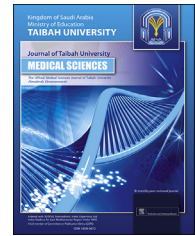




# Taibah University

## Journal of Taibah University Medical Sciences

www.sciencedirect.com



### Original Article

## Female sexual dysfunction among overweight and obese women in Kota Bharu, Malaysia



Artini Abidin, MMed (Fam)<sup>a</sup>, Nani Draman, MMed (Fam)<sup>a,\*</sup>,  
Shaiful B. Ismail, MMed (Fam)<sup>a</sup>, Izadora Mustafa, M.Sc<sup>b</sup> and  
Imran Ahmad, MMed (Fam)<sup>a</sup>

<sup>a</sup> Department of Family Medicine, School of Medical Sciences, Universiti Sains Malaysia, Kubang Kerian, Kelantan, Malaysia

<sup>b</sup> Fakulti Teknologi Kejuruteraan, Universiti Teknikal Malaysia Melaka, Hang Tuah Jaya, Durian Tunggal, Melaka, Malaysia

Received 7 November 2015; revised 26 January 2016; accepted 26 January 2016; Available online 3 March 2016

### المخلص

**أهداف البحث:** تعتبر زيادة الوزن والسمنة عوامل خطيرة للعجز الجنسي. مع ذلك، لم يتم توثيق هذه العلاقة جيدا في النساء، وأيضا النتائج الموجودة متعارضة. يمكن أن يرجع هذا إلى أن الحياة الجنسية لدى الإناث أكثر تعقيدا. تهدف هذه الدراسة لتحديد معدل الانتشار والعوامل المرتبطة بالعجز الجنسي لدى الإناث وأنوعها بين السيدات اللواتي يعانين من زيادة الوزن والسمنة.

**طرق البحث:** أجريت هذه الدراسة المقطعية في الفترة من شهر يناير إلى يونيو ٢٠١٢م في عيادات "راواتان كيلوارجا" بمستشفى جامعة سينز الماليزية. تم توزيع النسخة الصحيحة بلغة الملايو لمؤشر الوظيفة الجنسية للإناث ل ٢٠٤ من السيدات اللاتي يعانين من زيادة الوزن والسمنة. تم الحصول على المعلومات الاجتماعية والديموغرافية، والجسدية والحيوكيميائية. تم استخدام الانحدار اللوجستي المتعدد لتقييم العوامل الخارجية للعجز الجنسي.

**النتائج:** بلغ معدل انتشار العجز الجنسي لدى الإناث اللاتي يعانين من زيادة الوزن والسمنة ١٢.٣٪. وكان اضطراب الرغبة الجنسية الأكثر انتشارا (٢٣٪)، ويتبعه اضطراب الاستثارة (٨.٣٪)، واضطراب الترتيب (٩.٣٪)، واضطراب الشهوة (٤.٩٪)، واضطراب الرضا (٩.٣٪) واضطراب الألم (٦.٩٪). ارتبط الإنجاب ومدة الزواج بشكل كبير بالعجز الجنسي لدى الإناث في دراسات الارتباط.

**الاستنتاجات:** العجز الجنسي لدى السيدات اللاتي يعانين من زيادة الوزن والسمنة كان منخفضا. وأظهر الإنجاب ارتباطا إيجابيا كبير بالعجز الجنسي للإناث، بينما أظهرت مدة الزواج عامل وقائي للعجز الجنسي للإناث.

**الكلمات المفتاحية:** العجز الجنسي للإناث؛ السمنة؛ زيادة الوزن؛ الإنجاب؛ اضطراب الاستثارة

### Abstract

**Objectives:** Overweight and obesity have been identified as risk factors for sexual dysfunction. However, this relationship has not been well documented in women, and the results have been conflicting, perhaps because of the complexity of female sexuality. The aim of our study was to determine the prevalence of and factors associated with female sexual dysfunction (FSD) and its subtypes among overweight and obese women.

**Methods:** This cross-sectional study was conducted from January to June 2012 at Klinik Rawatan Keluarga Hospital Universiti Sains Malaysia. A validated Malay version of the Female Sexual Function Index was administered to 204 overweight and obese women. The socio-demographics and physical and biochemical parameters were obtained. Multiple logistic regression was used to evaluate the confounding factors for sexual dysfunction.

