The Knowledge and Awareness of Obesity and Its Risk of Cancer Among IIUM Undergraduate Students

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Abstract:

Introduction: Obesity, a condition of excessive adipose tissue accumulation, has been elucidated as a common risk factor in many types of cancer by previous studies. Thus, the purpose of this study was to investigate IIUM Kuantan undergraduates' knowledge and awareness of obesity and its risk of cancer. **Methods:** A cross-sectional study using convenience sampling was conducted using a validated, self-administered online questionnaire that comprised (1) sociodemographic characteristics and questions on (2) knowledge and (3) awareness of the topic. 133 respondents participated in the survey. **Results:** The data were analysed using SPSS IBM Statistics 26. The study revealed that most respondents have moderate knowledge (n=67, 50.4%) and awareness (n=79, 59.4%) regarding obesity and the risk of cancer. Significant differences in knowledge level were identified using the Kruskal-Wallis test between respondents' gender ($p=0.017$) and Kulliyyah ($p<0.001$). A fair positive correlation between knowledge and awareness of obesity and its risk of cancer among respondents was found by the Spearman coefficient ($r=0.463$, $p<0.001$). This implied that moderate knowledge on the topic also contributes to a moderate level of awareness. **Conclusion:** Most respondents were moderately aware of and acknowledged the potential cancer risk in obesity. The respondent's level of knowledge of the topic may have been influenced by their associated gender and kulliyyah. Nonetheless, more awareness needs to be spread among the students regarding the potential for cancer incidence in people with obesity and excessive adiposity.

Keywords: Obesity, Risk of cancer, Knowledge, Awareness, Correlation

Introduction:

Obesity, a disease of excessive adiposity, has been one of the most concerning comorbidities in current times (Panuganti et al., 2021; Purnell, 2000). In Malaysia, the 2019 National Health and Morbidity Survey (NHMS) found that out of more than 14, 000 individuals, more than half were overweight or obese, with 30.4% being overweight and the remaining 19.7% being obese (Perialathan et al, 2020). Overweight and obesity rates have increased significantly since the NHMS 2015, with 30.0% and 17.7%, respectively (Institute of Public Health, 2015). With current dietary trends like boba milks and junk foods (Goh et al., 2020) that are high in sugar and unsaturated fats and sedentary lifestyle trends among Malaysian youths and adults, the percentage may potentially remain inclined, simultaneously exposing obese populations to obesity-associated complications such as cancer. This dietary trend is also observable among IIUM Kuantan students, along with an alarming 42.5% reported prevalence of obesity and overweight among IIUM Kuantan students (Fauzy et al., 2020) which has sparked concern about the need to provide the students with adequate insights that they may be exposed to the underlying risk for cancer with increasing body fat storage.

Multiple studies have found that obesity has become a common risk factor in many cancers such as colorectal, endometrial, and pancreatic cancer as more correlations between obesity and cancer have been

elucidated (Avgerinos et al., 2019). These risk factors include circadian rhythm dysregulation (Gan et al., 2018) and an imbalanced diet (Sung et al., 2011). A recent review by Avgerinos et al. (2019) also compiled several mechanisms of cancer induction in obesity, such as chronic inflammation, anomalies in the secretion of insulin and insulin-like growth factor (IGF) and sex hormone biosynthesis, as well as possible therapeutic approaches such as lifestyle change, insulin-regulating drugs, and bariatric surgery. However, this fact is commonly overlooked. This was seen based on past health surveys, which concluded a relatively low level of awareness of the potential of obesity-associated cancer among Malaysian adults (Seng et al., 2018; Yusof et al., 2014; Schliemann et al., 2020; Su et al., 2013). Thus, this research aspired to identify the level of knowledge and awareness of obesity and its link to cancer risk among IIUM Kuantan undergraduates, sociodemographic factors that may influence the level of knowledge and awareness, and the correlation between knowledge and awareness on the topic.

