KNOWLEDGE AND AWARENESS OF OBESITY-RELATED FEMALE FERTILITY RISKS AMONG IIUM KUANTAN FEMALE STUDENTS

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Abstract

Introduction: Overweight and obesity have significant health problems that may lead to the different prevalence of reproductive risks among women. This study aimed to assess the knowledge and awareness of obesity-related female reproductive risks among IIUM Kuantan female students. **Methods**: A cross-sectional study with convenience sampling was conducted in the International Islamic University Malaysia Kuantan Campus involving students from six faculties. An online survey questionnaire consisting of 3 sections; (1) socio-demographic background, (2) knowledge and awareness of obesity, (3) awareness on obesity-related female reproductive risks, was completed by 98 female students in their reproductive age (18 to 35 years old). **Results**: The data were analyzed using SPSS IBM Statistics 22 for the descriptive analysis and Spearman's correlation analysis. The data shows that 70% of the respondents have a high knowledge of general obesity. Most respondents 42 (42.9%) have a moderate awareness of obesity-related female reproductive risks. A total of 27 respondents (27.6%) had a high awareness level, 42 respondents (42.9%) had a moderate level of awareness, and 29 respondents (29.65%) had a low awareness level of obesity-related female reproductive risks. There is a moderate positive correlation between the knowledge of obesity and awareness of obesity-related female reproductive risks is ($r=0.536$, p value <0.01). **Conclusion:** Most participants were knowledgeable and aware of the cardiometabolic risk factor of obesity. However, the level of awareness of obesity-related reproductive risks was low among participants. Thus, public education is necessary to increase understanding and awareness of the reproductive risk and consequences of obesity toward female reproductive risks.

KEYWORDS: Obesity, Female, Reproductive, Risks, Knowledge, Awareness, Student

Introduction

According to the World Health Organization (WHO), in 2016, it was estimated that 39% of adults aged 18 and above in the global population were overweight; 13% of them were obese, and 15% of them were female. Obesity has been mentioned by the Centers for Diseases Control and Prevention (CDC), (2021) as a globally known leading problem that causes many severe diseases and health problems in both males and females. This includes hypertension, type II diabetes mellitus (DM), cardiovascular diseases (CVD), breathing problems and several types of cancer. According to Schetz et. al, (2019), obesity is a significant public health concern and raises the risk of various diseases. Additionally, Xue et. al, (2021) stated that an increase in waist circumference and waist-to-height ratio are predicted to increase the risk of CVD in men and women. Meanwhile, Seravalle and Grassi (2017) stated that several studies had shown a clear connection between increased blood pressure and weight gain.

Excessive body weight has been significant health problems that raise a considerable concern about how they may lead to the different prevalence of reproductive risks among women. Seif, Diamond and Nickkho-Amiry (2015) reported obese women usually suffer from reproduction disorders, such as menstrual disorders, infertility and PCOS. Pantasri and Norman (2014) testified that about 90% of women with anovulatory infertility are caused by polycystic ovary syndrome (PCOS) and obesity. The chance for obese and overweight women to get pregnant compared to healthy women with ideal body weight declined by about 18% and 8%, respectively. It was evidenced by the study by Talmor and Dunphy (2015), which showed remarkably lower oocyte utilization rates and substantially more embryos rejected than the normal and overweight subgroups. Meanwhile, Stubert, Reister, Hartmann and Janni (2018) studied the risk associated with obesity and pregnancy and found that some disorders associated with pregnancy increase as the severity of obesity increases.

Silvestris et. al., (2018) stated that abnormal body weight would affect women's reproductivity by causing hormone imbalance and distracting the ovulatory functions. These conditions would elevate the risk of having adverse pregnancy outcomes such as gestational diabetes and hypertension. Meanwhile, Dağ and Dilbaz (2015) mentioned obesity as a remarkable root of the reproductive disorder, menstrual disorders, and miscarriage. According to Catalano and Shankar (2017), obese women would face increased insulin resistance in the early stage of the pregnancy, which will cause glucose intolerance and fetal overgrowth at the end stage of pregnancy. Cavalcante et al. (2018) also reported a significant relationship between obesity and recurrent pregnancy loss.

(Katz, 2019) stated one of the obesity-related cancer problems for women is a massively increased chance of getting endometrial cancer, accounting for up to 40%

of all endometrial cancer cases. In addition, Arem and Irwin (2013) studied twelve published studies on obesity and survival of endometrial cancer, where four of which proposed that obesity is linked to poorer survival among women with uterine cancer, with the magnitudes of risk varying from 1.86 to 2.76 for obese women compared to women of normal weight.