**Results:** The prevalence of FSD among overweight and obese women was reported to be 12.3% (95% CI: 7.79, 16.81). Sexual desire disorder was the most prevalent dysfunction (23%), followed by arousal disorder (8.3%), lubrication disorder (9.3%), orgasm disorder (4.9%), satisfaction disorder (9.3%) and pain disorder (6.9%). Parity 1.08 (1.01, 1.15) and duration of marriage 0.70 (0.50, 0.96) were significantly associated with FSD in the study cohort.

**Conclusions:** Sexual dysfunction among overweight and obese women was low. Parity showed a significant positive correlation with FSD, while the duration of marriage appeared to be a protective factor against FSD.

\* Corresponding address: Department of Family Medicine, School of Medical Sciences, Universiti Sains Malaysia, 16150 Kubang Kerian, Kelantan, Malaysia.

E-mail: drnani@usm.my (N. Draman)

Peer review under responsibility of Taibah University.



Production and hosting by Elsevier

**Keywords:** Arousal disorder; Female sexual dysfunction; Obese; Overweight; Parity

© 2016 The Authors.

Production and hosting by Elsevier Ltd on behalf of Taibah University. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

## Introduction

The ability to function sexually contributes to a healthy sexual life, which in turn sustains a good relationship. However, sexual function impairment in intimate relationships can cause discontentment and bitterness. Several definitions and classifications for female sexual dysfunction (FSD) have been proposed. The World Health Organization (WHO) defines sexual dysfunction for an individual as the inability to participate in a sexual relationship as he or she would wish.<sup>1</sup> In the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV), sexual dysfunctions are defined as disturbances in sexual desire and the psychophysiological changes that characterize the sexual response cycle, causing marked distress and interpersonal difficulty.<sup>2</sup>

The prevalence of FSD among obese women has ranged from 50% to 86%.<sup>3,4</sup> A study by Kolotkin et al. indicated that higher BMI was associated with higher impairment of sexual quality of life in women.<sup>5</sup> David B et al. documented that extreme obesity also led to impairment of quality of life.<sup>6</sup> However, few women have come forward to reveal that they have sexual dysfunction, although it does affect their self-esteem and quality of life, as well as causing emotional distress, leading to relationship problems in their marital lives.<sup>7</sup>

There are many factors leading to FSD, such as having a much older husband, being married for too long, having too many children and reduced intercourse frequency.<sup>8</sup> There are also decreases in sexual desire and frequency of sexual intercourse during pregnancy, due to physical discomfort, fatigue, a feeling of unattractiveness and fear of miscarriage or causing harm to the foetus.<sup>9</sup> A number of medical illnesses can also lead to FSD through various pathophysiologic changes, including diabetes mellitus, hypertension, smoking and heart disease.<sup>10</sup> Lower household income<sup>11</sup> and stress urinary incontinence<sup>12</sup> are also factors that can lead to FSD.

Obesity increases the incidence of dyslipidaemia and the prothrombotic state.<sup>13</sup> Dyslipidaemia progressively develops as BMI increases from 21 kg/m<sup>2</sup> with an elevation in proatheromatous, dense, small-particle-sized low density lipoprotein.<sup>13</sup> Diseases can cause reduced genital blood flow secondary to atherosclerosis of the iliohypogastric or pudendal arterial bed, causing vaginal wall and clitoral smooth muscle fibrosis and resulting in vaginal dryness, dyspareunia and impaired sexual arousal.<sup>10</sup>

Hormonal balances are also an important factor in maintaining normal female sexual function. Oestradiol is a predominant female sex hormone that contains oestrogen, and it maintains vaginal mucosal epithelium integrity, which improves lubrication and increases vaginal sensation.<sup>9,14</sup> It

also has vasodilatory and vasoprotective effects on the vagina.<sup>14</sup> The beneficial effects of oestrogen enhance sexual arousal. In postmenopausal women, oestrogen replacement therapy has been proved to improve vaginal lubrication, as well as female sexual desire.<sup>15</sup>

Testosterone, an androgen predominant in women, plays an important role in libido and sexual desire, influencing sexual activity initiation and permission for sexual behaviour.<sup>16</sup> Testosterone also enhances vaginal lubrication and facilitates smooth vaginal muscle relaxation. The androgens also play roles in the development of reproductive function and in secondary sexual characteristic growth and maintenance by modulating the vaginal and clitoral physiology.<sup>16</sup> Treatment with testosterone in surgically menopausal women improved clitoral sensitivity, sexual desire, arousal and satisfaction.<sup>14</sup> In addition, it also caused improvements in energy, well-being and psychological symptoms.<sup>16</sup>

The incidence of sexual dysfunction has been noted to be higher among overweight and obese women, compared to the general population. This problem can negatively affect physical and emotional well-being, which subsequently can impair the general health of affected persons. However, no local data could be found showing the severity of the problem; the available literature has come mainly from Western studies. By studying the FSD problem among local women, it will hopefully assist doctors in providing appropriate interventions or assistance. Thus, this study was performed to determine the prevalence of FSD and its associated factors among local overweight and obese women, as well as the subtypes of FSD problems in this group.