Methodology:

Study Design and Study Population

The study has been conducted as a cross-sectional study in the Kuantan campus of the International Islamic University Malaysia (IIUM). This type of study was chosen as it can be conducted on a specific population at a single point in time (a short period). The research was carried out between April 18 and April 30, 2022. The selected population were IIUM Kuantan undergraduates.

Sampling Method

The convenience sampling method was used in this study, in which the study population was randomly selected among IIUM Kuantan students who were available to participate. The self-administered questionnaires were disseminated via a Google Form link.

Questionnaire Design and Data Collection

The items of the questionnaire were constructed based on the literature review of this study. The questionnaire was divided into three sections. The first section was on participants' sociodemographic characteristics, such as gender, discipline of study, year of study, participant's height and weight, self-history, and familial history of obesity or cancer. Self-reported histories of obesity and cancer indicated whether the respondents had previously suffered from either of these conditions prior to this study.

The second section of the questionnaire consisted of nine items that evaluated participants' knowledge of obesity and its risk of cancer based on three domains: (1) mechanism and metabolic pathway of cancer induction in obesity, (2) common risk factors of obesity and cancer, and (3) possible therapeutic approaches. This section provided the answers "true," "false," and "not sure." The correct answer was awarded two marks, while the incorrect and "not sure" options were given zero mark.

The third section also contained nine items that assessed the participants' awareness of obesity as a risk factor for cancer based on the same domains as the second section. In the second and third sections, a mixture of positive and negative items were constructed to reduce the response bias's occurrence. A Likert scale was utilized, which consisted of as follows: '5 = Strongly Agree', '4 = Agree', '3 = Neutral', '2 = Disagree' and '1 = Strongly Disagree. 'Strongly Agree' and 'Agree' options carried 2 marks, while 'Neutral', 'Disagree' and 'Strongly Disagree' carried a zero mark. Reverse coding is done for the negative items.

Inclusion and Exclusion Criteria

The study included all IIUM Kuantan undergraduate students from six Kulliyyah who voluntarily participated in this study. Kulliyyah of Medicine (KOM), Kulliyyah of Dentistry (KOD), Kulliyyah of Pharmacy (KOP), Kulliyyah of Allied Health Sciences (KAHS), Kulliyyah of Nursing (KON), and Kulliyyah of Science (KOS) were among those included. Respondents were both males and females and of all nationalities. Years 1-4 and Year 5 (from KOM and KOD students) were included in the study. The study excluded postgraduate students and IIUM Kuantan undergraduate students who were on study leave. The participants were also reminded of the eligibility criteria for the survey's participation before the first section of the questionnaire.

Content Validation and Pilot Study

Six experts (N=6) among medical doctors from Lukut District Health Clinic, Port Dickson District Health Office, Raja Perempuan Zainab II Hospital, and Slim River Hospital were involved in

the content validation of the questionnaire. Items that received a content validity index (CVI) value of 0.7 and above were retained for the pilot study. Then, eighteen respondents were recruited for the pilot study. This study was carried out to evaluate the questionnaire's internal consistency and reliability.

Data Analysis

Data analysis was done using IBM SPSS Statistics version 26. The normality of the raw data was checked before proceeding to any statistical analysis by checking the histogram, comparing means, and calculating skewness. The evaluation of the level of knowledge and awareness of IIUM Kuantan undergraduate students regarding obesity and its risk of cancer was done using a descriptive frequency table.

For the determination of a possible relationship between sociodemographic factors and knowledge and awareness of obesity and its risk of cancer among IIUM Kuantan undergraduates, Kruskall-Wallis and Mann-Whitney U tests were used. The determination of the association between knowledge and awareness of obesity and its risk of cancer among IIUM Kuantan undergraduate students was done using correlation analysis and the Spearman correlation coefficient. Table 1 displayed the scoring method used to evaluate the level of knowledge and awareness based on an adjusted Bloom's cut-off point to divide the proportion of marks earned into three categories: good, moderate, and poor (Ramli et al., 2018).

Table 1 Categorization for Level of Knowledge and Awareness of Obesity and its Risk of Cancer among IIUM Kuantan Undergraduate Students (adapted from Ramli et al. (2018).