It is an interesting necessity to review the knowledge and awareness of obesity-related female reproductive risks, especially among female students, since medical science-trained professionals will be the primary advisor for obesity prevention and management in the future. Thus, it is crucial to explore the relationship between obesity and potential reproductive risks and to discover the knowledge and awareness of obesity-related female reproductive risks among students in medical and health education.

Methods

Research Population

This research study was conducted in the International Islamic University Malaysia Kuantan Campus, involving undergraduate and postgraduate students from six faculties: Kulliyyah of Medicine, Kulliyyah of Pharmacy, Kulliyyah of Dentistry, Kulliyyah of Nursing, Kulliyyah of Allied Health Sciences and Kulliyyah of Science. The inclusion criteria of the respondents are restricted to be a complete response from female students in their reproductive age; 18 to 35 years old only, regardless of the level of the study; undergraduate, postgraduate, or doctoral degree. Any incomplete response has been considered unacceptable and has not been included in the study.

Research Design & Sampling

The cross-sectional study design was applied to this study. Convenience sampling has been implemented for this research study considering the accessibility to the respondents, as the current situation of COVID-19 had just entered the endemic phase by the time the questionnaire was disseminated. It has been considered a safer option for the research survey to be conducted online and on social media platforms such as WhatsApp and Instagram. This sampling method did not require a high cost to be completed and less time consumption.

Sample Size

The single proportion formula was adapted from a prior study by Xue et al. (2021), in which 65.4% of the individuals demonstrated a substantial level of obesity knowledge. The subjects for this research study have been chosen from a single population, and there is no comparison. Where, $Z\alpha_{/2}$ = 1.645, for 90% confidence interval (CI), precision; Δ is 0.1 and the proportion in the population is (0.65). The assumption was made that 10% of the non-response rate. Thus, the overall respondents targeted to complete the questionnaire are at least 96 respondents.

Ethical approval and Consent Letter

This study received the ethical approval from Kulliyyah Postgraduate and Research Committee (KPGRC) on 15th March 2022. The inclusion criteria, exclusion criteria, consent, confidentiality, benefit, and risk of participation were explained in the first section of the survey form. Participants were considered to have agreed to participate when they finished the survey form completely. Furthermore, the researcher's contact number and email address has also been attached in the same section for any inquiries.

Data Collection

The data for this study has been collected through online surveys using Google form. The set of questionnaires adapted from Rhoton-Vlasak, et. al, (2017) consisted of three sections: (1) questions on socio-demographic data, (2) knowledge of obesity and (3) awareness of obesity and its relation to female reproductive risks.

The socio-demographic section contains 6 questions regarding age, level of study, faculty of study (Kulliyyah), year of study, current height, and weight. Next, seven questions were provided in the second section regarding the knowledge of obesity including interpretation of respondents on BMI based on height and weight, agreement on whether weight loss positively affects reproductive risks related to obesity and knowledge on obesity related cancer problems. On the other hand, 10 questions regarding awareness of obesity and its relation to female reproductive health risks have been included in the third section.

Data Analysis

The BMI of the participants was calculated based on the weight and height from the socio-demographic section of the questionnaire survey. It was interpreted using WHO BMI classification; < 18.5 kg/m² (underweight), 18.5 kg/m² to 24.5 kg/m² (normal), 25 kg/m² to 29.9 kg/m² (overweight), 30 kg/m² to ≥ 40 kg/m² (obese).

The correct answer for each close ended question was given (1) score and (0) score for a wrong answer, and (0) score for a "maybe" answer. The scoring scale for the awareness type of question is measured as: aware (4), somewhat aware (3), somewhat unaware (2), unaware (1). On the other hand, the scoring scale ranging from strongly agree to strongly disagree are measured as: strongly agree (5), agree (4), neither agree nor disagree (3), disagree (2), strongly disagree (1).

The data from section 2 and 3 of the questionnaires was analyzed using Bloom's (1956) cut-off point (Tikuye, 2013). The score ranged from 0 to 21 points for obesity knowledge and awareness, and from 0 to 14 points for obesity-related female reproductive risks. Then, it was divided into three levels: high level (80-100%) 17-21 scores, moderate level (60-79%) 13-16 scores, low level (less than 60%) 0-12 scores.

Statistical Analysis

All collected data were sorted and analyzed using SPSS IBM Statistics 22. Descriptive analysis was implemented for the first two specific objectives; (1) To identify the knowledge and awareness of obesity among IIUM Kuantan female students, and (2) To assess the awareness of obesity-related female reproductive risks among IIUM Kuantan female students. Since the survey results were not normally distributed, and the Kolmogorov-Smirnov p-value was less than 0.05; Spearman's Rho correlation analysis was used for the third objective: (3) To analyze the correlation between the knowledge and awareness of obesity-related female reproductive risks among IIUM Kuantan female students.

