related to higher risk of breast cancer, can positively influence breast cancer incidence prevention. The aim of this research is to determine the factors associated with knowledge and attitude towards breast cancer among undergraduate students in the Faculty of Medicine and Health Sciences, Universiti Putra Malaysia (UPM). This was a cross sectional study involving 141 undergraduate students from Faculty of Medicine and Health Sciences, UPM. Sociodemographic characteristics, anthropometry data and medical characteristics were obtained from self-administered questionnaire. Dietary intake and physical activity were assessed by using Food Frequency Questionnaire (FFQ) and International Physical Activity Questionnaire (IPAQ) respectively. Meanwhile, knowledge and attitude on breast cancer were assessed using Cancer Awareness Questionnaire (CAQ). All questionnaires were designed in online basis through Google Form. The mean age and BMI of the respondents was 21.84 ± 1.08 years old and 21.87 ± 4.31 kg/m^2 respectively. Most of the respondents have poor dietary quality (90.8 %), no family history (68.8 %), low physical activity levels (49.6 %), poor level of knowledge (60.3 %) and attitude (65.7 %) on breast cancer. There was a significant association between knowledge on breast cancer and its prevention with intake of wholegrain and wholegrain products ($r = 0.179$, $p = 0.034$) and vegetables ($r = 0.189$, $p = 0.025$). Meanwhile, consumption of vegetables was positively associated with attitude of breast cancer ($r = 0.190$, $p = 0.024$). Health care professionals can refer the knowledge and attitude level as

a parameter to develop health promotion program to increase their knowledge and attitude on reducing the prevalence of breast cancer.

ABSTRAK

PENGETAHUAN DAN SIKAP TERHADAP KANSER PAYUDARA DI KALANGAN PELAJAR PRA SISWAZAH, FAKULTI PERUBATAN DAN SAINS KESIHATAN, UNIVERSITI PUTRA MALAYSIA

DALILATI DAYANA BINTI ABDUL GAFAR

Mengenal pasti faktor gaya hidup yang berkaitan dengan peningkatan risiko kanser payudara seperti diet dan aktiviti fizikal dapat mempengaruhi penjegahan kanser payu dara. Oleh itu, tujuan penyelidikan ini dilakukan adalah untuk mengkaji faktor-faktor yang berkaitan dengan pengetahuan dan sikap terhadap kanser payudara di kalangan pelajar ijazah sarjana muda di Fakulti Perubatan dan Sains Kesihatan, Universiti Putra Malaysia (UPM). Satu kajian keratan rentas yang melibatkan 141 pelajar pra – siswazah telah melibatkan diri dalam kajian ini. Latar belakang sosiodemografi, data antropometri dan latar belakang perubatan di ambil daripada borang kendiri kaji selidik. Data pemakanan harian dan aktiviti fizikal diperolehi daripada Borang Kekerapan Makanan (FFQ) dan Soal Selidik Aktiviti Fizikal Antarabangsa (IPAQ). Di samping itu, pengetahuan dan sikap terhadap kanser payu dara dinilai melalui Soal Selidik Kesedaran Kanser (CAQ). Kaji selidik ini telah dilakukan secara dalam talian melalui aplikasi *'Google Form'*. Kekerapan umur dan indeks jisim tubuh (IJT) responden adalah 21.84 ± 1.08 tahun dan 21.87 ± 4.31 kg/m^2. Majoriti daripada responden mempunyai kualiti pemakanan yang rendah (90.8 %), tiada sejarah kanser dalam keluarga (68.8 %), aktiviti fizikal yang rendah (49.6 %), tahap pengetahuan yang lemah (60.3 %) and tahap sikap yang lemah (65.7 %) terhadap kanser payudara. Terdapat kaitan yang positif antara tahap pengetahuan terhadap kanser payudara dengan pengambilan makanan dari kumpulan bijirin dan produk bijirin ($r = 0.179$, $p = 0.034$) dan sayur – sayuran ($r = 0.189$, $p = 0.025$). Tambahan pula, pengambilan sayur sayuran di dalam diet mempunyai kaitan yang positif dengan tahan sikap terhadap

pencegahan kanser payudara (r = 0.190, p = 0.024). Pasukan penjagaan kesihatan boleh merujuk tahap pengetahuan dan sikap ini sebagai satu parameter untuk menjalankan pelbagai program kesedaran terhadap faktor risiko dan pencegahan terhadap kanser payudara.

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Finally, I have a great expectation that my study will be valuable and useful for those who is interested to read this study.

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1 INTRODUCTION

1.1 Research Background

Globally, one third (33 %) of women less than 50 years old were diagnosed with breast cancer in 2008 and about half of the women have been diagnosed in Southeast Asia (Bhatia & Re, 2016). According to Global Cancer Incidence, Mortality and Prevalence, breast cancer is the number one cancer in Malaysia with incidence rates of 47.8% per 100 thousand populations and second rank of leading causes of death in Malaysia with a death rate of 13.6% (Sung et al., 2021).

Several factors already recognize for the presence of breast cancer. Being a woman, getting older, genetics and family history are the risk factors that cannot be altered to prevent the occurrence of breast cancer. Meanwhile, being overweight, sedentary lifestyle, smoking cigarettes and alcohol intake are the modifiable causes of breast cancer (Division of Cancer Prevention and Control, 2020). Women are at a higher risk of breast cancer than men. There are approximately 2.6 thousand new invasive breast cancer cases and about 64 thousand non-invasive breast cancer cases in the US women during 2020 and men account for less than 1% of newly diagnosed cases (Breastcancer.org, 2021). In addition, family history of breast cancer is strongly associated with breast cancer among women as the results of a meta-analysis study revealed that Asian ethnicities in Malaysia and Indonesia, particularly those of Malays and Chinese, have a higher risk of breast cancer (Nindrea et al., 2019).

Unhealthy eating patterns was reported to have a positive association with development of breast cancer (Xiao et al., 2019). Excessive intake of red meat, animal fats, and refined carbs have been mentioned to be correlated with an increased risk of breast cancer (World Cancer Research Fund/American Institute for Cancer Research, 2018), meanwhile high intake of fruits and vegetables, whole grains, and dietary fiber have been associated with a reduction of breast

cancer risk factor. Research shown women who exercise regularly are less likely to develop breast cancer (World Cancer Research Fund/American Institute for Cancer Research, 2018). In Thailand, a study found that breast cancer risk decreased among women in their 20s and 30s who exercise regularly (Sangrajrang et al., 2013). Therefore, a good dietary pattern and being physically active are crucial to prevent the occurrence of breast cancer.

Knowledge, attitude, and practice (KAP) towards the disease may contribute to the awareness and prevention of disease. Nowadays, nutritional recommendations have been included in medical practices to educate the patients about the disease. Chronic disease has been observed to have a significant impact on risk reduction when there have been positive changes in eating patterns (Ganasegeran et al., 2012). As a result, recognizing the risk factors associated with eating patterns that increase breast cancer risk have a positive influenced on dietary behaviors and the incidence of the disease.

The chances of successfully treating breast cancer are higher when it is diagnosed in its early stages rather than when it is diagnosed later. Delay in diagnosis is associated with lower survival rates, more complications associated with treatment and higher costs. For that purpose, medical and health sciences students play important roles as part of healthcare professionals to be noticed not only by the pathogenesis of breast cancer, but also by the knowledge of breast cancer nutrition related factors. Since there is limited study about nutrition related to KAP breast cancer risk factors and prevention in Malaysia, this study aims to close that gap in the literature. In consequence, this study will be conducted to determine breast cancer knowledge and attitude among undergraduate students in the Faculty of Medicine and Health Sciences, UPM. In addition, this study also was designed to determine the association between sociodemographic background, nutritional status, medical characteristic and physical activity status with knowledge and attitude towards breast cancer and prevention.

1.2 Problem Statement

Knowledge, and attitude concerning the nutritional factors related to breast cancer are important, as it can help to reduce the incidence and cost of breast cancer as well as minimize the burden on health care providers. According to cancer country profiles 2020 by the World Health Organization (WHO), the data presented shows that the burden of breast cancer in Malaysia is the highest among the other cancers. It states that incidence of breast cancer is 47.8% while 13.6% of mortality cases are from breast cancer only (Sung et al., 2021). This means that there are one to two patients who died out of ten patients who suffered from breast cancer. Apart from that, WHO also mentioned estimated past and future trends in total cases per year where there are approximately 5000 cases in 2012 and keep rising to 7500 in 2018 while they estimate that the cases will go higher up to 13.3 thousand cases of breast cancer in the next 20 years. Therefore, low level of KAP toward breast cancer may show a significant problem that should be addressed in reducing the incidence of breast cancer.

In a case control study done by researchers in Bangkok, Thailand, researchers found that body mass index (BMI) is associated with breast cancer risk, and the risk is even higher in postmenopausal women (Sangrajrang et al., 2013). In addition, higher fat intake could increase the risk of developing breast cancer about five times higher (S. Singh et al., 2018). This evidence is also supported by Rose & Vona-Davis (2010), the association between postmenopausal breast cancer and adiposity is directly related with upper body obesity and several studies have found that the higher waist to hip ratio, the higher the risk factor of breast cancer (Friedenreich, 2001). In Malaysia, there is a case control study that shows a significant association ($p < 0.05$) between high BMI and breast cancer risk (Norsa'adah et al., 2005). However, there is still limited study on knowledge and attitude towards breast cancer that are related to BMI in Malaysia.

Apart from that, KAP on dietary intake also affects breast cancer risk (World Cancer Research Fund/American Institute for Cancer Research, 2018). As a means of preventing cancer occurrence, they also encourage each person to have a healthy lifestyle, which includes maintaining a healthy body weight, eat plenty of fruits and vegetables, restricting red meats intake and avoiding sugary foods. There is a study that states that fruits and vegetables intake are associated with breast cancer risk factor and prevention in an indirect way (Peng et al., 2017). This means that, in response towards high fruits and vegetable intake, there is a minimal short-term weight reduction in breast cancer survivors. Next, based on research done by Raji Lahiji et al. (2019), knowledge about dietary intake in breast cancer risk factor is still lacking as there are about half of the participants unaware of "weight gain", "vitamin D deficiency", "vitamin C deficiency" and "consuming sweet foods" are known risk of breast cancer. However, based on the same study, they found that those with a history of breast cancer had higher nutrition knowledge about breast cancer and prevention. Nonetheless, in the context of Malaysia, the association between KAP towards dietary intake and breast cancer risk factor and prevention is limited.

Lastly, it is reported that being physically active including vigorous physical activity can reduce the risk of breast cancer in pre- and postmenopausal women (World Cancer Research Fund/American Institute for Cancer Research, 2018). In addition, physical activity has shown significant association on reducing one-quarter of average risk of breast cancer (Lynch et al., 2011). This is due to physical activity had make a significant reduction on estrogens and androgens levels in postmenopausal women (World Cancer Research Fund/American Institute for Cancer Research, 2018). Similarly, there are findings stating that physical activity influences the reduction in levels of free circulating estradiol. As long-term exposure to high levels of endogenous hormones is a significant major risk factor for breast cancer in females, it is evident that physical activity may help reduce breast cancer risk. Though, knowledge and

attitude towards breast cancer risk factors that are related to nutrition and physical activity are yet to be explored in Malaysia.

1.3 Research Questions

1. What are the sociodemographic background, nutritional status, medical characteristics and physical activity status among undergraduate students in the Faculty of Medicine and Health Sciences, UPM?
2. What are the knowledge and attitude of breast cancer among undergraduate students in the Faculty of Medicine and Health Science UPM?
3. What are the association between sociodemographic background, nutritional status, medical characteristic and physical activity status with knowledge and attitude towards breast cancer among undergraduate students in the Faculty of Medicine and Health Sciences UPM?

1.4 Significance of Study

There is limited study done for breast cancer nutrition-related knowledge and attitude in Malaysia. Hence, this study served to fill in the gap of the current knowledge and attitude about breast cancer in Malaysia related to nutrition and its associated risk factors. In Iran, there has been a study that focuses on nutrition knowledge and attitude (Raji Lahiji et al., 2019). Therefore, the findings can be used as a baseline data or reference for the future studies on breast cancer nutrition knowledge and attitude in Malaysia.

Additionally, the associated nutrition related risk factors and prevention of breast cancer can assist the policy makers and health care professionals to implement and develop appropriate preventive measures such as health education, motivational interview and intervention programs for the population who are at risk of breast cancer.

Lastly, this study can help to increase the knowledge and awareness for the community in Malaysia on the issues of risk factors and prevention towards breast cancer that are related to nutrition. Hence, the community can help to improve their overall health status.

1.5 Objectives

1.5.1 General Objective

To determine the factors associated with knowledge and attitude towards breast cancer among undergraduate students in the Faculty of Medicine and Health Sciences, Universiti Putra Malaysia (UPM).

1.5.2 Specific Objective

1. To determine the sociodemographic background, nutritional status, medical characteristic and physical activity status among undergraduate students in the Faculty of Medicine and Health Sciences, Universiti Putra Malaysia (UPM).
2. To assess knowledge and attitude towards breast cancer among undergraduate students in the Faculty of Medicine and Health Sciences, Universiti Putra Malaysia (UPM).
3. To determine the association between sociodemographic background, nutritional status, medical characteristic and physical activity status with knowledge and attitude towards breast cancer among undergraduate students in Faculty of Medicine and Health Sciences, Universiti Putra Malaysia (UPM).

1.6 Null Hypothesis

There is no association between socio-demographic background, nutritional status, medical characteristic and physical activity status with knowledge and attitude towards breast cancer among undergraduate students in the Faculty of Medicine and Health Sciences, UPM.

