

KNOWLEDGE AND AWARENESS OF MALE OBESITY-RELATED INFERTILITY AMONG IIUM KUANTAN STUDENTS

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Abstract

Introduction: Fertility issues occur not only in females but also in males. The community still has a low level of knowledge and awareness of male obesity-related infertility. Several students may be aware that obesity can impact men's fertility, but some may be unaware. Therefore, this study was conducted to determine the knowledge and awareness of male students regarding obesity-related infertility. **Method:** Convenience sampling was used to gather respondents in this cross-sectional study. A validated questionnaire was used to assess knowledge and awareness about male obesity-related infertility. A total of 110 subjects completed the study. **Result:** The data analysis was done using the SPSS Statistics Version 26.0. The results indicate that the mean knowledge score is 35.24 ± 5.69 , which could be classified as moderate. In addition, the mean awareness score is 41.99 ± 7.00 , which could be ranked as high. No significant difference was found between male and female students' level of knowledge or awareness of male obesity-related infertility. Knowledge and awareness were found to be moderately associated ($r=0.674$; $p=0.05$), which indicates that if individuals are knowledgeable, they are also most likely to have awareness. **Conclusion:** Regardless of the considerable awareness level, the student's knowledge regarding obesity and infertility is still at the intermediate level. Thus, promoting a healthy lifestyle and raising awareness of the risks that obesity poses to reproduction is essential.

KEYWORDS: Obesity, Infertility, Knowledge, Awareness, Students

Introduction

According to the National Health and Morbidity Survey (NHMS) 2019, obesity is prevalent among Malaysian adults, accounting for 19.7% of the population (Mohd- Sidik, Lekhraj, & Foo, 2021). According to the WHO, approximately 650 million adults worldwide were obese in 2016, with around 900 million being overweight. In 2021, WHO reported that 13% of adults 18 years old were obese (15% were female and 11% were male); overweight adults accounted for 13% of the global population (40% were female, and 39% were male). In addition, according to World Health Organization (WHO), on World Health Day 2019, Malaysia has high obesity and overweight rates among Asian countries, with 64% of males and 65% of females obese or overweight (WHO, 2019). Obesity rates had tripled since 1975 by 2016, and the pandemic had exaggerated the problem. Obesity is also one of the factors that affect fertility in males. The inability to conceive after a few years of marriage would be an implication that affects obese patients.

Infertility affects roughly 15% of all sexually active couples worldwide (Kashou et al., 2012). Moreover, males cause at least half of all infertility cases, alone or in combination with female causes. In approximately 20% of cases, the male is fully responsible, while in another 30% to 40% of cases, the male is a contributing factor for infertility (Leslie et al., 2021). Infertility is multifactorial, with various unknown reasons (Dutta, Sengupta, & Chhikara, 2020). According to Pfeifer et al. (2015), a sperm analysis is essential for evaluating infertile couples; while a normal result does not guarantee normal fertility, a semen analysis can uncover these issues. Following that, environmental factors and lifestyle behaviours may impact male infertility. These factors may also have an impact on the quality of the sperm. Smoking is one of the lifestyle factors that can have an effect on a man's sperm quality. Male smokers had sperm concentrations that were 13% to 17% lower than nonsmokers, according to Durairajanayagam (2018). Cigarette smoking has also been associated with decreased sperm count, motility, and morphology.

Moreover, obesity is rising, and many individuals should be aware that being overweight can harm their overall health. Numerous studies have linked male obesity to infertility. The downward trend in sperm parameters corresponds to the global rise in obesity rates (Katib, 2015). Some people are unaware of the association between obesity and fertility in males, especially those who are still not married. Numerous studies have connected obese men to poor spermatogenesis and altered sperm parameters, such as decreased total sperm count and concentration (Manna, & Jain, 2015; Adewoyin et al., 2017). According to the Malaysian Dietitians' Association (n.d.), obesity has negatively impacted fertility in both men and women. Furthermore, obese women with an overweight or obese male spouse have up to two-fold lower fertility than obese women with normal-weight mates (Malaysian Dietitians' Association, n.d.). This has an impact on the efficacy of reproductive treatments.