Results

A total of 98 responses from IIUM female students were collected through this research study. Table 1 shows the demographic data results. Most of the participants (63%) were categorized as having normal body mass index (BMI).

Table 1: The socio-demographic data (N=98)

Demographic	n (%)	Mean (SD)
Age in year		
19-20	11.2 (11)	
21-22	80.6 (79)	21. 82 (0.978)
23-24	6.1 (6)	
25-26	2.0 (2)	
Kulliyyah		
Kulliyyah of Allied Health Sciences	52.0 (51)	
Kulliyyah of Pharmacy	19.4 (19)	
Kulliyyah of Medicine	8.2 (8)	
Kulliyyah of Nursing	8.2 (8)	
Kulliyyah of Dentistry	7.1 (7)	
Kulliyyah of Science	5.1 (5)	
Year of Study		
1	11.2 (11)	
2	10.2 (10)	
3	76.5 (75)	
4	2.0 (2)	
BMI Classification		
Obese Class II	4.1 (4)	
Obese Class I	5.1 (5)	
Overweight	13.3 (13)	22.4 (4.6)
Normal	63.3 (62)	
Underweight	14.3 (14)	

Knowledge of Obesity

The main health risk related to obesity identified by the participants was cardiovascular disease; 94.9%, followed by Type II DM; 92.9%, fatty liver; 80.6%, hypertension; 87.8%, early mortality; 56.1%, arthritis; 48%, sleep issues; 47%, and others not stated; 31.6%. Furthermore, a case study about BMI categorization found that 80% of the participants answered it correctly. The following question about obesity and health risk found that 98% of the participants were informed of the connection. When the data were further elaborated, 64% of respondents were very knowledgeable, and 36% were somewhat knowledgeable. Moreover, 99% of the respondents believed that weight loss in overweight and obese individuals might help increase pregnancy safety and improve fertility. This shows that the participants were concerned about the considerable fertility risks associated with obesity. Thus, they agreed (96%) that overweight women should be motivated to get a normal weight or reduce weight before trying to conceive.

Almost all participants, 64% (strongly agree) and 27% (agree), would actively endeavor to reduce weight or reach normal weight before trying to get pregnant if they have reproductive issues. Following that, 33.7% of respondents stated that they were well-versed that obesity might raise the risk of uterine cancer. Furthermore, 50% and 41% of respondents know that obesity may increase the risk of ovarian cancer and postmenopausal breast cancer. About 29 individuals (29.6%) have moderate knowledge, whereas the remaining 69% have excellent knowledge of obesity-related female reproductive risks.

Awareness of Obesity-related Female Reproductive Risks

About one-third (34.7%) of respondents claimed to be "aware" of obesity-related female reproductive risk, while half (50%) claimed to be "somewhat aware" of the same issue. Table 2 presents the respondents' answers regarding reproductive risks related to obesity.

Table 2: The risk of reproductive risks associated with obesity (N=98)

Before taking this survey, were you aware that female obesity increases the risk for:	Yes % (n)	No % (n)
Menstrual period irregularity	86.7 (85)	13.3 (13)
Heavy menstrual bleeding	43.9 (43)	56.1 (55)
A lower chance of getting pregnant	77.6 (76)	22.4 (22)
Less responsiveness to fertility treatment	72.4 (71)	27.6 (27)
Higher rate of miscarriages	57.1 (56)	42.9 (42)
Entering puberty at a younger age	70.4 (69)	29.6 (29)

Only 52 out of 98 respondents reported to be aware of the possibility that some hormonal birth control methods may be less effective in obese women. When asked if being advised about obesity-related reproductive risks will increase their motivation to reach or maintain a healthy weight before having a child, 96.9% of participants responded "yes." Furthermore, Table 3 highlights the participants' preferences for information about obesity and reproductive difficulties. It determines that participants favor getting information from doctors in public media (78%) over other platforms.

Table 3: Preference to get information about obesity and reproductive issues (N=98).

Preference	% (n)
1. Doctors	7.1 (7)
2. Relevant government agencies	1.0 (1)
3. Education Institute	8.2 (8)
4. Public media	3.1 (3)
5. Doctors in public media	78 (77)

Nevertheless, 79% of respondents believe maternal obesity during pregnancy may predispose the child to obesity, while 19% believe it is impossible. As a result, 76.5% are optimistic about having their biological children someday, 20.4% said "maybe," and 3.1% said they were against the idea. In the previous year, 45.9% of respondents reported having sought out information regarding fertility issues, pregnancy, and related topics, while the remaining 54.1% did not.

The Correlation Between Knowledge of Obesity and Awareness of Female Reproductive Risks among IIUM Kuantan Female Students.

Figure 4 represents the correlation between the levels of knowledge and awareness of the participants regarding obesity and reproductive risks among female participants. The results found a moderate positive correlation, which indicates knowledge may influence the awareness among the participants.