1.7 Conceptual Framework

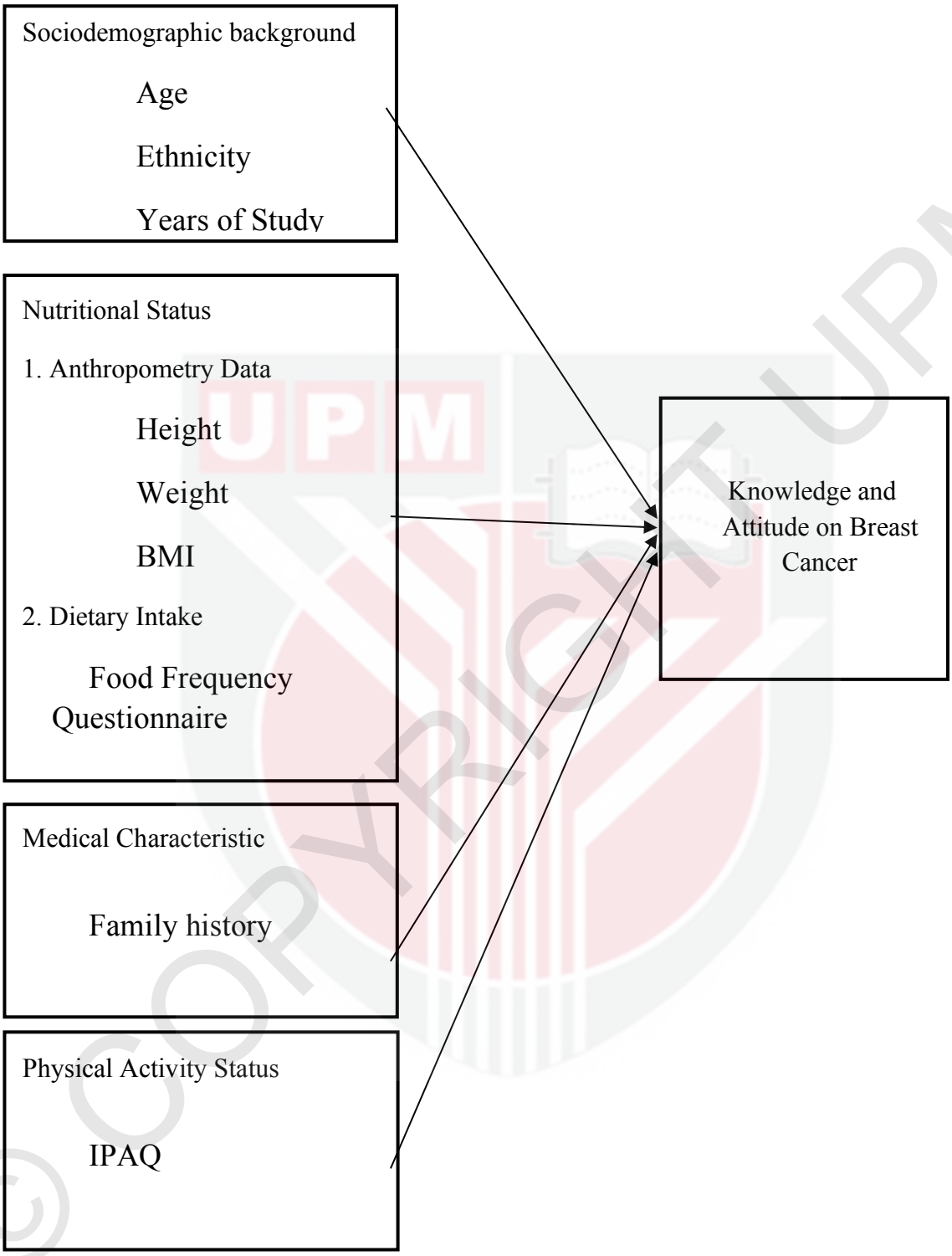


Figure 1: Conceptual framework of the study

2 LITERATURE RIVIEW

2.1 Knowledge, attitude, and practice related to nutrition towards breast cancer

Cited from a research done by Raji Lahiji et al. (2019) knowledge about dietary intake in breast cancer risk factor is still insufficient as there is only 50 % of the subjects noticed that "weight gain", "vitamin d deficiency", "vitamin c deficiency" and "consuming sweet foods" as risk factors for breast cancer while the other half did not. This is also supported by the study done among undergraduate students in University of Ibadan, Nigeria where they found that there is a significant association between knowledge of cancer prevention and consumption of dietary pattern (Folasire et al., 2016). In addition, awareness of several dietary factors associated with occurrence of cancer (include red meat, alcohol intake and limited consumptions of fruits & vegetables) was particularly poor (Power et al., 2011). Similar with the study done among British adults, where their knowledge about low fibre diet, low intake of fruits and vegetables and high fat diet which are the established causes of the occurrence of breast cancer are very low; 5-10% from the participants (Wardle et al., 2001). In terms of other nutritional status such as BMI, there is a study proved that only a third of the respondents (33%) identified that being overweight is the risk factor of breast cancer (Redeker et al., 2009). Lastly, a group of researchers conclude that there is a positive correlation with high levels of knowledge about breast cancer prevention with the attitudes and practices done by the subjects especially on eating practices (Raji Lahiji et al., 2019).

2.2 Association between body weight status and breast cancer

Incidence rate of breast cancer is claimed to be the highest by the Global Cancer Observatory which is 47.8 and 13.6 % of mortality cases which categorized as second rank of leading causes of mortality in Malaysia (Sung et al., 2021). One of the risk factors that

associated with breast cancer especially among premenopausal and postmenopausal women including nutritional status of the women such as weight status.

Findings from a case control study conducted by (Chow et al., 2005) found that a group of researchers in Bangkok, Thailand found that 198 participants of a cases group in Hong Kong, China, where the risk of developing breast cancer during post-menopausal stage is increased with BMI more than 23 kg/m^2. This evidence is also supported by Sangrajrang et al. (2013) who are doing case control study claimed that there is a significant association between BMI and the presence of breast cancer, and the risk is even higher in post-menopausal women but not in premenopausal women. Besides, a study done in North India mentioned that the risk of developing breast cancer is decreased among the participants who had BMI less than 18.5 kg/m^2. In addition, the researcher also mentioned that higher fat intake could increase the risk of developing breast cancer about five times higher (M. Singh & Jangra, 2013). The higher fat intake would induce overconsumption and contribute to the overweight and obesity that are associated with having breast cancer. The finding is also supported by (Elkum et al., 2014) in a study which was done in the Kingdom of Saudi Arabia (KSA). The researcher found that the proportion of cases group who have BMI more than 25 kg/m^2 was significantly higher among healthy control groups.

On the other hand, there is also a study to determine the obesity correlation in premenopausal women such as a research done by Salleh et al. (2007) to 75 subjects including three major ethnics in Malaysia which is Malay, Chinese and Indian. The researchers found out, abdominal obesity has approximately 4-5 times risk of breast cancer among premenopausal women as measured by waist circumference. The researchers also used waist to hip ratio (WHR) to assess abdominal obesity and the results is that WHR also has a

significant association with the risk of breast cancer among premenopausal women (Salleh et al., 2007).

2.3 Association between dietary intake and breast cancer

Healthy lifestyle which are maintaining the normal body weight, having a plenty of fruits and vegetables, restricting red meats intake and avoiding sugary foods could positively affect the risk of developing breast cancer (World Cancer Research Fund/American Institute for Cancer Research, 2018). These findings are also supported by (Peng et al., 2017) who are conducted a meta-analysis and they found that there is a significance difference ($p=0.003$) in two studies (Saxe et al., 1999; Thomson et al., 2011) investigated the association between highest versus lowest total vegetable intake and breast cancer recurrence. This means that, in response towards high fruits and vegetable intake, there is a minimal short-term weight reduction in breast cancer survivors (Peng et al., 2017). In the same context of study, limiting high fat foods especially food that are high in saturated fatty acids (reduced 7% calories from saturated fat) could decrease the mortality incidence from any cause into 59% yet no consistent associations were mentioned between breast cancer survival and types of fat intake (Beasley et al., 2011).

2.4 Association between physical activity status and breast cancer

Active lifestyle such as participating in vigorous physical activity reduced the risk of breast cancer in both pre-menopausal and post-menopausal women (World Cancer Research Fund/American Institute for Cancer Research, 2018). This statement was supported by many researchers from various backgrounds. A systematic review of 73 observational epidemiological studies done by a group of researchers found that there is a significantly 40 % decreased in breast cancer risk factors from the reviews when comparing the level of physical activity (Lynch et al., 2011). This is due to physical activity had make a significant reduction

on estrogens and androgens levels in postmenopausal women (World Cancer Research Fund/American Institute for Cancer Research, 2018). This claim was supported by Lynch et al. (2011) where estrogens have biologic mechanisms that stimulate a proliferation of mammary glands cells through estrogen receptor-mediated transcriptional activity and by activation of intracellular signaling pathways (Lorincz & Sukumar, 2006). Another evidence to support this claim is from a systematic review of randomized controlled trials, with meta-analysis found that there is a statistically significant decrease in total and percent of fat mass when high level of physical activity was performed that significantly reduced the estrogens levels as fat mass is the main source of estrogens (Ennour-Idrissi et al., 2015).

3 METHODOLOGY

3.1 Study Design

This is a cross sectional study that was conducted to assess the knowledge and attitude towards breast cancer among undergraduate students from Faculty of Medicine and Health Sciences, Universiti Putra Malaysia (UPM).

3.2 Study Location

This study was conducted among undergraduate students in the Faculty of Medicine and Health Sciences, Universiti Putra Malaysia (UPM). Faculty of Medicine and Health Sciences is one of the 16 faculties in Universiti Putra Malaysia (UPM). It is in the West of Hospital Serdang and at the South of Hospital Pengajar Universiti Putra Malaysia (HPUPM). Currently there are about 1285 undergraduate students under the Faculty of Medicine and Health Sciences with six different bachelor programmes offered in this faculty.

3.3 Study Population

3.3.1 Sampling Population

The sample population of this study are undergraduate students aged 21-30 years old and currently studying in the Faculty of Medicine and Health Sciences, Universiti Putra Malaysia (UPM).

3.3.2 Sampling Method

In this study, a cluster sampling method was used to sample the population. Firstly, the list of faculties in Universiti Putra Malaysia (UPM) were obtained from the official portal of the Universiti Putra Malaysia. Then, from the 16 faculties in Universiti Putra Malaysia , only one faculty was selected by using a simple random sample technique. Faculty of Medicine and Health Sciences was selected (Figure 3.1). All female undergraduate students who meet the inclusion and exclusion criteria in the selected faculty were invited to participate in this study.

3.3.3 Selection Criteria

The subject in this study are undergraduate students aged 21-30 years old and are currently studying in the Faculty of Medicine and Health Sciences. The inclusion and exclusion criteria for the undergraduate students are as follows:

Inclusion criteria:

- Aged 21-30 years old
- Female undergraduate students
- Currently studying in Faculty of Medicine and Health Sciences, UPM

Exclusion criteria:

- Presence of breast cancer
- Students who refused to participate in the study

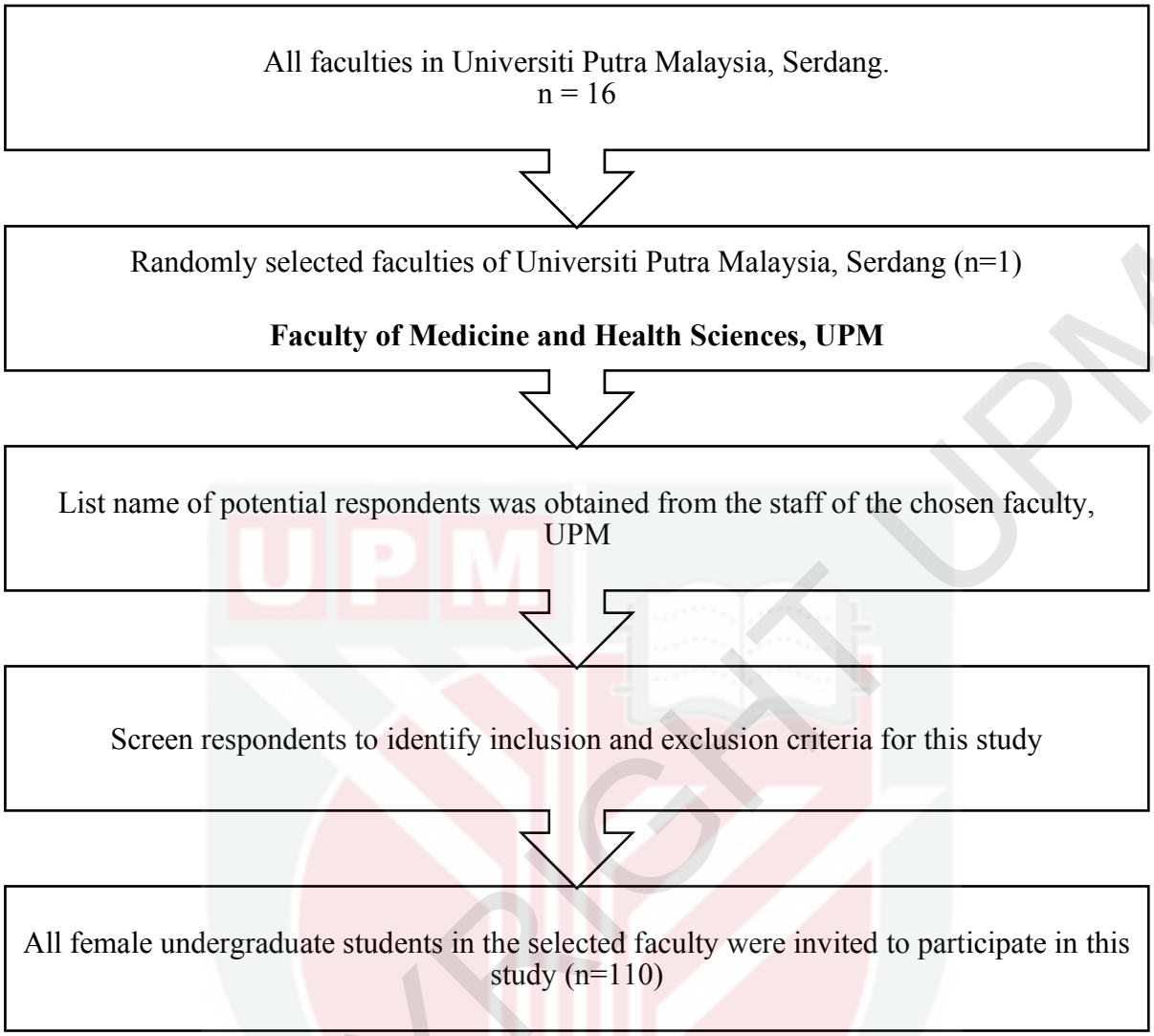


Figure 3.1: Cluster sampling for respondent recruitment

3.3.4 Sample Size Determination

Sample size for correlation study was used to determine sample size as shown below (Hulley, Cummings, Browner, Grady, & Newman, 2013)

$$\mathbf{n = [(z\alpha+z\beta)/c]^2 + 3}$$

Where,

N = Required sample size

A = $z\alpha$ = 1.96

B = $z\beta$ = 0.84 (80%)

C = 0.5 x in [(1+r)/(1-r)]

R = The expected correlation coefficient

Table 3.1: Table of sample size calculation

Correlation Studies	**Correlation Coefficient, R**	**Sample Size, N**
Association between nutritional diet and knowledge on nutrition breast cancer among female (Asadi et. al., 2018)	r = 0.880	C = 0.5 x In [(1+r)/(1-r)] N = [(Zα+Zβ)/C]2 + 3 N = 7.14 **= 7**
Association between knowledge and dietary quality towards nutrition breast cancer among undergraduate students in Malaysia (Ayob & Mohd Shukri, 2020	r = 0.29	C = 0.5 x In [(1+r)/(1-r)] N = [(Zα+Zβ)/C]2 + 3 N = 91.28 **= 92**

Table 3.1 shows the calculation of sample size using formula by Hulley, Cummings, Browner, Grady, & Newman, (2013). The highest sample size from the calculation was 92. After adjusting to 20% for non - response rate, the minimum sample size was 110 respondents.