Some students might be aware that the contributing factors to men's infertility are smoking, using alcohol and being overweight. However, many students may still be ignorant that obesity significantly contributes to male infertility. The lack of knowledge

would make the students unaware of males' relationship between obesity and fertility. The students should cultivate awareness through knowledge of prevention and caution for future planning. To date, limited clinical studies have been conducted on the relationship between obesity and infertility among males in Malaysia. As a result, the current study was undertaken as a precursor by determining the students' knowledge and awareness of male obesity-related infertility.

Materials and Methods

Subjects

A total of 110 respondents (males=42, females=68) from the International Islamic University Malaysia (IIUM) Kuantan Campus were recruited. The convenience sampling method was used in this study. Convenience sampling is a non-probability sampling technique in which respondents were chosen based on their availability or accessibility. The inclusion criteria included students aged 18 years and above and involved both male and female students. Exclusion criteria were non-IIUM students, staff, and participants aged less than 18 years old. Informed consent was obtained from all respondents before the study took place.

Sample Size

The sample size was calculated based on a single proportion formula.

$$\begin{aligned} \text{Where: } Z_{\alpha/2} &= 1.96 \text{ (for 95\% CI)} \\ \Delta &= \text{Precision (0.08)} \\ p &= \text{proportion in the population (0.70)} \\ n &= (Z_{\alpha/2} / \Delta)^2 \times p(1 - p) \\ n &= (1.96 / 0.08)^2 \times 0.70(1 - 0.70) \\ n &= 126 \end{aligned}$$

An addition of 10% for the "non-response rate" is included, presuming that some respondents do not complete the questionnaires entirely.

$$\begin{aligned} n &= 70\% + 10\% \\ n &= 126 + 12 \\ n &= 138 \end{aligned}$$

Study Design

A cross-sectional study design was undertaken to conduct this study. The benefits of this study design are that it can produce prevalence estimates quickly and at a low cost.

Questionnaire

There were three sections to the questionnaire. These include socio-demographic details, knowledge of male obesity-related infertility, and awareness about male obesity-related infertility. The items were adopted and modified from the previous study (Sallmen et al.,

2006; Barron et al., 2020; Rhoton-Vlasak et al., 2017). The content validity assessment and pilot study were conducted on the questionnaire before data collection.

Content Validation

Content validation involved four experts from the Department of Nutrition Sciences, including two lecturers and two dietitians (N=4), who assessed the questionnaire items and were representative of the construct's interest. The content validity index (CVI) values for items with 0.7 and above were kept for the pilot study.

Pilot Testing

Pilot testing was conducted among 30 students to assess the questions' internal consistency.

Statistical analyses

Statistical analyses were carried out using the SPSS Statistics Version 26. Descriptive analysis was used to determine the demographic data's percentage, mean, standard deviation and level of knowledge and awareness. Aside from that, the independent sample t-test was used to determine the difference in knowledge scores between male and female students about male obesity-related infertility and the difference in male and female students' awareness level of male obesity-related infertility. The level of knowledge and awareness was classified using a scoring technique based on Bloom's cut-off points for the Knowledge, Attitude and Practice (KAP) evaluation (Wahidiyat et al., 2021). The KAP ranges from 80% to 100% (good), 60% to 79% (moderate), and less than 60% (poor). The Spearman correlation coefficient was used to determine the association between knowledge and awareness of male obesity-related infertility among all participants.

Ethical approval & participant consent

The Kulliyah Postgraduate Research Committee (KPGRC) provided ethical permission for this study, which was thereafter approved by the IIUM Research Ethics Committee (IREC). Each questionnaire came with a consent form that the respondents had to fill out.

Results

Content Validity & Reliability

The content validation results found no issues as all the value is between 0.6 to 0.8; thus, no deletion was made except for a few sentences rephrasing was done according to the expert's suggestions. Cronbach's alpha result for knowledge and awareness was in the acceptable to excellent range. The value obtained for the knowledge and awareness section without any deletion of items was 0.7 and 0.9, respectively; thus, there was no item deletion after the pilot study.