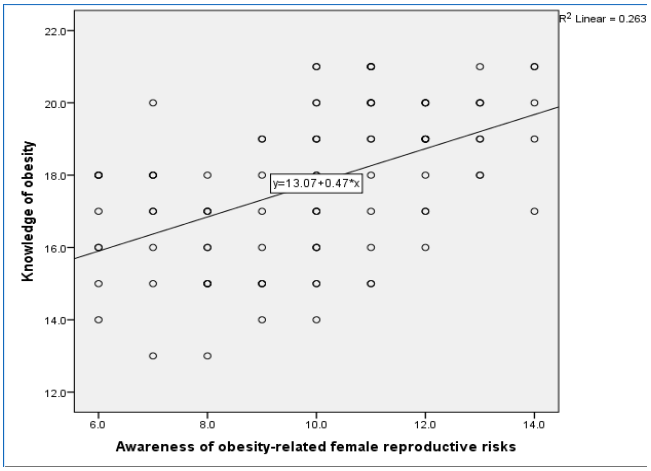

Figure 4: Correlation of obesity knowledge and awareness of obesity-related female reproductive risks.

Discussion

The general knowledge and awareness of obesity-related female reproductive risks should be exceptionally high, considering that the participants should have an explicit scientific understanding as they were from medical and health backgrounds. Therefore, as expected, most participants know and are aware of the cardiometabolic health problems related to obesity and the female reproductive risks linked to the obesity problem. However, a high percentage of them are unaware of obesity and its relation to ovarian cancer, uterine cancer, and post-menopausal breast. The results were consistent with previous studies by Cardozo et. al (2013), where they also found that most women were unaware that obesity is linked to cancer.

The knowledge of BMI was considerable when about 80% - 95% of the participants could identify the correct BMI range for the provided case studies. Each woman of reproductive age should understand BMI classification and be able to identify herself in whatever category. This is important to create awareness for them to be in the normal BMI category for better health outcomes. The latest study by Zhu at. al, (2022) found a negative relationship between BMI and infertility, a one-unit increase in BMI reduced infertility by 33%. Moreover, a study done by Arendt et al. (2021) observed that being underweight could lead to infertility in women of reproductive age. Thus, it is proved that knowledge regarding BMI is vital for fertility.

A previous study by Cardozo et. al, (2013) found that knowledge and awareness of obesity and cardiometabolic risks were significant. Cardozo et. al, (2013) mentions a 2003 Harvard University national survey, where most Americans perceive obesity as a serious health issue. A significant proportion of them are conscious that obesity is associated with a greater risk of cardiovascular disease (86%), hypertension (86%), and diabetes (78%). However, only 52% seem to be knowledgeable that obesity is also

associated with a greater risk of certain cancers, such as endometrial and breast cancer. In fact, only 42% of women are aware that obesity promotes risk of endometrial cancer and 54% are aware that it increases risk of breast cancer, based on a survey on public knowledge and awareness of obesity and cancer risks. Therefore, there is a lack of knowledge and awareness of reproductive risks related to obesity.

However, in this current study, the percentage of knowledge and awareness of obesity is higher than the awareness of obesity and its relation to female reproductive risks. This could be related to the participants' backgrounds; as in the current study, the participants were from the medical and health sciences. They may have a basic understanding of BMI and reproductive risks. Current findings identified a moderate linear relationship between knowledge and awareness of obesity-related female reproductive risks. About 50% of the participants with good knowledge of obesity are aware of reproductive risks as well. Previous studies discovered that around half of the individuals said they had obtained weight-gain counseling from a physician (Phelan et al., 2011; Stengel et al., 2012). The provider-patient educational gap suggested a lack of support or a possible unwillingness to discuss excess weight and a possibly existing knowledge gap regarding obesity and reproductive risks among medically trained individuals (Phelan et al. 2011).

Though there was a high level of knowledge of the general health problems related to obesity, the poorer understanding of the obesity-related reproductive risks is a noteworthy result, particularly among IIUM Kuantan female students. In fact, following the NHMS findings in a survey conducted in 2020, 54.2% of Malaysia's adult population is overweight or obese, rising four percentage points from the NHMS findings in 2019. Thus, expanding obesity awareness and education regarding nutrition as a part of the most crucial topic to be discussed publicly may be relevant next steps toward understanding obesity-related female reproductive risk.

Conclusion

Most participants were knowledgeable and aware of the cardiometabolic risk factor of obesity, but few realized the correlation between body weight and female reproductivity. Thus, public education is necessary to increase understanding and awareness of the female reproductive risks and consequences of obesity toward female reproductive risk. Information regarding obesity and weight loss programs may be disseminated to women of reproductive age via social media, as that is how the current generation prefers to learn.

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