3.4 Study Instrument

The study instrument that was used in conducting this study was questionnaire that include self-administered questionnaire, validated forms and measurements recorded. The questionnaire was filled by the respondent to ensure all the information were accurate. The time estimated for a respondent to complete the questionnaire is around 15 minutes. This questionnaire contains 5 sections which will enquire about the sociodemographic background,

medical characteristic anthropometric measurements, physical activity level and dietary intake of the respondents.

3.4.1 Sociodemographic characteristics

Sociodemographic background of respondents was obtained through the self-administered questionnaire. It includes information such as subjects' age (18-30 years old), gender (female), ethnicity (Malay, Chinese, Indian, or others), and marital status (single, divorced, married, widow).

3.4.2 Nutritional Status

Anthropometric Data

To obtain anthropometric variables, self-reported weight and height were asked to the subjects. However, the guidelines on how to take a reading for weight and height were provided to the subjects. The subjects were asked to take the reading three times as the average reading were recorded. From the weight and height data, BMI was calculated using a formula BMI = current weight (kg) / height^2 (m). The subjects were classified according to Public Health, World Health and Organization (2004) for Asian population cut off which is underweight, normal, overweight, and obese (Table 3.2).

Table 3.2: Asian population criteria for BMI according to WHO

BMI Classification	Public Health, WHO (2004)
Underweight	< 18.5 kg/m^2
Normal	18.5 – 22.9 kg/m^2
Overweight & Obese	> 23 kg/m^2

Dietary Intake

The purpose of assessing dietary intake was to further measure the diet quality that determine the good practices toward risk factor and cancer prevention. Tools that were used for obtaining dietary intake information is Food Frequency Questionnaire (FFQ) adapted from Malaysian Adult Nutrition Survey (MANS), 2014 that have been modified according to the study's need. Food Frequency Questionnaire (FFQ) listed 26 food items which were categorized into 5 food groups. There were four main columns in the FFQ that describe the frequency, serving size and the number of servings consumed each time the food item was eaten.

The 5 food groups included in FFQ are listed below.

a) Wholegrain and wholegrain product (4 food items)
b) Meat and meat products (2 food items)
c) Vegetables (5 food items)
d) Fruits (10 food items)
e) Alcoholic beverages (5 food items)

All the food items that were listed are the type of foods that have potential effect to the occurrence or the prevention of the breast cancer. Next, the score for each food category was

compared with servings recommended by Malaysian Dietary Guideline 2010 (Ministry of Health Malaysia, 2010) and was calculated as below:

No of servings taken ÷ servings recommended by MDG × 10

Overall total score were classified based on Malaysian Healthy Eating Index that was developed by Lee et al. (2011) to assess the overall diet quality of the respondents in Malaysia, and it was validated by (Appannah et al., 2020). Table 3.3 shows the classification category in Malaysian Healthy Eating Index.

HEI Classification	Total Score (%)
Poor diet quality	< 51%
Diet requiring improvements	51 % - 80 %
Good diet quality	> 80 %

Table 3.3: Classification of Malaysian Healthy Eating Index score

3.4.3 Medical Characteristic

Medical characteristic information was obtained from a self-administered questionnaire which includes the family history of breast cancer.

3.4.4 Physical Activity

The questionnaire for physical activity was derived from International Physical Activity Questionnaire (IPAQ) short form edition. The IPAQ is a self-administered, 7-day recall questionnaire designed to provide a general estimation of physical activity levels of young and middle-aged adults from 15 to 69 years old. The short form IPAQ was used in this study where it consists of 4 generic items which records the activity for the last 7 days of four intensity levels including vigorous-intensity activity such as heavy lifting, moderate-intensity activity

such as carrying light loads, walking, and sitting. Overall, the purpose of the questionnaire was to gather information on the types, frequency, intensity, and time (duration) of the physical activity carried out during the last 7 days prior to the interview. As a result, the data obtained were reported in categorical data which are low activity levels, moderate activity levels or high activity levels (Table 3.4).

Table 3.4: Criteria for each physical activity category

Physical Activity Category	**Criteria**
Low activity levels	No activity reported or did not meet any of the criteria either moderate or high levels of physical activity
Moderate activity levels	If the respondent engages in one of these criteria: • 3 or more days of vigorous intensity activity and/or walking of at least 30 minutes per day • 5 or more days of moderate intensity activity and/or walking of at least 30 minutes per day • 5 or more days of any combination of walking, moderate intensity or vigorous intensity activities achieving a minimum total physical activity of at least 600 MET minutes a week.
High activity levels	If the respondent engages in one of these criteria: • Vigorous intensity activity on at least 3 days achieving a minimum total physical activity of at least 1500 MET minutes a week • 7 or more days of any combination of walking, moderate intensity or vigorous intensity activities achieving a minimum total physical activity of at least 3000 MET minutes a week.

3.4.5 Knowledge and Attitude

Questionnaire on Knowledge Towards Breast Cancer

The questionnaire to determine the knowledge towards breast cancer that was adapted from Cancer Awareness Questionnaire from (Lin Loo et al., 2013). This questionnaire was designed to determine the knowledge or information level of the subjects regarding the risk factors

towards breast cancer that are related to nutrition, physical activity, and lifestyle factors. There are about 23 items altogether with three answer options which are true, false or don't know. A total of 19 out of 23 items are positive statements while the remaining four are negative statements. Items were scored according to the correct and incorrect answer. Each correct items were summed to obtain total score in percentage. The higher the score, the higher level of knowledge related to risk factors and prevention of breast cancer. Good score level refers to more than 70% of the answer is correct.

In terms of validity and reliability, this self-administered questionnaire have good internal consistency in measuring level of knowledge and awareness related to risk factors and prevention of breast cancer with a Cronbach's coefficient alpha value is 0.65 (Lin Loo et al., 2013).

Questionnaire on Attitude Towards Breast Cancer

Similar with the questionnaire to assess attitude towards breast cancer, Cancer Awareness Questionnaire (CAQ) was adapted and has been validated by Lin Loo et al. (2013), with the value of Cronbach's coefficient alpha is 0.65 which showed high validity and reliability. The purpose of this questionnaire was to gather the information regarding attitudes of the subjects to prevent breast cancer in the future. There were 15 questions that were asked to the subjects by using a Likert scale. Likert scale consists of five points of agreement which are strongly agree, agree, neither agree nor disagree, disagree, and strongly disagree, which were scored as 4, 3, 2, 1 and 0, respectively.

From a total of 15 items, there are 11 positive and four negative statements. The reverse score was used for negative statements. The maximum score for this scale was 60. All items were summed to obtain total score in percentage. The higher the score, the higher level of attitudes

towards cancer and cancer prevention. Good score level refers to more than 70% of the answer is correct.

3.5 Pre – Testing

Prior to data collection, a pre - testing survey was conducted to assess the comprehensiveness of the questionnaire and the participants' understanding regarding the questionnaire. Pre - testing questionnaires were distributed to the random sample that have similar characteristics with the sample population. Apart from that, time required to complete the questionnaire also was identified. Any problems and errors that happened during answering the questionnaire were determined and corrected based on their feedback. Subsequently, the questionnaire was adjusted and revised after the pre-testing to ensure the subjects can obtain the appropriate information during the actual data collection. The subjects who have participated in pretesting have not been included in the actual data collection.

3.6 Study Procedure

Prior to the study, approval for the study protocol was obtained from the Ethics Committee for Research Involving Human Subjects UPM (JKEUPM) (Reference no: JKEUPM-2020-503) (Appendix A). Data collection carried out after permission was obtained from JKEUPM. Information sheets regarding the purpose of study was distributed through the class representatives of the selected program and online consent form were given to get informed consent before answering the questionnaire. Then, the researchers were ready to answer every question virtually that was arise from the subjects during the administration of the study.

3.7 Data Analysis

Statistical analyses were performed using IBM SPSS Version 24 with statistical significance level was set at $p < 0.05$. The descriptive data was analyzed using univariate analysis with nominal and categorical reports as mean ± SD meanwhile continuous variables present as

frequencies and percentage. For bivariate analysis, Pearson correlation and chi-square test was conducted to evaluate the association between independent variables (socio-demographic, anthropometric data, dietary intake, medical characteristics, physical activity status) with dependent variables (knowledge, attitude, and practice towards breast cancer).

4 RESULT AND DISCUSSION

This chapter presented the findings of this study in which to determine the association between sociodemographic factors, nutritional status (anthropometry measurements and dietary intake), medical characteristics and physical activity status with knowledge and attitude among undergraduate students in Faculty of Medicine & Health Sciences, Universiti Putra Malaysia (UPM).

4.1 Screening and recruitment of the respondents

There are 6 programs in Faculty of Medicine and Health Sciences includes:

(a) Doctor of Medicine

(b) Bachelor of Science (Dietetics)

(c) Bachelor of Science (Nutrition and Community)

(d) Bachelor of Science (Environmental & Occupational Health)

(e) Bachelor of Biomedical Science

(f) Bachelor of Nursing

All female undergraduate students in Faculty of Medicine and Health Science were invited to participate in this study through email and info dissemination by class representative. Figure 4.1 shows the screening and recruitment procedure of the study. A total of 144 undergraduate students were screened for the study. 141 were eligible for this study based on inclusion and exclusion criteria. A minimum sample size is 110 respondents, and the response rate is 130%.

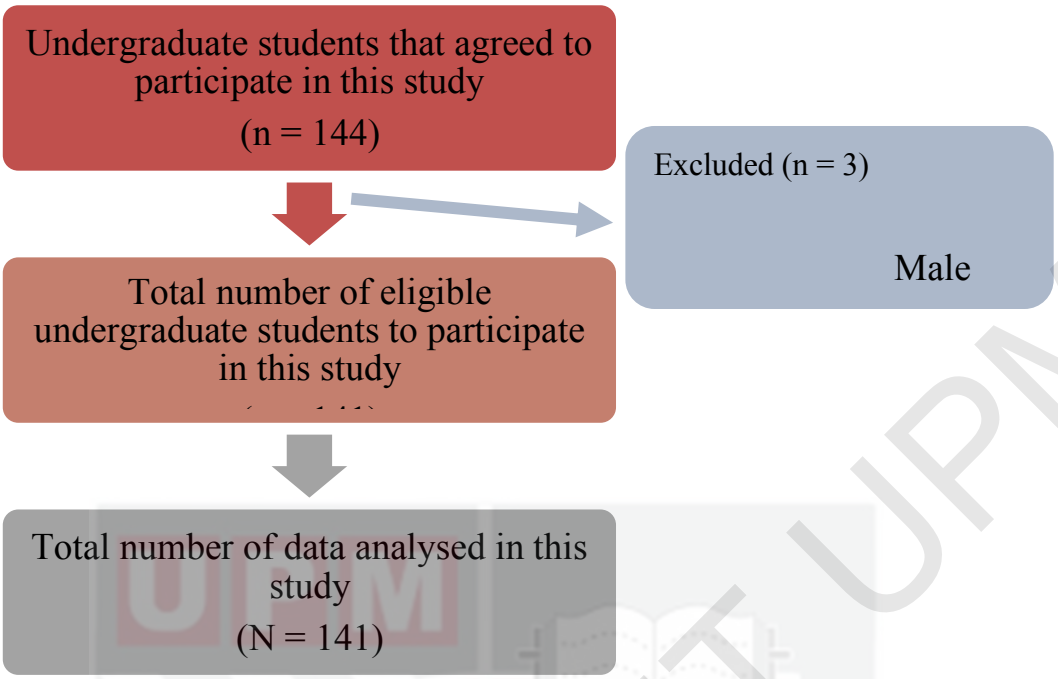


Figure 4.1 Screening and recruitment of respondents

4.2 Sociodemographic characteristics of the respondents

There were 141 female undergraduate students from Faculty of Medicine & Health Sciences, UPM participated in this study. The mean age was 21.84 ± 1.08 years and it was found that majority of the respondents are Malay followed by Chinese and Indian respondents. Among the undergraduate students, about half of them is in their third year of study (48.2 %) and the rest is first year (15.6 %), second year (17.0 %) and fourth year (19.2 %) of study. The sociodemographic characteristics of the respondents are tabulated in Table 4.1.