Percentage (%)	Knowledges	Awareness	Level of knowledge and awareness
80-100	12-18	25-36	High
60-79	6-11	12-24	Moderate
≤ 59	0-5	0-11	Poor

Results:

From 3,112 articles collected, seven articles met the eligibility criteria. The articles are two randomized controlled trials (RCTs) double-blind placebo-controlled (RCTs-PC), one RCT and one open-RCT, one RCT double-blind crossover (RCT-C), one open clinical trial, and one prospective case study. Two articles which had no placebo control group were excluded from the meta-analysis.

Content Validation and Reliability

One item in the knowledge and awareness section with I-CVI values of 0.75 and 0.50, respectively, was revised and removed from the questionnaire. The remaining nine items in both the knowledge and awareness sections were kept as the CVI values obtained were 0.70 and above. The Cronbach's alpha values for the knowledge and awareness sections were acceptable with 0.756 and 0.791, respectively.

Scores of Knowledges and Awareness on Obesity and its Risk of Cancer

The evaluation of the level of knowledge and awareness of IIUM Kuantan undergraduate students regarding obesity and its risk of cancer has been identified as the first objective of this study (Table 3). For knowledge scores, the frequency of respondents obtaining the score "moderate" was the highest (n=67, 50.4%) compared to the respondents obtaining the score "high" (n=57, 42.9%) and "poor" (n=9, 6.8%). This indicated that the level of knowledge and awareness of obesity as a risk factor for cancer among the respondents was largely moderate. The same trend can be seen in the awareness category, where respondents attaining a moderate score had the highest frequency (n=79, 59.4%) followed by those scoring "poor" (n=54, 40.6%). No respondents obtained a high score for the awareness section in this study.

Comparison of Sociodemographic Characteristics on Knowledge of Obesity and Its Risk of Cancer

The Mann-Whitney test indicated that there is a statistically significant difference between the level of knowledge of obesity and its risk of cancer between male (M=10.00) and female (M=10.00) respondents ($p = 0.017$) (Table 4).

Kruskall-Wallis test showed that there was a statistically significant difference between respondents' associated Kulliyyah and their level of knowledge on obesity and its risk of cancer ($p<0.001$),

Sociodemographic Characteristics of Respondents

Table 2. Sociodemographic Data of Respondents (n=133)

Sociodemographic characteristics	Frequency	Percentage (%)
Gender		
Male	18	13.5
Female	115	86.5
Kulliyyah		
KOM	12	9.0
KOD	9	6.8
KOP	25	18.8
KAHS	65	48.9
KON	10	7.5
KOS	12	9.0
Level of Study		
Year 1	29	21.8
Year 2	30	22.6
Year 3	64	48.1
Year 4	9	6.8
Year 5	1	0.8
Body Mass Index (BMI)		
Below 18.5 (Underweight)	34	25.6
18.5 to 24.9 (Normal)	78	58.6
25.0 to 29.9 (Overweight)	11	8.3
30.0 to 34.9 (Obesity class I)	7	5.3
35.0 to 39.9 (Obesity class II)	3	2.3
Self History of Overweight, Obesity and Cancer		
None	99	74.4
Underweight (BMI below 18.5)	1	0.8
Overweight (BMI 25.0 to 29.9)	27	20.3
Obesity (BMI 30 to 40)	11	8.3
Cancer	0	0.0
Familial History of Health Conditions		
None	47	35.3
Overweight (BMI 25.0 to 29.9)	62	46.6
Obesity (BMI 30 to 40)	27	20.3
Cancer	24	18.0
Household Income		
B40 (RM 4850 and below)	54	40.6
M40 (RM 4851 to RM10,970)	57	42.9
T20 (RM 10,971 and above)	22	16.5

Table 3. Categories of Knowledge Scores and Awareness Scores on Obesity and Its Risk of Cancer.