Sociodemographic Data

The subjects' mean age was 21.73 ± 1.09 years. All participants were unmarried. The subjects were from IIUM Kuantan's Kulliyahs (faculties) of Nursing, Medicine, Sciences, Pharmacy, Dentistry, and Allied Health Sciences. Their participation rates were 4.5%, 9.1%, 11.8%, 16.4%, 6.4%, and 51.8%, respectively. Table 1 demonstrates the respondents' actual Body Mass Index (BMI), to which they replied with consent and awareness. The actual BMI was measured and categorized using SPSS Statistics 26 based on the weight and height given by the participants. It shows that 10.9% were underweight, 69.1% had a normal BMI, 18.2% were overweight, and 1.8% were obese. The BMI was further classified according to the mean as 1 (underweight), 2 (normal), 3 (overweight), and 4 (obese).

Table 1: Demographic details (n=110)

Demographics	n (%)	Mean \pm SD
Gender		
Male	42 (38.2)	
Female	68 (61.8)	
Age		
19- 22	92 (84)	
23-27	18 (16)	21.7 \pm 1.1
Kulliyah (Faculty)		
Nursing	5 (4.5)	
Medicine	10 (9.1)	
Science	13 (11.8)	
Pharmacy	18 (16.4)	
Dentistry	7 (6.4)	
Allied Health Sciences	57 (51.8)	
Level of Study		
Year 1	18 (16.4)	
Year 2	21 (19.1)	
Year 3	59 (53.6)	
Year 4	11 (10.0)	
BMI Classification		
Underweight (1)	14 (12.7)	
Normal (2)	75 (68.2)	2.0 \pm 0.63
Overweight (3)	18 (16.4)	
Obese (4)	3 (2.7)	

Assessment of Knowledge Score of Male Obesity-related Infertility

The cumulative knowledge score across all subjects was 35.4 ± 5.69 . The minimum knowledge score was 11, and the maximum score was 55. Among all the participants, 22.7% (n=25) of them had insufficient knowledge, 70.0% (n=77) of participants had intermediate knowledge levels, and 7.3% (n=8) had excellent knowledge levels.

Assessment of Awareness Score of Male Obesity-related Infertility

The total awareness score across all subjects is 41.99 ± 7.00 . The minimum awareness score was 11, and the maximum awareness score was 55. About 9.1% of the individuals ($n=10$) had poor levels of awareness, 43.6% ($n=48$) had moderate levels of awareness, and 47.3% ($n=52$) of the participants had a high degree of awareness.

The gender differences in knowledge and awareness of male obesity-related infertility

Table 2 shows the knowledge and awareness scores of male and female students. There was no significant difference in either knowledge or awareness scores between male and female participants.

Table 2: Evaluation of knowledge and awareness scores between males ($n=42$) and females ($n=68$) students

Variable	Male (mean \pm SD)	Female (mean \pm SD)	Mean differences (95% CI)	t-test (df)	p- value*
Knowledge	34.76 \pm 5.15	35.53 \pm 6.02	0.77(-1.45, 2.99)	0.686 (108)	0.494
Awareness	41.40 \pm 6.21	42.35 \pm 7.47	0.95(-1.781, 3.677)	0.689 (108)	0.493

*Independent sample t-test

Correlation between knowledge and awareness of male obesity-related infertility

Figure 1 illustrates the correlation between knowledge and awareness of male obesity-related infertility. The findings demonstrated a statistically significant positive correlation ($r=0.67$; $p<0.01$) between knowledge and awareness of male obesity-related infertility. Thus, it can be concluded that those with enough knowledge of obesity-related to infertility may take necessary precautions for prevention.