Table 4.1: Sociodemographic characteristics of the respondent (n=141)

Variables	n (%)	Mean ± SD
Age (years)		21.84 ± 1.08
20	21 (14.5)	
21	17 (12.1)	
22	69 (48.9)	
23	29 (20.6)	
24	5 (3.5)	
Ethnicity		
Malay	106 (75.2)	
Chinese	20 (14.2)	
Indian	7 (5.0)	
Other	8 (5.7)	
Years of study		2.71 ± 0.95
Year 1	22 (15.6)	
Year 2	24 (17.0)	
Year 3	68 (48.2)	
Year 4	27 (19.2)	

4.3 Nutritional status of the respondents

Nutritional status of the respondents was determined from anthropometry data and dietary intake. In anthropometry data, the findings consist of weight, height, and BMI that were classified accordingly. Meanwhile the dietary intake was measured to indicate the diet quality of the respondent.

4.3.1 Anthropometry data

The mean weight of the respondents was 54.01 ± 11.3 kg in which the minimum weight of the respondents was 38 kg and maximum weight of the respondents was 103 kg. In terms of

height, mean of the respondent was 157.23 ± 5.80 cm which is 142 cm and 172 cm is the minimum and maximum height respectively. Table 4.2 shows the anthropometry data of the respondents.

Table 4.2: Anthropometry data of the respondents (n=144)

Characteristic	**Range**	**Mean ± SD**
Weight (kg)	38 – 103	54.01 ± 11.3
Height (cm)	142 – 170	157.23 ± 5.80
BMI (kg/m^2)	14.86 – 39.74	21.87 ± 4.31

The mean BMI of the patients was 21.87 ± 4.31 kg/m^2, which indicates that the average BMI of these respondents were normal according to World Health Organization (2004) for Asian population cut off. In terms of detailed nutritional features of the BMI classification, the study found that about half of the respondents was in normal BMI, 19.1 % were underweight and 32.6% were categorized as overweight and obese. Figure 4.2 shows results of classification for BMI of the respondents.

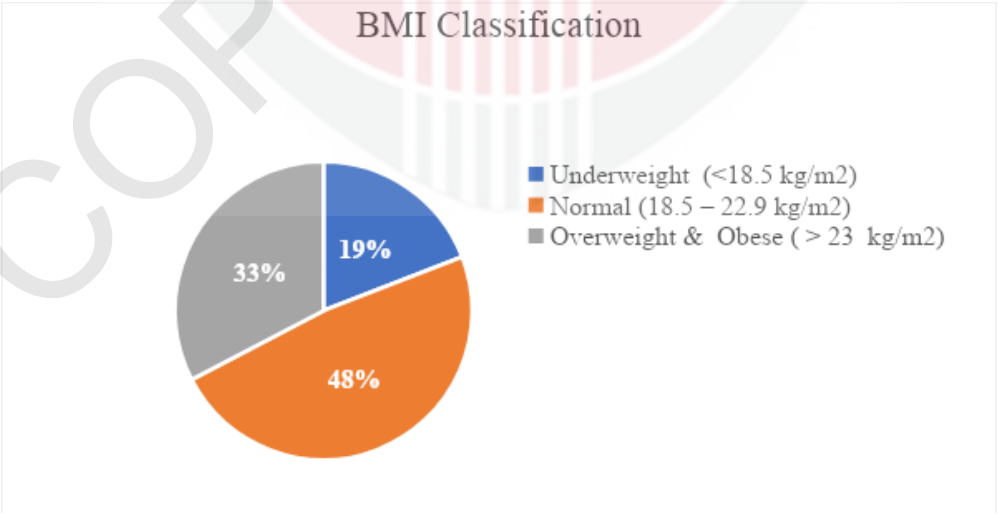


Figure 4.2: Classification of BMI of the respondents (n=141)

4.3.2 Dietary intake

Food frequency questionnaire was used in this study to measure the dietary intake that indicates dietary quality of the respondents towards food that have potential to increase or decrease the risk of cancer. The score calculated based on formula from Malaysian Healthy Eating Index and was classified accordingly. Mean score for each food groups taken by the respondents were tabulated in Table 4.4 and the proportion of the dietary quality was presented in Figure 4.3. Averagely, the overall score for dietary quality is 39.00 ± 10.54 % which is categorized as poor diet quality as classified in Table 4.3. In addition, the proportion of the dietary quality among the respondents show that 90% of them have poor diet quality, 9 % have diet requiring improvements and none of them have good diet quality. This finding is in contrast to previous findings in which, only 23% of them have poor diet quality and 72% is in moderate dietary quality (56.9± 10.1) (Ayob & Mohd Shukri, 2020).

Table 4.3 Mean score for overall dietary quality and based on food groups from the dietary intake

	HEI range score	**Mean ± SD**
Overall dietary quality (HEI)	0 – 100%	39.00 ± 10.54
Food groups		
Wholegrain & Wholegrain product	1 – 10	1.21 ± 1.93
Red and processed Meat	1 – 10	5.85 ± 4.16
Fruits	1 – 10	0.84 ± 1.43
Vegetable	1 – 10	1.944 ± 1.85
Alcohol	1 – 10	9.65 ± 0.13

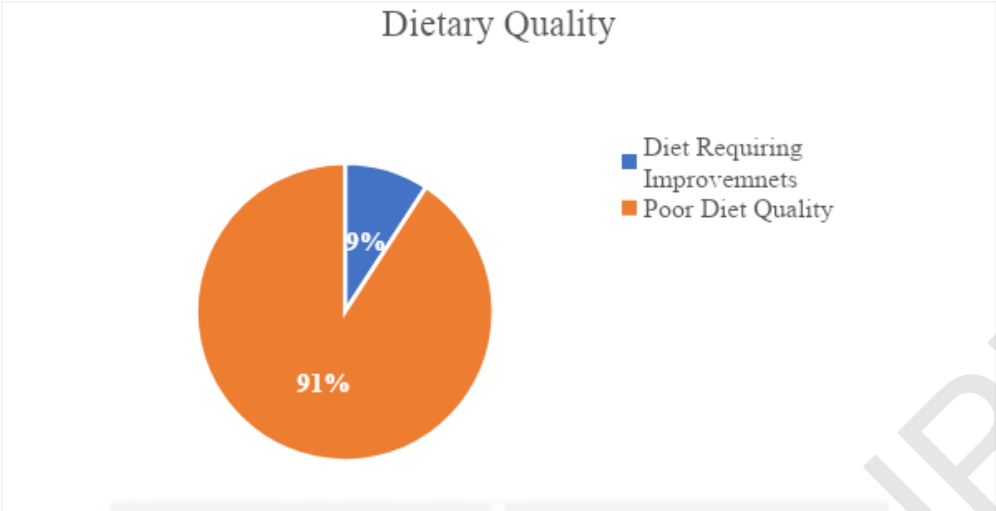


Figure 4.3: Proportion of dietary quality among the respondents

Table 4.4 shows mean intake based on food groups among the respondents. In average, majority of the respondents did not achieve the recommendation serving per day for wholegrain & wholegrain products, fruits, and vegetables (0.97 ± 1.55, 1.34 ± 2.29, 2.92 ± 2.72). This finding was supported by a study done among undergraduate students, only 13% of them consumed wholegrain & wholegrain products daily (Subramanian et al., 2019). Meanwhile, a study conducted among International I slamic University Malaysia (IIUM) students in Gombak revealed that half of the students consume only one serving of fruits and vegetable daily (Sirfan et al., 2020). In terms of red and processed meat, most of the respondent did not exceed the recommended serving intake (1.06 ± 1.07). Similar finding shown by Subramaniam et. al., (2019), 1/3 of medical students consumed red meat and processed meat products 2 – 3 times per week.

Table 4.4: Mean intake based on food groups among respondents

Food Groups	Mean ± SD	Recommendation intake based on MDG
Wholegrain & Wholegrain products	0.97 ± 1.55	2 servings per day
Red and processed meat	1.06 ± 1.07	*< 3 servings per week
Fruits	1.34 ± 2.29	2 servings per day
Vegetable	2.92 ± 2.72	3 servings per day
Alcohol	0.17 ± 0.07	*0 servings per day

* Recommendation intake based on World Cancer Research Fund for prevention of breast cancer

4.4 Medical characteristic of the respondents

Table 4.5 shows family history of the respondents. More than half of the respondents reported that they don't have family history of breast cancer (68.8 %). Meanwhile about one third of them have family history of breast cancer includes in the first-degree family (3.5 %) and in the other family relatives (27.7 %).

Table 4.5: Family history of breast cancer (n=141)

Family history of breast cancer	n (%)
Have family history	
In the first-degree family	5 (3.5)
In the other family	39 (27.7)
No family history	97 (68.8)

4.5 Physical activity status of the respondents

Physical activity status of the respondents based on International Physical Activity Level Questionnaire (IPAQ) was presented in Table 4.6. About half of the respondents are

categorized in low and moderate activity levels which is 49.6 % and 48.2 % respectively. Only 3 respondents have high activity levels (2.1 %). These findings affect by the current pandemic situation of COVID-19 such as changes in psychosocial factor and residency pattern (i.e. distance from university reduced) as well as increased work and class time demands especially during online distance learning (Calestine et al., 2017; Dyck et al., 2014). Similarly, there are 9 out of 10 studies included in the review reported significant reduced in physical activity levels during lockdown period (López-Valenciano et al., 2021).

Table 4.6: Physical activity status of the respondents based on IPAQ (n=141)

Physical Activity Status	**n (%)**
Low activity levels	70 (49.6)
Moderate activity levels	68 (48.2)
High activity levels	3 (2.1)

4.6 Knowledge and attitude towards breast cancer

4.6.1 Knowledge

Based on Figure 4.4, domain with the most correct answered questions in the breast cancer knowledge questionnaire were nutrition knowledge (78.7 %), followed by knowledge on physical activity and body weight management related to breast cancer (75.8 %), and the least correct answered question was domain lifestyle and risk factor (69.6 %).

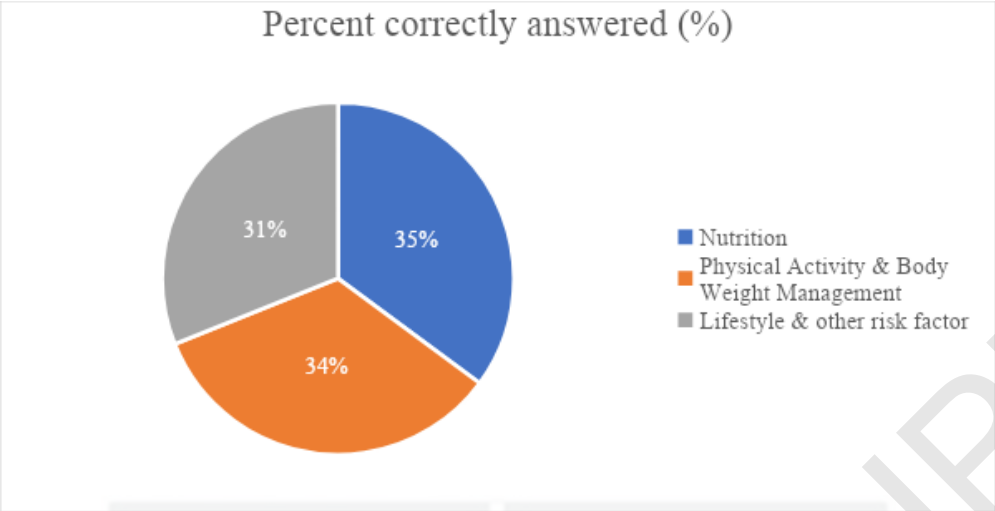


Figure 4.4 Overall domain correctly answered for knowledge on breast cancer questionnaire (n=141)

Based on Table 4.7, questions with mostly correct answered (> 90%) were fruits and vegetables contain antioxidants that help eliminate free radicals from the body (92.9%), reducing the consumption of processed meat can reduce cancer risk (91.5%), correct formula to calculate body mass index (90.8 %), smoking and secondhand smoker exposure may increase the risk of breast cancer (99.3 % & 96.5 %).

Table 4.7: Proportion of respondents correctly answered for cancer risk factors knowledge question (n=141)

23 items in cancer risk factors knowledge	Correctly answered n (%)
Nutrition	
Eating the right kind of foods can reduce chances of developing cancer	126 (89.4)
Eating at least 5 servings of fruit and vegetables a day can prevent certain kinds of cancer.	105 (74.5)
Fruits and vegetables are high in antioxidants to eliminate free radicals in the body.	131 (92.9)
Antioxidants can only be obtained through dietary supplement.	101 (71.6)
High intakes of fats can increase chances of developing cancer.	104 (73.8)
Limiting the consumption of red meat (e.g., beef, goat, lamb, and pork) can reduce the risk of developing cancer.	76 (53.9)
Limiting the consumption of processed meat (e.g., sausages, hamburgers, and ham) can reduce the risk of developing cancer.	129 (91.5)
High intakes of salt-preserved (e.g., salted fish) and barbequed (e.g., satay) foods are associated with cancer.	105 (74.5)
Limiting the consumption of energy-dense foods and avoid sugary drinks can help in maintaining a healthy weight and eventually reduce the risk of certain cancers.	121 (85.8)
Physical Activity & Body Weight Management	
Being moderately physically active for at least 30 minutes and 5 times a week is recommended in preventing cancer.	122 (86.5)
Household chores (i.e., washing car, washing toilet, and cleaning floor) cannot be considered as healthy physical activity.	84 (59.6)
Sedentary habits such as watching television and playing computer games can bring harm to the body.	120 (85.1)
A healthy body weight can be measured using the body mass index (BMI) – formula as: $\frac{\text{weight (kg)}}{\text{height}^2\ (\text{m}^2)}$	128 (90.8)
Waist circumference is another indicator for risk of chronic diseases (such as cancer and cardiovascular diseases).	91 (64.5)
Body and abdominal fatness do not increase the risk of developing cancer.	96 (68.1)
Lifestyle and other risk factor	
Regular alcohol consumption increases the risk of cancer.	123 (87.2)

Smoking may increase the risk of getting cancer.	140 (99.3)
Exposure to secondhand smoke increases the risk of cancer	136 (96.5)
Pressure/ stress is linked to cancer	88 (62.4)
Exposure to sun between hours of 10 am to 4 pm when ultraviolet rays are most intense reduces the risk of cancer.	62 (44.0)
Reaching sexual maturation (menarche) before the age of 12 increases the risk of getting cancer.	37 (26.2)
Having a close relative with cancer increases risk of getting cancer.	117 (83.0)
Infection with HPV (Human Papillomavirus) increases risk of getting cancer.	82 (58.2)

Table 4.8 shows knowledge score of the respondents and the mean knowledge score was 37.07 ± 5.67 % which categorized as poor knowledge. In addition, more than half of the respondents have poor knowledge related to breast cancer (60.3 %) and only one fourth of them have score more than 70% that indicates good knowledge of breast cancer. Al-Naggar, (2011) also reported that cancer prevention knowledge was low among Malaysian university students. Contrary with current findings, about half of the respondents (49 %) have good knowledge of breast cancer (Folasire et al., 2016).