Categories	Frequency	Percentage
Knowledge scores		
High	57	42.9
Moderate	**67**	**50.4**
Poor	9	6.8
Awareness scores		
High	0	0.0
Moderate	**79**	**59.4**
Poor	54	40.6

Note: The total of highest frequency from each category is highlighted in bold.

which was between respondents from Kulliyyah of Science (M=8.00) and Kulliyyah of Pharmacy (M=10.00), Kulliyyah of Allied Health Sciences (M=10.00) and Kulliyyah of Medicine (M=12.00). Respondents from Kulliyyah of Medicine scored higher in the knowledge section (M=12.00), in contrast to respondents from Kulliyyah of Dentistry (M=6.00) which had low scores in the same section. Nonetheless, there was no statistically significant difference between age, level of study, BMI, self, and familial history of overweight and obesity, familial history of cancer, and household income in terms of respondents' level of knowledge on obesity and its risk of cancer.

Comparison of Sociodemographic Characteristics on Awareness on Obesity and Risk of Cancer

According to the Kruskall-Wallis test, there was no statistically significant difference between respondents' associated Kulliyyah, level of study, body mass index (BMI), and household income in

Table 4. Comparison between Sociodemographic Characteristics and Knowledge Scores (n=133)

Sociodemographic characteristics	Median	*p*-value
Gender		
Male	10.00	0.017*
Female	10.00	
Kulliyyah		
KOM	12.00	p<0.001*
KOD	6.00	
KOP	10.00	
KAHS	10.00	
KON	12.00	
KOS	8.00	
Level of Study		
Year 1	10.00	0.543
Year 2	10.00	
Year 3	10.00	
Year 4	10.00	
Year 5	-	
Body Mass Index (BMI)		
Below 18.5 (Underweight)	10.00	0.316
18.5 to 24.9 (Normal)	10.00	
25.0 to 29.9 (Overweight)	10.00	
30.0 to 34.9 (Obesity class I)	8.00	
35.0 to 39.9 (Obesity class II)	12.00	
Self History of Overweight and Obesity		
Yes	10.00	0.494
No	10.00	
Familial History of Overweight and Obesity		
Yes	10.00	0.053
No	10.00	
Familial History of Cancer		
Yes	10.00	0.343
No	10.00	
Household Income		
B40 (RM 4850 and below)	10.00	0.759
M40 (RM 4851 to RM10,970)	10.00	
T20 (RM 10,971 and above)	9.00	

Note: (*) Statistically significance is shown.

terms of respondents' level of awareness on obesity and its risk of cancer.

Meanwhile, there was no statistically significant difference between the respondents' gender, self, and familial history of overweight and obesity, as well as familial history of cancer, and their level of awareness of obesity and its risk of cancer, according to the Mann-Whitney U test.

Correlation Between Knowledge and Awareness on Obesity and Risk of Cancer

The Spearman's correlation coefficient's value was 0.463 (p<0.001), indicating that a statistically significant, fair positive correlation was observed. Table 5 displays the correlation analysis result between knowledge and awareness.

Table 5. Correlation between Knowledge Scores and Awareness Scores on Obesity and Its Risk of Cancer (n=133)

Variables	Correlation coefficient, *r*	*p*-value
Knowledge scores-Awareness scores	+0.463	<0.001**

Note: *r*-value which is positive show a fair positive correlation; (**) p-value is statistically significant (<0.01)

Discussion:

Firstly, the study aimed to evaluate the level of knowledge and awareness of IIUM Kuantan undergraduate students regarding obesity and its risk of cancer. Most of the respondents displayed a moderate level of knowledge regarding the topic of obesity and its risk of cancer. None of the respondents also received high scores for the awareness section of the questionnaire. A previous study by Ramya et al. (2019) also reported that medical students possessed moderate knowledge on the relationship between obesity and breast cancer. This outcome was attributed to the fact that the students undertaking medical-related courses may have been exposed to information related to breast cancer, such as a risk factor, in their learning module. Thus, it can be concluded that exposure to information regarding obesity as a risk factor for certain types of cancer can contribute to the knowledge and awareness level of the mentioned topic.