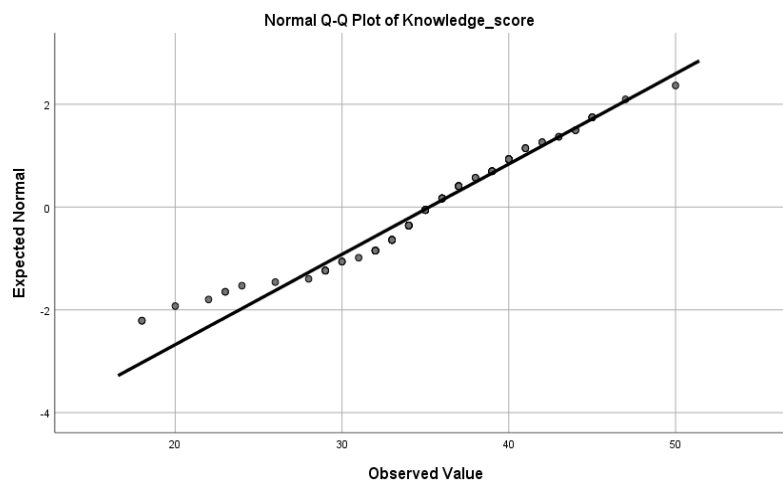


Figure 1: Scatterplots of knowledge and awareness score

Discussion

Obesity prevalence has increased dramatically worldwide and is now a global health issue. Given that obesity is a condition of chronic inflammation, MCP-1-mediated pathways in women may result in increased macrophage infiltration in the ovaries. Increased serum AGEs may also exacerbate ovaries' adiposity-related impairment. Numerous molecular pathways are involved in obesity-related male infertility, and obesity disturbs sperm parameters and hormonal balance (Ahmad & Haque, 2022).

Thus, knowing students' level of knowledge and awareness regarding infertility is necessary to raise awareness of obesity-related infertility among them. As there is no available questionnaire, an adapted questionnaire from several studies were used (Sallmen et al., 2006; Barron et al., 2020; Rhoton-Vlasak et al., 2017). The content validation and pilot testing were conducted to assess the newly adapted questionnaire's validity and reliability. The results found a good validity and reliability value; thus, it was valid and reliable for measuring knowledge and awareness of male obesity-related infertility. Enabling the content and pilot testing for the adapted questionnaire is necessary to avoid irrelevant information for the tested population.

The knowledge score of the IIUM Kuantan students on the relationship between obesity and male fertility is 35.24 ± 5.69 . The results show that most students have moderate knowledge regarding male obesity-related infertility. This result was inconsistent with a study in Saudi populations, which found that IVF patients are more educated on the problem of obesity which can affect fertility because of the high prevalence of obesity in this group of patients, which included 70% of IVF patients and 55% of fertile outpatients (Abolfotouh et al., 2013). People with health problems are more knowledgeable about their health condition.

The mean awareness score of students on male obesity-related infertility is 41.99 ± 7.00 . Although most of the respondents had a moderate knowledge level, it is noticeable that they had high awareness of the associations. Since knowledge and awareness were positively associated, adequate knowledge might increase awareness. The current findings are inconsistent with those of Rhoton- Vlasak et al. (2017) 's, which concluded that despite having at least a college education, the populations examined had relatively low awareness of the obesity-related reproductive condition. According to Gerhard et al. (2014), attitude and knowledge of medical conditions and treatments impact behaviour related to seeking health care and potential determinants of health disparities. Gerhard et al. (2014) found a low level of awareness about male infertility and its treatment, with many respondents reporting that they were unfamiliar with the issue or had not heard of treatment alternatives. It is conceivable that awareness initially motivated people to seek out their health.

Moreover, this study found no significant difference between male and female students in terms of knowledge and awareness regarding male obesity-related infertility. In another study, male students were reported to have more considerable knowledge gaps

about fertility, indicating that they need to become more mature to avoid infertility (Meissner et al., 2016). The study from Hammarberg et al. (2012) also showed a similar finding that indicates that men have lower knowledge and awareness of male obesity-related infertility. The study found that male obesity and smoking were thought to not affect fertility by a higher proportion of men than women (Hammarberg et al., 2012).

Conclusions

Despite the substantial awareness level, the student's knowledge regarding obesity and infertility is still at the intermediate level. Thus, promoting a healthy lifestyle and raising awareness of the risks that obesity poses to reproduction is essential. The university management must collaborate with healthcare professionals to provide the necessary knowledge to the students.

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