Table 4.8: Knowledge score of the respondents (n=141)

Knowledge of cancer risk factor	***Score points**	**n (%)**	**Mean ± SD**
			37.07 ± 5.67
Good knowledge	≥ 70 %	56 (39.7)	
Poor knowledge	< 70 %	85 (60.3)	

*Sources: Lin Loo et al., 2013

4.6.2 Attitude

Table 4.9 shows attitude score of the respondents and the mean attitude score was 45.71 ± 5.66 % which includes in poor attitude category. In addition, about 65.2 % of the respondent obtained poor attitude towards cancer risk factor and prevention. Meanwhile, less than half of

them have good attitude towards cancer risk factor and prevention (n= 48, 34%). However, there are contrary findings done among undergraduates students in Klang Valley, in which 76.9% of participants achieve a good attitude toward cancer prevention (Lin Loo et al., 2013). A study conducted in Iran also shows contradict finding where 85% of the undergraduates students have good attitude toward cancer prevention (Raji Lahiji et al., 2019).

Table 4.9: Attitude score of the respondents (n=141)

Attitude towards cancer risk factor & prevention	**Score points**	**n (%)**	**Mean ± SD**
			45.71 ± 5.66
Good attitude	≥ 70 %	48 (34)	
Poor attitude	< 70 %	92 (65.2)	

4.7 Hypothesis testing

4.7.1 Association between sociodemographic characteristics with knowledge and attitude towards breast cancer

There was no significant association between sociodemographic background (age, ethnicity, and year of study) with knowledge and attitude among undergraduate students in Faculty of Medicine and Health Science, Universiti Putra Malaysia.

For the age, there are similar study conducted among undergraduate students in Management Science University (MSU) with majority of the students less than 23 years, there was no significant association between age with knowledge and attitude towards nutrition cancer prevention (Al-Naggar, 2011). Similarly, there was no significant association found between age with knowledge on cancer prevention among health college students in Turkey (Nogay et al., 2012). By contrast, a study in Iran shows that undergraduate students aged above 22 years old have significant association with nutrition knowledge and attitude on breast cancer in which about 62% of the respondents aged 22 years and above have good nutrition knowledge (Raji Lahiji et al., 2019). However, age alone cannot determine undergraduates' knowledge as in higher education institute, they will classify student based on year of study.

In terms of ethnicity, there is similar findings with current study in which there was no significant difference between ethnicity with knowledge and attitude towards breast cancer among Malaysian undergraduate students (Al-Naggar, 2011; Lin Loo et al., 2013). In comparison with previous findings by Lin Loo et al., (2013), ethnicity is closely related with level of knowledge towards breast cancer. As cancer is more prevalent among Chinese students, they may seek more knowledge about cancer risk factors. This also supported by data from National Malaysia Cancer Registry Report (NMCRR), the incidence of breast cancer was highest among Chinese followed by Indians and Malays (NMCR, 2019).

Table 4.10: Association between sociodemographic characteristics (age) with knowledge towards breast cancer

Variable			**r**	**p**
Age (Years)			0.082	0.331
	Knowledge Classification		**X^2**	**p^c**
	Good N (%)	**Poor N (%)**		
Ethnicity			1.836	0.175
Malay	60 (42.6)	46 (32.6)		
Non – Malay	25 (17.7)	10 (7.1)		

p^c: Results obtained from Chi Square test

Table 4.11: Association between sociodemographic characteristics with attitude towards breast cancer

Variable			**r**	**p**
Age (Years)			- 0.034	0.693
	Attitude Classification		**X^2**	**p^c**
	Good N (%)	**Poor N (%)**		
Ethnicity			0.199	0.655
Malay	35 (24.8)	71 (50.4)		
Non – Malay	13 (9.2)	22 (15.6)		

p^c: Results obtained from Chi Square test

4.7.2 Association between nutritional status with knowledge and attitude towards breast cancer

In this study, nutritional status consists of Body Mass Index (BMI) and dietary intake. For BMI, there was no significant association between BMI classification with knowledge and attitude towards breast cancer. This finding also supported by previous finding conducted among university students in Selangor concluded that there was no significant association between BMI with knowledge and attitude of cancer prevention (Al-Naggar, 2011). This means that either normal BMI or abnormal (underweight, overweight & obese) BMI, it would

not affect knowledge or attitude someone's regarding breast cancer. However, this contradicts with previous findings in which prevalence of overweight and obesity among newly diagnosed breast cancer patients is even higher (72.4 %) compared to abnormal BMI (Kiew et. al., 2018). This may be due to poor knowledge and attitude on breast cancer and its associated risk factors such as high body weight status.

Table 4.12: Association between nutritional status (BMI) with knowledge and attitude towards breast cancer

Variable	**Knowledge Classification**		**X^2**	**p**
	Good N (%)	**Poor N (%)**		
BMI Classification			1.824	0.402
Underweight	19 (13.5)	8 (5.7)		
Normal	41 (29.1)	27 (19.1)		
Overweight & Obese	25 (17.7)	21 (14.9)		
	Attitude Classification		**X^2**	**p**
	Good N (%)	**Poor N (%)**		
BMI Classification			1.017	0.601
Underweight	10 (7.1)	17 (12.1)		
Normal	25 (17.7)	43 (30.5)		
Overweight	13 (9.2)	33 (23.4)		

In relation between dietary intake based on food group with knowledge and attitude, significant association found between intake of wholegrain & wholegrain products and vegetable with knowledge ($r = 0.179$, $p = 0.034$), ($r = 0.189$, $p = 0.025$) and vegetable only with attitude ($r = 0.190$, $p = 0.024$) on breast cancer and its prevention. In line with this study, previous finding shows that there was a significant association between consumption of vegetable with attitude on cancer prevention (Folasire et al., 2016). Whole grain consumption was found to increase among college students enrolled in general nutrition courses (Ha &

Caine-Bish, 2011). In addition, knowledge on importance of wholegrain & wholegrain products in disease prevention increases the intake of this food group (Ha & Caine-Bish, 2011). Thus, positive attitude towards healthy eating pattern were related to the better dietary profiles. In contrast with previous finding, there were no significant association with consumption of vegetables with knowledge on cancer prevention as vegetable consumption contributes by m many factors such as availability and affordability in college (Folasire et al., 2016; Sirfan et al., 2020).

There was no significant association between consumption of meat & processed meat, fruits, and alcohol with knowledge as well as consumption of wholegrain & wholegrain products, meat & processed meat, fruits, and alcohol with attitude on cancer prevention. In contrast with current research, there was a significant difference in intake of fast food with cancer prevention (Nogay et al., 2012). Previous study conducted in Nigeria, found that there was a significant association between intake of meat and alcohol with nutrition knowledge on cancer prevention (Folasire et al., 2016).

While most fast food used meat and meat products as a main ingredient, it may contain carcinogenic effects thus it has been linked to increase cancer risk. Another finding from the same study proof that comparing with students who did not consume fast food, those who ate fast food outside their homes or dormitories had worse dietary habits (Nogay et al., 2012). Apparently, high consumption of fast food and meat products among university students probably because fast food restaurants are available on campus and fast foods can be prepared quickly. Though in current study there was no association found between meat & meat products with knowledge, but high intake of this food group could explain why more respondents than expected could not correctly answer that 'High intakes of fats can increase chances of developing cancer', 'Limiting the consumption of red meat (e.g., beef, goat, lamb, and pork)

can reduce the risk of developing cancer' and Limiting the consumption of processed meat (e.g., sausages, hamburgers, and ham) can reduce the risk of developing cancer.

Table 4.13: Association between nutritional status (dietary intake) with knowledge towards breast cancer

Variable	r value	p value	r value	p value
	Knowledge		Attitude	
Wholegrain & wholegrain product	0.179	**0.034***	0.105	0.214
Meat and processed meat	0.079	0.354	0.037	0.659
Vegetable	0.189	**0.025***	0.190	**0.024***
Fruits	0.130	0.125	0.123	0.145
Alcohol	0.057	0.502	0.303	0.145

*Significant value at $p<0.05$

4.7.3 Association between medical characteristic with knowledge and attitude towards breast cancer

A study conducted in Iran found that there was significant association between family history of breast cancer with knowledge and attitude on breast cancer among undergraduates students (Raji Lahiji et al., 2019). Another study also supported this findings in which respondents who have family history of breast cancer have significant association with attitude level (Atashi et al., 2020). Besides, a study shows that a higher level of risk awareness regarding breast cancer was observed in women with a family history of the disease compared to those without a family history (Khushalani et al., 2020). The experience of breast cancer in one's family may change one's eating habits and food preferences. Besides, having a family history of breast cancer provides information about the risk and its preventative measures to the other family member.

However, this is contradicting with current finding done among undergraduate students in which, there was no significant association between family history with knowledge and

attitude towards breast cancer as shown in table 4.14 and table 4.15. The previous study reported the same finding about no association found among undergraduates students in Selangor between family history with knowledge and attitude towards breast cancer (Al-Naggar, 2011). A study conducted among health college student in Turkey also shown no significant association between history of cancer in the family relatives with cancer prevention (Nogay et al., 2012).

Table 4.14: Association between medical characteristic with knowledge towards breast cancer

Variable	**Knowledge Classification**		**X^2**	**p**
	Good N (%)	**Poor N (%)**		
Family history			0.038	0.845
Yes	26 (18.4)	18 (12.8)		
No	59 (41.8)	38 (27.0)		

Table 4.15: Association between medical characteristic with attitude towards breast cancer

Variable	**Attitude Classification**		**X^2**	**p**
	Good N (%)	**Poor N (%)**		
Family history			1.781	0.182
Yes	11 (7.8)	33 (23.4)		
No	37 (26.2)	60 (42.6)		

4.7.4 Association between physical activity status with knowledge, attitude, and practice towards breast cancer

Based on table 4.16, data presented that there was no significant association between physical activity status with knowledge and attitude towards breast cancer. Lack of awareness about role of physical activity in cancer prevention shows higher prevalence among woman (Miyawaki et al., 2014). Besides, the purpose of physical activity among undergraduate students might differ such as for stress relieved, having social interaction and fill in leisure time instead for cancer prevention (Gaya et al., 2015). Thus, physical activity done may not meet the requirement to have an impact on cancer prevention. On the other hand, different finding found that high level of knowledge on breast cancer risk factor and symptoms have significant association with awareness of role of physical activity in preventing breast cancer (Miyawaki et al., 2014). Therefore, physically active women may have good knowledge and attitude on breast cancer.

Table 4.16: Association between physical activity status with knowledge towards breast cancer

Variable	**Knowledge Classification**		**X^2**	**p**
	Good N (%)	**Poor N (%)**		
			0.385	0.535
Inadequate	44 (31.2)	26 (18.4)		
Adequate	41 (29.1)	30 (21.3)		

Table 4.17: Association between physical activity status with attitude towards breast cancer

Variable	**Attitude Classification**		**X^2**	**p**
	Good N (%)	**Poor N (%)**		
			0.087	0.859
Inadequate	23 (16.3)	47 (33.3)		
Adequate	25 (17.7)	46 (32.6)		

5 CONCLUSION, LIMITATION AND RECOMMENDATION

5.1 Conclusion

There are 141 undergraduate students from Faculty of Medicine and Health Sciences, UPM were participated in this study with age ranging from 20 to 24 years old. Majority of them are Malay, in their third year of study and no family history of breast cancer. Most of the respondents have poor level of knowledge and attitude on breast cancer and its prevention. In terms of nutritional status, most of them are in normal BMI however have poor diet quality with inadequate intake of wholegrain & wholegrain products and fruits. Majority of them also have low level of physical activity.

The study showed significant result for dietary intake in which the consumption of wholegrain & wholegrain products and vegetable have significant association with knowledge on breast cancer. Besides, intake of vegetable also shows significant association with attitude in breast cancer. Thus, proper strategies for each associated factor need to be done to increase the level of knowledge and attitude on breast cancer. Further studies can be conducted in larger population to study other possible variable that might contributed to knowledge and attitude level of breast cancer.

5.2 Limitations and Recommendations

There were some limitations while completing this study. Unequal distribution of participants among the age groups and year of study may limit the statistical power. Participants invited were done through email invitation and dissemination by class representative in which older age that represents final year student were difficult to reach. To improve this limitation, this study could be conducted with a broader age range.

Furthermore, the study participants were volunteers which may resulted in bias selection that cannot represent the whole undergraduate students in the university. To improve these limitations, this study could be done in larger population with the same interest such as invites undergraduate students in various faculty in the university. Even better if this study can include undergraduate students in Faculty of Medicine and Health Sciences from several university.

In terms of study instrument, self-reported dietary intake and physical activity can be biased by the tendency of respondents to answer consistent with expected norms. In order to address this issue, an objective measure can be considered for measures physical activity such as use accelerometer or pedometers as a guidance. Apart from that, since this study is an online survey, the translation of FFQ into an online form has limited the full functionality of the form. Thus, the data taken might be exposed to bias and cannot represent the overall dietary pattern of the respondents. Thus, the quantitative and qualitative data taken might be biased and cannot represent the overall dietary pattern of the respondent. Therefore, these limitations need to be improved by proper selection of the online platform to address the qualitative data as well as make it convenience and less time consuming for the respondents.

Lastly, the authorities such as higher education or public health may create various health promotion program to increase knowledge and attitude among undergraduate students that eventually may reduce the prevalence of breast cancer in Malaysia.