It was discovered that there was a statistically significant difference in the level of knowledge of obesity as a risk factor for cancer between females and men ($p = 0.017$). This suggested that each gender may have responded differently to the prompted questions, which led to differences in the knowledge section's score obtained by them. This result was similar to the Lin Loo et al. (2013) research finding that gender contributed to a significant difference in terms of knowledge of cancer. The study highlighted the possibility of females being more actively engaged in the actions of cancer detection compared to males, especially in cancers that are highly associated with women, such as breast and cervical cancer, where awareness campaigns for these cancers are frequently conducted.

Significant differences in knowledge levels can also be found among the respondents' kulliyyah ($p< 0.001$). According to this result, most of the respondents receiving high scores were from the Kulliyyah of Medicine (KOM). This is due to the topic's relevance to their discipline, as opposed to non-health science and non-medical science students like Kulliyyah of Science. This finding was also supported by the studies by Ramya et al. (2019) and Lin Loo et al. (2013) on medical and science students' higher knowledge levels of breast cancer risk factors and cancer in general, respectively, compared to non-medical and non-science students. The study by Ramya et al. (2019) stated that the medical students' sources of information on breast cancer were largely attributed to the education provided by the university, as reflected in the frequency of 42% (n=106) of 116 respondents compared to that of non-medical students, which was only 4% (n = 10). Meanwhile, the study by Lin Loo et al. (2013), which examined the cancer knowledge, awareness, and attitude of Malaysian undergraduate students regarding cancer, testified that higher knowledge was identified among science students in comparison to non-science students with respect to knowledge, awareness, and attitude toward cancer. The syllabus provided by the respondents' university was crucial in influencing the level of knowledge of breast cancer due to the different amount of exposure to the issue received by both medical and non-medical students (Ramya et al., 2013; Lin Loo et al., 2013). Nevertheless, there was no statistically significant difference in regard to the respondents' level of knowledge on obesity and its risk of cancer between level of study, Body Mass Index (BMI), self and familial history on overweight and obesity, familial history on cancer as well as household income.

It has been observed that there was no significant differences in terms of awareness of obesity and its risk of cancer among all sociodemographic groups were identified. This result contradicted the outcome of the study by Schliemann et al. (2020), Lin Loo et al. (2013), Hooper et al. (2018) and Seng et al. (2018) in which a significant difference between genders was found in terms of awareness of cancer signs and symptoms, with females scoring higher in terms of awareness of cancer risk factors. Females were also more exposed to the awareness campaigns targeting female-dominated cancers like cervical cancer, which are among the most actively promoted in specified localities. The type of academic discipline (medical or non-medical) was also a factor in cancer awareness, as evidenced by the significant difference in cancer awareness between Malaysian undergraduate students of science and non-science faculties (Lin Loo et al., 2013).

Finally, a moderately positive correlation has been found between knowledge and awareness of obesity and its associated risk of cancer among IIUM Kuantan undergraduates. A probable factor may be that sufficient knowledge can result in positive, elevated awareness on the issue, whereas poor awareness of obesity as a cancer risk factor may be a result of a lack of knowledge on the topic. A positive correlation indicates that the two variables, knowledge, and awareness, moved in the same direction, with an increment in knowledge increasing awareness.

Conclusion:

In conclusion, the study targeted to examine the level of knowledge and awareness of obesity and its risk of cancer among undergraduate students at IIUM Kuantan Campus. Most respondents among IIUM Kuantan undergraduates were aware of the role of obesity as a cancer risk factor. The differences in respondents' affiliated gender and kulliyyah may have contributed to the level of knowledge of obesity as a risk factor for cancer, as significant differences have been identified between these sociodemographic groups and the level of knowledge. The findings also show a significant positive correlation between the level of knowledge and awareness about obesity and the risk of cancer. Nonetheless, more efforts must be made to raise awareness of the role of obesity in the incidence of cancer for the information to reach a larger number of people, such as public populations.

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