BIBLIOGRAPHY

Al-Naggar, R. A. (2011). Nutrition and Cancer Prevention: Knowledge, Attitudes and Practices among Young Malaysians Asian Pacific. In *Asian Pacific Journal of Cancer Prevention* (Vol. 12). https://www.researchgate.net/publication/51179258

Appannah, G., Emi, N. A., Athira, N., Yusin, A., Gan, W. Y., Shariff, Z. M., Shamsuddin, N. H., Zaini, A. A., & Appukutty, M. (2020). Evaluation of Dietary Quality Using Malaysian Healthy Eating Index and Its Relationships With Cardiometabolic Risk Factors in Malaysian Adolescents. In *Malaysian Journal of Medicine and Health Sciences* (Vol. 16, Issue SUPP6).

Atashi, H. A., Eslami Vaghar, M., Olya, M., Mirzamohammadi, P., Zaferani Arani, H., Hadizadeh, M., Hashemi Rafsanjani, S. M. R., & Alizadeh, G. (2020). Knowledge, Attitudes, and Practices toward Breast Cancer. *Archives of Breast Cancer*, *7*(1), 25–32. https://doi.org/10.32768/abc.20207125-32

AYOB, R., & MOHD SHUKRI, N. A. (2020). DIET QUALITY BASED ON HEALTHY EATING INDEX FOR MALAYSIANS (M-HEI) AMONG IIUM KUANTAN STUDENTS. *International Journal of Allied Health Science*, *4*(3).

Beasley, J. M., Newcomb, P. A., Trentham-Dietz, A., Hampton, J. M., Bersch, A. J., Passarelli, M. N., Holick, C. N., Titus-Ernstoff, L., Egan, K. M., Holmes, M. D., & Willett, W. C. (2011). Post-diagnosis dietary factors and survival after invasive breast cancer. *Breast Cancer Research and Treatment*, *128*(1), 229–236. https://doi.org/10.1007/s10549-010-1323-z

Bhatia, H., & Re, G. (2016). *Breast Cancer in Asia Report*. 2–5. http://www.malaysiaoncology.org/article.php?aid=1115

Breastcancer.org. (2021, April). Being a Woman. Retrieved from Breastcancer.org: https://www.breastcancer.org/risk/factors/woman

CALESTINE, J., BOPP, M., BOPP, C. M., & PAPALIA, Z. (2017). College Student Work Habits are Related to Physical Activity and Fitness. *International Journal of Exercise Science*, *10*(7), 1009. /pmc/articles/PMC5685070/

Chow, L. W. C., Lui, K. L., Chan, J. C. Y., Chan, T. C., Ho, P. K., Lee, W. Y., Leung, L. H., Sy, W. M., Yeung, C. C., & Yung, A. K. M. (2005). Association between body mass index and risk of formation of breast cancer in Chinese women. *Asian Journal of Surgery*, *28*(3), 179–184. https://doi.org/10.1016/S1015-9584(09)60338-9

Division of Cancer Prevention and Control. (2020, September). Retrieved from Centre of Disease Control and Prevention: https://www.cdc.gov/cancer/breast/basic_info/risk_factors.htm

Dyck, D. Van, Bourdeaudhuij, I. De, Deliens, T., & Deforche, B. (2014). Can Changes in Psychosocial Factors and Residency Explain the Decrease in Physical Activity During the Transition from High School to College or University? *International Journal of Behavioral Medicine 2014 22:2*, *22*(2), 178–186. https://doi.org/10.1007/S12529-014-9424-4

Elkum, N., Al-Tweigeri, T., Ajarim, D., Al-Zahrani1, A., & Aboussekhra, A. (2014). *Obesity is a significant risk factor for breast cancer in Arab women*. https://doi.org/10.1186/1471-2407-14-788

Ennour-Idrissi, K., Maunsell, E., & Diorio, C. (2015). Effect of physical activity on sex hormones in women: A systematic review and meta-analysis of randomized controlled trials. *Breast Cancer Research*, *17*(1), 1–11. https://doi.org/10.1186/s13058-015-0647-3

Folasire, O. F., Folasire, A. M., & Chikezie, S. (2016). Nutrition-related cancer prevention knowledge of undergraduate students at the university of Ibadan, Nigeria. *South African Journal of Clinical Nutrition*, *29*(4), 165–171. https://doi.org/10.1080/16070658.2016.1217648

Friedenreich, C. M. (2001). Review of anthropometric factors and breast cancer risk. In *European Journal of Cancer Prevention* (Vol. 10, Issue 1, pp. 15–32). Eur J Cancer Prev. https://doi.org/10.1097/00008469-200102000-00003

Ganasegeran, K., Al-Dubai, S. A. R., Qureshi, A. M., Al-Abed, A. A. A. A., Am, R., & Aljunid, S. M. (2012). Social and psychological factors affecting eating habits among university students in a Malaysian medical school: A cross-sectional study. *Nutrition Journal*, *11*(1). https://doi.org/10.1186/1475-2891-11-48

Gaya, D., Fizikal, H., & Kolej, P. (2015). Dietary Intake and Physical Lifestyle of Residential College Students in Universiti Kebangsaan Malaysia. In *Jurnal Personalia Pelajar* (Vol. 18, Issue 2). http://www.devonhealthandwellbeing.org.uk/wp-

Ha, E. J., & Caine-Bish, N. (2011). Interactive Introductory Nutrition Course Focusing on Disease Prevention Increased Whole-Grain Consumption by College Students. *Journal of Nutrition Education and Behavior*, *43*(4), 263–267. https://doi.org/10.1016/j.jneb.2010.02.008

Khushalani, J. S., Qin, J., Ekwueme, D. U., & White, A. (2020). Awareness of breast cancer risk related to a positive family history and alcohol consumption among women aged 15–44 years in United States. *Preventive Medicine Reports*, *17*, 101029. https://doi.org/10.1016/J.PMEDR.2019.101029

Kiew, S. J., Islam, T., Taib, N. A., Majid, H. A., & MyBCC Study Group. (2018). The prevalence of metabolic syndrome among newly diagnosed Malaysian breast Cancer patients.

Kurubaran Ganasegeran 1, S. A.-D.-a.-a. (2012). Social And Psychological Factors Affecting Eating Habits Among University Students In A Malaysian Medical School: A Cross-Sectional Study. Nutrition Journal, 11(1), 48.

Lin Loo, J., Yee Woo, W., Wah Chin, M., Ru Yam, H., Kwang Ang, Y., & Seng Yim, H. (2013). Cancer Awareness of a Sample of Malaysian Undergraduate Students. *American Journal of Cancer Prevention*, *1*(1), 9–13. https://doi.org/10.12691/ajcp-1-1-3

López-Valenciano, A., Suárez-Iglesias, D., Sanchez-Lastra, M. A., & Ayán, C. (2021). Impact of COVID-19 Pandemic on University Students' Physical Activity Levels: An Early Systematic Review. *Frontiers in Psychology*, *0*, 3787. https://doi.org/10.3389/FPSYG.2020.624567

Lorincz, A. M., & Sukumar, S. (2006). Molecular links between obesity and breast cancer. In *Endocrine-Related Cancer* (Vol. 13, Issue 2, pp. 279–292). https://doi.org/10.1677/erc.1.00729

Lynch, B. M., Neilson, H. K., & Friedenreich, C. M. (2011). Physical activity and breast cancer prevention. In *Recent Results in Cancer Research* (Vol. 186, Issue May 2014). https://doi.org/10.1007/978-3-642-04231-7_2

Miyawaki, R., Shibata, A., Ishii, K., & Oka, K. (2014). Awareness and correlates of the role of physical activity in breast cancer prevention among Japanese women: Results from an internet-based cross-sectional survey. *BMC Women's Health*, *14*(1). https://doi.org/10.1186/1472-6874-14-80

Nindrea, R. D., Aryandono, T., Lazuardi, L., & Dwiprahasto, I. (2019). Family history of breast cancer and breast cancer risk between malays ethnicity in Malaysia and Indonesia: A meta-analysis. In *Iranian Journal of Public Health* (Vol. 48, Issue 2, pp. 198–205). Iranian Journal of Public Health. https://doi.org/10.18502/ijph.v48i2.814

Nogay, N. H., Akinci, A. C., Sert, H., Kurtulus, Z., & Gedik, S. (2012). Dietary habits contributing to the cancer prevention among health college students in Turkey. *Asian Pacific Journal of Cancer Prevention*, *13*(3), 963–968. https://doi.org/10.7314/APJCP.2012.13.3.963

Norsa'adah, B., Rusli, B. N., Imran, A. K., Naing, I., & Winn, T. (2005). Risk factors of breast cancer in women in Kelantan, Malaysia. *Singapore Medical Journal*, *46*(12), 698–705.

Peng, C., Luo, W. P., & Zhang, C. X. (2017). Fruit and vegetable intake and breast cancer prognosis: A meta-analysis of prospective cohort studies. *British Journal of Nutrition*, *117*(5), 737–749. https://doi.org/10.1017/S0007114517000423

Power, E., Simon, A., Juszczyk, D., Hiom, S., & Wardle, J. (2011). Assessing awareness of colorectal cancer symptoms: Measure development and results from a population survey in the UK. *BMC Cancer*, *11*(1), 1–10. https://doi.org/10.1186/1471-2407-11-366

Raji Lahiji, M., Dehdari, T., Shokouhi Shoormasti, R., Hosseini, A. F., Navaei, M., & Zarrati, M. (2019). Nutrition knowledge, attitudes, and practice towards breast cancer prevention among the female population of Iran University of medical science students. *Nutrition and Cancer*, *71*(8), 1355–1364. https://doi.org/10.1080/01635581.2019.1607410

Redeker, C., Wardle, J., Wilder, D., Hiom, S., & Miles, A. (2009). The launch of Cancer Research UK's "Reduce the Risk" campaign: Baseline measurements of public awareness of cancer risk factors in 2004. *European Journal of Cancer*, *45*(5), 827–836. https://doi.org/10.1016/j.ejca.2008.10.018

Rose, D. P., & Vona-Davis, L. (2010). Interaction between menopausal status and obesity in affecting breast cancer risk. *Maturitas*, *66*(1), 33–38. https://doi.org/10.1016/j.maturitas.2010.01.019

Salleh, R. M., Shahar, S., Arshad, F., Ghazali, A. R., Haron, N., & Rajab, N. F. (2007). Abdominal Obesity Increased Breast Cancer Risk. *Jurnal Sains Kesihatan Malaysia*, *5*(2), 17–28.

Sangrajrang, S., Chaiwerawattan, A., Ploysawang, P., Nooklang, K., Jamsri, P., & Somharnwong, S. (2013). Obesity, diet and physical inactivity and risk of breast cancer in Thai women. *Asian Pacific Journal of Cancer Prevention*, *14*(11), 7023–7027.

https://doi.org/10.7314/APJCP.2013.14.11.7023

Saxe, G. A., Rock, C. L., Wicha, M. S., & Schottenfeld, D. (1999). Diet and risk for breast cancer recurrence and survival. In *Breast Cancer Research and Treatment* (Vol. 53).

Singh, M., & Jangra, B. (2013). Association between body mass index and risk of breast cancer among females of north India. *South Asian Journal of Cancer*, *2*(3), 121. https://doi.org/10.4103/2278-330x.114108

Singh, S., Pal, A., Srivastava, N. K., & Thakur, P. (2018). Level of Awareness and Practices of Women Regarding Breast Cancer in Chhattisgarh, India: An Institution Based Survey. *International Journal of Medicine and Public Health*, *8*(4), 145–151. https://doi.org/10.5530/ijmedph.2018.4.30

Sirfan, A., Hamirudin, A. H., & Sidek, S. (2020). Assessment of fruit and vegetable consumption among female university students 1. *Journal Homepage*, *4*(5), 1451–1460. https://doi.org/10.26656/fr.2017.4(5).067

Subramanian, Patil, S. S., Ponnusamy, S., Hasamnis, A. A., Loh, K. Y., & Santosh, N. (2019). Whole-grain consumption and its determinants in Malaysian medical students: A cross-sectional study. *Indian Journal of Public Health*, *63*(3), 220. https://doi.org/10.4103/IJPH.IJPH_278_18

Sung, H., Ferlay, J., Siegel, R. L., Laversanne, M., Soerjomataram, I., Jemal, A., & Bray, F. (2021). Global Cancer Statistics 2020: GLOBOCAN Estimates of Incidence and Mortality Worldwide for 36 Cancers in 185 Countries. *CA: A Cancer Journal for Clinicians*, *71*(3), 209–249. https://doi.org/10.3322/caac.21660

Thomson, C. A., Rock, C. L., Thompson, P. A., Caan, B. J., Cussler, E., Flatt, S. W., & Pierce, J. P. (2011). Vegetable intake is associated with reduced breast cancer recurrence in tamoxifen users: A secondary analysis from the Women's Healthy Eating and Living Study. *Breast Cancer Research and Treatment*, *125*(2), 519–527. https://doi.org/10.1007/s10549-010-1014-9

Wardle, J., Waller, J., Brunswick, N., & Jarvis, M. J. (2001). Awareness of risk factors for cancer among British adults. *Public Health*, *115*(3), 173–174. https://doi.org/10.1038/sj.ph.1900752

World Cancer Research Fund/American Institute for Cancer Research. (2018). Meat, fish and dairy products and the risk of cancer. Continous Update Expert Project Report.

Xiao, Y., Xia, J., Li, L., Ke, Y., Cheng, J., Xie, Y., Chu, W., Cheung, P., Kim, J. H., Colditz, G. A., Tamimi, R. M., & Su, X. (2019). Associations between dietary patterns and the risk of breast cancer: A systematic review and meta-analysis of observational studies. In *Breast Cancer Research* (Vol. 21, Issue 1, pp. 1–22). BioMed Central Ltd. https://doi.org/10.1186/s13058-019-1096-1

APPENDICES

APPENDIX A: Approval Letter from Ethic Committee for Research Involving Human Subject (JKEUPM)

Ref. no: UPM/TNCPI/RMC/JKEUPM/1.4.18.2 (JKEUPM)
Date: 5 April 2021

Dear Prof./Dr./Mr./Ms.,

APPLICATION FOR JKEUPM ETHICAL CLEARANCE: APPROVED

With reference to the above, I am pleased to inform you that your application for ethical clearance for the research project entitled **'Breast Cancer Knowledge, Attitudes, and Practices (KAP) among Undergraduate Students in Faculty of Medicine and Health Sciences, Universiti Putra Malaysia'** has been approved.

Please note that the official letter of approval will be issued as soon as possible. However, the ethical clearance is considered effective from the date of this email, and you may now proceed with your research.

Kindly remind the ethical approval is required in the case of amendments/ changes to the study documents/ study sites/ study team.

Researchers should also complete a Study Final Report upon study completion. The form can be obtained from the Ethics Committee for Research Involving Human Subjects (JKEUPM) website (http://www.tncpi.upm.edu.my/faildokumen).

If you have any enquiries, please contact Ms. Nurulhasanah Ishak (03-97691605) or Ms. Nor Ellia Abd Ajis (03-97691244).

Note: Please use this reference number for any transaction:- **JKEUPM-2020-503**

Thank you.

Yours faithfully,

Prof. Dr. Zamberi Sekawi
Chair
Ethics Committee for Research Involving Human Subjects
Universiti Putra Malaysia

APPENDIX B: Information sheet for patient and consent form (Malay Version)

JAWATANKUASA ETIKA UNIVERSITI UNTUK PENYELIDIKAN MELIBATKAN MANUSIA (JKEUPM)
UNIVERSITI PUTRA MALAYSIA, 43400 UPM
SERDANG,
SELANGOR, MALAYSIA

BORANG 2.4: PENERANGAN DAN PERSETUJUAN RESPONDEN

Sila baca maklumat berikut dengan teliti. Sekiranya anda mempunyai sebarang pertanyaan, sila kemukakan kepada penyelidik.

1.TAJUK KAJIAN: Pengetahuan, sikap dan amalan terhadap kanser payudara di kalangan pelajar siswazah Fakulti Perubatan dan Sains Kesihatan, Universiti Putra Malaysia.

2. PENGENALAN

Merujuk kepada Kanser Profil Negara, 2020 yang diterbitkan oleh Pertubuhan Kesihatan Sedunia (WHO), bebanan kesa kanser payudara adalah yang tertinggi di Malaysia dia antara kanser jenis lain dengan kadar kemenjadian kes adalah 17.1 %. Oleh itu, tujuan penyelidikan ini dilakukan adalah untuk mengkaji faktor-faktor yang berkaitan dengan pengetahuan, sikap dan amalan (KAP) terhadap kanser payudara di kalangan pelajar ijazah sarjana muda di Fakulti Perubatan dan Sains Kesihatan, Universiti Putra Malaysia (UPM). Satu kajian keratan rentas dengan anggaran 206 pelajar dari Fakulti Perubatan dan Sains Kesihatan, Universiti Putra Malaysia (UPM) akan dipilih untuk menlibatkan diri dalam kajian ini. Borang kendiri kaji selidik akan digunakan untuk menilai tahap KAP pelajar terhadap kanser payudara yang berkaitan dengan pemakanan dan gaya hidup. Kajian ini adalah penting untuk dijalankan kerana ia dapat membantu meningkatkan pengetahuan dan kesedaran masyarakat di Malaysia mengenai faktor risiko dan pencegahan terhadap kanser payudara yang berkaitan dengan pemakanan dan gaya hidup.

3. APAKAH YANG PERLU ANDA LAKUKAN?

Jika anda bersetuju untuk menyertai penyelidikan ini, anda perlu menjawab soalan-soalan penyelidikan serta melakukan beberapa aktiviti penyelidikan yang dijangkakan akan mengambil masa anda selama 20 minit. Anda akan dinilai melalui borang kendiri kaji selidik yang akan diisi oleh peserta. Borang ini mempunyai 7 bahagian yang perlu mengambil data latar belakang sosiodemografi, ciri-ciri perubatan, data anthropometri, data aktiviti fizikal dan data pemakanan.

Dalam bahagian latar belakang sosiodemografi dan ciri-ciri perubatan, temubual untuk mengisi soalan-soalan ini akan mengambil masa selama 3 minit. Setelah semua data diambil, pengukuran antropometri anda akan dilakukan iaitu berat, tinggi dan sebanyak tiga kali yang akan mengambil masa selama 5 minit. Bagi melengkapkan pengukuran antropometri ini, anda mungkin akan memerlukan bantuan individu lain. Apabila mengukur ketinggian, kasut harus ditanggalkan dan apabila mengambil berat badan, anda perlu mengeluarkan semua aksesori yang berat, kosongkan poket, dan tanggalkan kasut. Setelah itu, soal selidik berkenaan aktiviti fizikal perlu di isi untuk mendapatkan data tahap aktiviti fizikal anda dan bahagian ini mengambil masa selama 3 minit. Akhir sekali, data pemakanan anda akan diambil melalui boring kekerapan pengambilan makanan yang akan mengambil masa sebanyak 4 minit. Secara keseluruhan, anda perlu menjawab kesemua soalan dalam borang soal selidik ini selama 15 minit.

Adalah penting untuk menjawab semua soalan yang ditanya dengan jujur dan sepenuhnya sepanjang sesi penyelidikan dijalankan.

Setalah data penyelidikan diambil, anda boleh memberikan nombor telefon anda kepada penyelidik jika anda berminat untuk mengetahui tentang hasil kajian.

4. SIAPA YANG TIDAK BOLEH MENYERTAI KAJIAN INI?

Kajian ini tidak melibatkan subjek lelaki atau subjek yang mempunyai kanser payudara.

5. APAKAH FAEDAH MENYERTAI KAJIAN INI?

a) KEPADA ANDA SEBAGAI PESERTA?
Kajian ini mungkin memberi atau tidak memberi manfaat kepada anda. Walaubagaimanapun, jika anda berminat untuk mengetahui hasil kajian ini, anda boleh memberikan nombor telefon anda kepada penyelidik untuk dihubungi.

b) KEPADA PENYELIDIK?

Melalui soal selidik dan kajian ini, ia dapat membantu penyelidik untuk mengkaji tentang pengetahuan, amalan dan sikap tentang faktor risiko dan pencegahan terhadap kanser payudara di dalam konteks pemakanan.

6. ADAKAH IA BERISIKO?

Kajian ini adalah kajian yang hanya berisiko secara minimal dan tidak memberikan apa-apa kesian sampingan kerana kajian ini hanya melibatkan kajian soal selidik dan memerlukan dua pengkuran fizikal yang mudah untuk dikendalikan.

7. ADAKAH MAKLUMAT DAN IDENTITI SAYA KEKAL RAHSIA?

Segala maklumat anda yang diperolehi dalam penyelidikan ini akan disimpan dan dikendalikan secara sulit, bersesuaian dengan peraturan-peraturan dan/ atau undang-undang yang berkenaan. Sekiranya hasil penyelidikan ini diterbitkan atau dibentangkan kepada orang ramai, identiti anda tidak akan didedahkan tanpa kebenaran anda terlebih dahulu.

8. SIAPA YANG SAYA PERLU HUBUNGI SEKIRANYA SAYA MEMPUNYAI SOALAN TAMBAHAN SEMASA MENGIKUTI PENYELIDIKAN INI?

Jika anda mempunyai sebarang pertanyaan berkenaan dengan kajian ini, anda boleh menghubungi penyelidik bagi penyelidikan ini, Dalilati Dayana Binti Abdul Gafar, pelajar Fakulti Perubatan dan Sains Kesihatan, UPM pada sambungan talian 017-6938734 atau emailkan kepada dalilatidayanaaa@gmail.com. Anda boleh juga menghubungi pemantau penyelidikan ini iaitu, Dr. Zalina Binti Abu Zaid, melalui alamat email (zalina@upm.edu.my), pensayarah Fakulti Perubatan dan Sains

9. PERSETUJUAN

Saya…… No Kad Pengenalan. ……
beralamat……
……..dengan ini bersetuju untuk mengambil bahagian secara sukarela dalam penyelidikan yang tersebut di atas *(kajian klinikal/percubaan ubat-ubatan/rakaman video/kumpulan sasaran/temuduga/ soal selidik).

Saya telah diberi penjelasan secara menyeluruh mengenai penyelidikan ini dari segi metodologi, risiko dan komplikasi (seperti tertulis pada Helaian Penerangan Responden). Saya memahami bahawa saya berhak menarik diri dari penyelidikan ini pada bila-bila masa tanpa memberi sebarang alasan.Saya juga memahami bahawa sebarang maklumat yang berkaitan identiti saya akan dirahsiakan.

Saya* berminat / tidak berminat untuk mengetahui keputusan kajian yang melibatkan saya.

I setuju/tidak bersetuju untuk imei/gambar/rakaman video/ rakaman suara digunakan dalam apa jua bentuk penerbitan atau pembentangan. (sekiranya berkaitan).

*potong yang tidak berkenaan

Tandatangan …….. Tandatangan ……..
(*Responden*) (*Saksi*)

Tarikh :…….. Nama :……..

No. K/P: ……..

Saya mengesahkan bahawa saya telah menerangkan kepada responden ini sifat dan tujuan penyelidikan yang tersebut di atas.

Tarikh …….. Tandatangan ……..
(*Penyelidik*)

APPENDIX C: Information sheet for patient and consent form (English Version)

JAWATANKUASA ETIKA UNIVERSITI UNTUK PENYELIDIKAN MELIBATKAN MANUSIA (JKEUPM)
UNIVERSITI PUTRA MALAYSIA, 43400 UPM
SERDANG,
SELANGOR, MALAYSIA

FORM 2.4: RESPONDENT'S INFORMATION SHEET AND INFORMED CONSENT FORM

Please read the following information carefully and do not hesitate to discuss any questions you may have with the researcher.

1. STUDY TITLE : Breast cancer knowledge, attitudes, and practices among undergraduate students in Faculty of Medicine and Health Sciences, Universiti Putra Malaysia.

2. INTRODUCTION:

According to Cancer country profiles 2020 by the World Health Organization (WHO), the burden of breast cancer in Malaysia is the highest among the other cancers which is 17.3% of the incidence rate. Therefore, the aim of this research is to study the factors associated with knowledge, attitude and practice (KAP) towards breast cancer among undergraduate students in the Faculty of Medicine and Health Sciences, Universiti Putra Malaysia (UPM). A cross sectional study with estimation of 206 students from Faculty of Medicine and Health Sciences, Universiti Putra Malaysia (UPM) will be selected to complete this study. A self-administered questionnaire will be used to assess the student's KAP towards breast cancer related to nutrition and lifestyle factors. This study is important as it could help to increase the knowledge and awareness for the community in Malaysia on the issues of risk factors and prevention towards breast cancer that are related to nutrition and lifestyle factor.

3. WHAT WILL YOU HAVE TO DO?

If you agree to participate in the study, you will need to answer all questions and participate in study activities which will take about around 15 minutes of your time. You will be assessed using amself-administered questionnaire. This form contains 5 sections which will enquire about your sociodemographic background, medical characteristic anthropometric measurements, physical activity level and dietary intake.

In the sociodemographic background and medical characteristic section, the interview session is estimated to be done around 3 minutes. After obtaining those data, anthropometric measurements which are your weight and height will be measured 3 times which all together take around 5 minutes. For the measurement, you may need an assistance to help you complete the measurement. When measuring height, shoes must be taken off while when measuring weight, you need to remove all heavy outer clothes and accessories, empty the pocket and remove shoes. After that, physical activity questionnaire need to be completed to assess your physical activity level in past 7 days. The duration of this section contributes around 3 minutes. Lastly, you will also need to spend around 4 minutes to answer food frequency questionnaire to get an information about your dietary intake. In total, you are estimated to spend around 15 minutes to complete the self-administered questionnaire.

It is important that you answer all of the questions asked honestly during the interview session.

After data collection is conducted, you may leave your contact number to the researcher if you are interested to know the research outcome.

4. WHO SHOULD NOT PARTICIPATE IN THE STUDY?

This study does not include male participant or breast cancer patient.

5. WHAT WILL BE THE BENEFITS OF THE STUDY:

(a) TO YOU AS THE SUBJECT?

There may or may not be any benefits to you. However, if you are interested to know the research outcome, you may leave your contact number to the researcher.

(b) TO THE INVESTIGATOR?

The questionnaire may help the researcher to assess and describe the knowledge, attitude and practice toward breast cancer risk factor and prevention that are related to nutrition.

6. WHAT ARE THE POSSIBLE RISKS?

Participant's risk is minimal because it is only questionnaire based study and requires two physical measurement that are simple to be conducted. You are free to decline to answer any of the questions that you feel uncomfortable with.

7. WILL THE INFORMATION THAT YOU PROVIDE AND YOUR IDENTITY REMAIN CONFIDENTIAL?

All your information obtained in this study will be kept and handled in a confidential manner, in accordance with applicable laws and/or regulations. When publishing or presenting the study results, your identity will not be revealed without your expressed consent.

8. WHO SHOULD YOU CONTACT IF YOU HAVE ADDITIONAL QUESTIONS DURING THE COURSE OF THE RESEARCH?

If you have any questions about the study, please contact the researcher, Dalilati Dayana Binti Abdul Gafar, a student from Faculty of Medicine and Health Sciences, UPM at telephone number 017-6938734 or email at dalilatidayanaaa@gmail.com. You may also contact to her supervisor, Dr. Zalina Binti Abu Zaid through email (zalina@upm.edu.my), a lecturer from Faculty of Medicine and Health Sciences, UPM.

9. CONSENT

I …… Identity Card No. ……
address……..
. ……..hereby voluntarily agree to take part in the research stated above *(clinical /drug trial/video recording/ focus group/interview-based/ questionnaire-based).

I have been informed about the nature of the research in terms of methodology, possible adverse effects and complications (as written in the Respondent's Information Sheet). I understand that I have the right to withdraw from this research at any time without giving any reason whatsoever. I also understand that this study is confidential and all information provided with regard to my identity will remain private and confidential.

I* wish / do not wish to know the results related to my participation in the research

I agree/do not agree that the images/photos/video recordings/voice recordings related to me be used in any form of publication or presentation (if applicable)

* delete where necessary

Signature ……..…… Signature ……..……
(Respondent) (Witness)

Date :…….. Name :……..

I/C No. :……..…...

I confirm that I have explained to the respondent the nature and purpose of the above-mentioned research.

Date ……..…… Signature ……..……
(Researcher)

APPENDIX D: Questionnaire

FINAL YEAR PROJECT

QUESTIONNAIRE FORM

Breast cancer knowledge and attitude among undergraduate students in Faculty of Medicine and Health Sciences, Universiti Putra Malaysia.

STUDENT:

Dalilati Dayana Binti Abdul Gafar (198810)

SUPERVISOR:

Dr. Zalina Binti Abu Zaid

PROGRAM:

Bacelor Sains (Dietetik)

Department of Dietetics,

Faculty of Medicine and Health Sciences,

Universiti Putra Malaysia,

PART A: BACKGROUND INFORMATION

Instruction: Please fill in and circle the following questions accordingly.

Socio-demographic information (Please underline or circle the related information)

1. Age :
2. Gender : Male Female
3. Nationality : Malaysian Others
4. Ethnicity : Malay Chinese Indian Others
   (Please specify:_____)

Anthropometric measurements

Item no.	Anthropometric measurements	Reading 1	Reading 2	Average
5.	Height			
6.	Weight			

7. Body mass index (BMI): _____

Family History

8. Have you, or your family previously had breast cancer?

	Yes	No	Don't know
You			
Immediate family member (father, mother, brothers & sisters)			
Extended family member (grandparents, uncle, aunt & cousins)			

9. Have you, or your family currently have breast cancer?

	Yes	No	Don't know
You			
Immediate family member (father, mother, brothers & sisters)			
Extended family member (grandparents, uncle, aunt & cousins)			

PART B: KNOWLEDGE AND AWARENESS RELATED TO RISK FACTORS AND PREVENTION OF BREAST CANCER.

10. Nutrition

The following may or may not be risk factors of cancer. We are interested in your opinion. Please check (/) only **ONE (1)** answer for each item:

Item 15.	Nutrition	True	False	Don't know
i.	Eating the right kind of foods can reduce chances of developing cancer.			
ii.	Eating at least 5 servings of fruit and vegetables a day can prevent certain kinds of cancer.			
iii.	Fruits and vegetables are high in antioxidants to eliminate free radicals in the body.			
iv.	Antioxidants can only be obtained through dietary supplement.			
v.	High intakes of fats can increase chances of developing cancer.			
vi.	Limiting the consumption of red meat (e.g. beef, goat, lamb and pork) can reduce the risk of developing cancer.			
vii.	Limiting the consumption of processed meat (e.g. sausages, hamburgers and ham) can reduce the risk of developing cancer.			
viii.	High intakes of salt-preserved (e.g. salted fish) and barbequed (e.g. satay) foods are associated with cancer.			
ix.	Limiting the consumption of energy-dense foods and avoid sugary drinks can help in maintaining a healthy weight and eventually reduce the risk of certain cancers.			

11. Physical Activity and Body Weight Management

The following may or may not be risk factors of cancer. We are interested in your opinion. Please check (/) only **ONE (1)** answer for each item:

Item 16.	Physical activity and body weight management	True	False	Don't know
i.	Being moderately physically active for at least 30 minutes and 5 times a week is recommended in preventing cancer.			
ii.	Household chores (e.g. washing car, washing toilet, and cleaning floor) cannot be considered as healthy physical activity.			

iii.	Sedentary habits such as watching television and playing computer games can bring harm to the body.			
iv.	A healthy body weight can be measured using the body mass index (BMI) – formula as: $\frac{\text{weight (kg)}}{\text{height}^2\ (\text{m}^2)}$			
v.	Waist circumference is another indicator for risk of chronic diseases (such as cancer and cardiovascular diseases).			
vi.	Body and abdominal fatness does not increase the risk of developing cancer.			

12. Lifestyle and other risk factors

The following may or may not be risk factors of cancer. We are interested in your opinion. Please check (/) only **ONE (1)** answer for each item:

Item 17	Lifestyle and other risk factors	True	False	Don't know
i.	Regular alcohol consumption increases the risk of cancer.			
ii.	Smoking may increase the risk of getting cancer.			
iii.	Exposure to secondhand smoke increases the risk of cancer			
iv.	Pressure/ stress is linked to cancer			
v.	Exposure to sun between hours of 10am to 4pm when ultraviolet rays are most intense reduces the risk of cancer.			
vi.	Reaching sexual maturation (menarche) before the age of 12 increases the risk of getting cancer.			
vii.	Having a close relative with cancer increases risk of getting cancer.			
viii.	Infection with HPV (Human Papillomavirus) increases risk of getting cancer.			

PART C: ATTITUDES TOWARDS CANCER AND CANCER PREVENTION

Please check ❒ only **ONE (1)** answer that best describes how you feel for each of the following item:

Item no.		Strongly Agree	Agree	Disagree	Strongly Disagree	Don't know
1.	Cancer can be prevented early					
2.	I am willing to take a series of tests for the early diagnosis of cancer					
3.	Cancer patients are like other patients with chronic diseases (e.g., cardiovascular disease and diabetes mellitus)					
4.	I am afraid to come down with cancer					
5.	Cancer can be cured if diagnosed early					
6.	Smoking relaxes me					
7.	Drinking alcohol gives me great pleasure					
8.	Alcohol makes it difficult to control yourself					
9.	Diets with vegetables are not very enjoyable					
10.	A diet rich in vegetables helps to control cholesterol					
11.	A diet rich in fats harms the health of the heart					
12.	Maintaining a healthy weight prevents a lot of illnesses					
13.	Society accepts thin people more readily than fat ones					
14.	Sun creams are expensive					
15.	The sun is the most important cause of skin cancer					

INTERNATIONAL PHYSICAL ACTIVITY QUESTIONNAIRE

We are interested in finding out about the kinds of physical activities that people do as part of their everyday lives. The questions will ask you about the time you spent being physically active in the **last 7 days**. Please answer each question even if you do not consider yourself to be an active person. Please think about the activities you do at work, as part of your house and yard work, to get from place to place, and in your spare time for recreation, exercise or sport.

Think about all the **vigorous** activities that you did in the **last 7 days**. **Vigorous** physical activities refer to activities that take hard physical effort and make you breathe much harder than normal. Think *only* about those physical activities that you did for at least 10 minutes at a time.

1. During the **last 7 days**, on how many days did you do **vigorous** physical activities like heavy lifting, digging, aerobics, or fast bicycling?

   _____ **days per week**

   ☐ No vigorous physical activities → ***Skip to question 3***

2. How much time did you usually spend doing **vigorous** physical activities on one of those days?

   _____ **hours per day**

   _____ **minutes per day**

   ☐ Don't know/Not sure

Think about all the **moderate** activities that you did in the **last 7 days**. **Moderate** activities refer to activities that take moderate physical effort and make you breathe somewhat harder than normal. Think only about those physical activities that you did for at least 10 minutes at a time.

3. During the **last 7 days**, on how many days did you do **moderate** physical activities like carrying light loads, bicycling at a regular pace, or doubles tennis? Do not include walking.

   _____ **days per week**

   ☐ No moderate physical activities → ***Skip to question 5***

SHORT LAST 7 DAYS SELF-ADMINISTERED version of the IPAQ. Revised August 2002.

4. How much time did you usually spend doing **moderate** physical activities on one of those days?

_____ **hours per day**

_____ **minutes per day**

☐ Don't know/Not sure

Think about the time you spent **walking** in the **last 7 days**. This includes at work and at home, walking to travel from place to place, and any other walking that you have done solely for recreation, sport, exercise, or leisure.

5. During the **last 7 days**, on how many days did you **walk** for at least 10 minutes at a time?

_____ **days per week**

☐ No walking → ***Skip to question 7***

6. How much time did you usually spend **walking** on one of those days?

_____ **hours per day**

_____ **minutes per day**

☐ Don't know/Not sure

The last question is about the time you spent **sitting** on weekdays during the **last 7 days**. Include time spent at work, at home, while doing course work and during leisure time. This may include time spent sitting at a desk, visiting friends, reading, or sitting or lying down to watch television.

7. During the **last 7 days**, how much time did you spend **sitting** on a **week day**?

_____ **hours per day**

_____ **minutes per day**

☐ Don't know/Not sure

This is the end of the questionnaire, thank you for participating.

SHORT LAST 7 DAYS SELF-ADMINISTERED version of the IPAQ. Revised August 2002.

PART E: PRACTICES TOWARDS CANCER AND CANCER PREVENTION IN TERMS OF DIETARY INTAKE

1. In this part, respondents will be asked question on whether they have eaten or not the type of food listed. Write down numbers in the column how many times were consumed whether **Daily**, **Weekly** or **Monthly.**
2. How many times each serving were taken refers to how many of those foods were eaten by the respondents for each time. For example, if respondents eat papaya, how many slices of papaya were taken each time.

Example:

Code	Type of Food	How frequent each food was taken (*Fill in one of the columns only*)					Reference of meal size (*Fill in one of the columns only*)	Total servings *(Each time eaten)*
		Daily	Weekly	Monthly	Yearly	Never		
	E. Fruits							
E1	Papaya		1				Slices	2

FOOD FREQUECNY QUESTIONNAIRE

Code	Type of food	How frequent each food was taken (*Fill in one of the columns omly*)					Reference of meal size (*Fill in one of the columns only*)	Total servings *(Each time eaten)*
		Daily	Weekly	Monthly	Yearly	Never		
	A. Cereals and cereal product							
A1	*Nasi						Plate	
							Chinese Bowl	
							Cup	
							Laddle/Scoop	
A2	Brown rice						Plate	
							Chinese Bowl	
							Cup	
							Laddle/Scoop	
A4	Noodles						Plate	
							Chinese Bowl	
							Cup	
							Laddle/Scoop	
A5	White bread						Slices	
A6	Wholemeal bread						Slices	
A7	Roti canai						Slices	
A8	Capati						Slices	
A9	Tosai						Slices	
A10	Pizza						Slices	
A11	Corn						Tongkol	
							Cup	
A12	Barli						Cup	
A13	Breakfast cereals						Cup	

Code	Type of food B. Meat and Meat Product	How frequent each food was taken (*Fill in one of the columns only*) Daily	Weekly	Monthly	Yearly	Never	Reference of meal size (*Fill in one of the columns only*)	Total servings (*Each time eaten*)
B1	Chicken						Pieces	
B2	Meat						Matchbox size	
B3	Mutton						Matchbox size	
B4	Burger						Pieces	
B5	Sosej / Hotdog / Frankfurter						Pieces	
B6	Nugget						Pieces	
B7	Chicken/Meat/Prawn/Crab balls						Pieces	
B8	IDuck						Pieces	
B9	*Ham						Slices	
B10	*Bacon						Slices	
B11	*Luncheon meat						Slices	
B12	*Pork (For non-muslim)						Matchbox size	

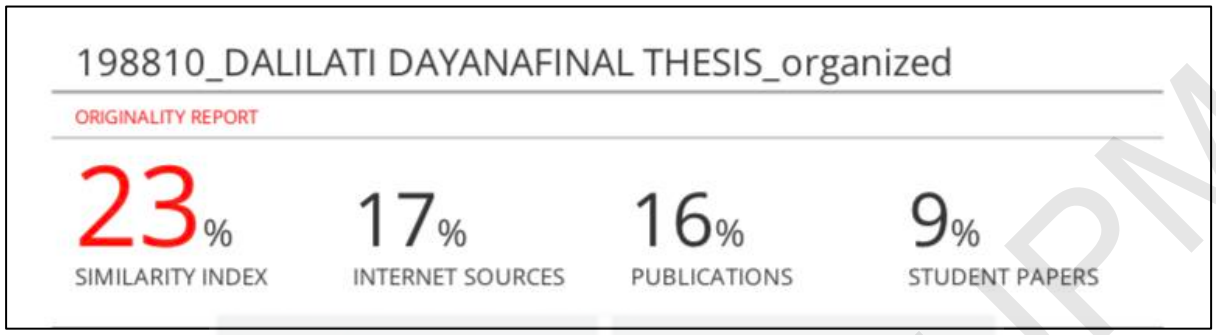
Kod	Type of food D. Vegetables	How frequent each food was taken (*Fill in one of the columns only*) Daily	Weekly	Monthly	Yearly	Never	Reference of meal size (*Fill in one of the columns only*)	Total servings (*Each time eaten*)
D1	Leaf green vegetables						Cup	
D2	Other type of legumes (Eg: Yardlong Bean, Winged Bean, Green Bean)						Cup	
D3	Tubers						Cup	
D4	Cabbages						Cup	
D5	Fruit vegetables (Luffa/ pumpkin/ cucumber/ baby corn)						Cup	
D6	Broccoli						Cup	
D7	Local fresh salads						Cup	
D8	Baby Corn						Table Spoon	
D9	Mushrooms / Dried mushrooms						Cup	
D10	Brinjal						Cup	

Code	Type of food E. Fruits	How frequent each food was taken (*Fill in one of the columns only*) Daily	Weekly	Monthly	Yearly	Never	Reference of meal size (*Fill in one of the columns only*)	Total servings (*Each time eaten*)
E1	Papaya						Slices	
E2	Guava						Slices	
E3	Kiwi						Biji	
E4	Mango						Slices	
E5	Pineapple						Slices	
E6	Banana						Pieces	
E7	Watermelon						Slices	
E8	Starfruit						Pieces	
E9	Apple						Pieces	

E10	Orange						Pieces	
E11	Pear						Pieces	
E12	Grape						Pieces	
E13	Strawberry						Pieces	
E14	Rambutan						Pieces	
E15	Canned fruits						Slices	
E16	Dried fruits						Slices	

Code	**Type of food** **F. Alcoholic drinks** *** For Non Muslim**	**How frequent each food was taken** *(Fill in one of the columns only)*					**Reference of meal size** *(Fill in one of the columns only)*	**Total servings** *(Each time eaten)*
		Daily	Weekly	Monthly	Yearly	Never		
F1	Syandi						Glass	
F2	Bir						Glass	
F3	Wain						Glass	
F4	*Spirit						Glass	
F5	*Likeur						Glass	

APPENDIX E: Plagiarism Check (Turn It In)



(NOTES)