## Materials and Methods

A cross-sectional study was conducted for a period of 6 months from January to June 2012 at Klinik Rawatan Keluarga (KRK), Hospital Universiti Sains Malaysia (HUSM).

### Participants

A total of 204 patients participated in this study, using a single proportion formula based on a study performed in Turkey.<sup>4</sup> The study power was 80%, after considering a 10% dropout rate. The inclusion criteria were female sex, age of 18 years old or old, body mass index (BMI) 25 kg/m<sup>2</sup> and greater, married with heterosexual relationship and regular menses. The exclusion criteria were pregnancy, menopause, patients who came for follow-ups for chronic illnesses, such as diabetes mellitus, stroke, heart failure, and end stage renal disease, chronic immobilization, known psychiatric illnesses, such as schizophrenia, depression, and anxiety disorders, known gynaecological problems, such as pelvic trauma, genital prolapse, and lower genital tract abnormalities, active genitourinary infection and the use of oral contraceptive pills.

### Assessment of sexual function

The Malay Version of the Female Sexual Function Index (MVFSFI) was developed and validated by Sidi et al. in married female patients who attended a primary health care

clinic at Bandar Tun Razak, Cheras, Kuala Lumpur.<sup>17</sup> The MVFSFI is a validated self-reported questionnaire that has been shown to have discriminate reliability between women with and without FSD. The sensitivity and specificity of the MVFSFI are 99% and 97%, respectively, with a Cronbach's  $\alpha$  ranging from 0.8665 to 0.9675. Sensitivity and specificity values for each domain were also established; they were 95% and 89%, respectively, for sexual desire disorder, 77% and 95%, respectively, for arousal disorder, 79% and 87%, respectively, for lubrication disorder, 83% and 85%, respectively, for orgasm disorder, 83% and 85%, respectively, for satisfaction disorder, and 86% and 95%, respectively, for sexual pain disorder.

The MVFSFI is a translated version of the original Female Sexual Function Index (FSFI), which was developed by Rosen et al. in the United States.<sup>18</sup> The questionnaire has 19 items assessing the participant's sexual function during the previous four weeks prior to enrolment. It categorizes sexual dysfunction into six basic domains: desire, arousal, lubrication, orgasm, satisfaction and sexual pain.

For each question, there are five to six options available, for which the most likely answer is chosen by the participants to represent their sexual function in the preceding four weeks. Each answer is scored ranging from 0 to 5. The lower the score is, the higher the probability is of having the respective female sexual dysfunction (Table 1). A total score of  $\leq 55$  was used as the cut-off point for the MVFSFI to differentiate between women with and without sexual dysfunction. For each domain, women who scored less than the cut-off point were indicated to have that specific domain disorder and vice versa.

#### Anthropometric measurements and laboratory analyses

The height and weight of the participants were measured using a calibrated Seca scale, with the participants wearing light-weight clothing without shoes. Body mass index (BMI) was calculated as weight in kilogrammes divided by the square of height in metres ( $\text{kg}/\text{m}^2$ ). The measurements were recorded in the participants' case report forms. BMI of  $\geq 25 \text{ kg}/\text{m}^2$  is considered overweight, while obesity is indicated by BMI  $\geq 30 \text{ kg}/\text{m}^2$ .<sup>19</sup>

A total of 5 ml of fasting venous blood was obtained to measure serum testosterone, fasting blood sugar and fasting lipid profiles. The venous blood was obtained in the morning before 10.00 am to maximize the accuracy of the serum

testosterone level because androgens undergo a diurnal variation, in which the levels are highest in the morning. The blood was sent to a private laboratory for analysis.

#### Data collection procedure

Using convenience sampling, eligible overweight and obese women were identified and approached by the researcher during their visits to KRK, HUSM, for various medical reasons. Explanations were provided regarding the study, and the women were reassured that the gathered information was kept confidential. Their BMIs were measured, and if they fulfilled the inclusion and exclusion criteria, a set of guided self-administered MVFSFI questionnaires was provided, and venous blood samples were drawn. The participants had to complete the questionnaire on the same day. The participants were provided with another appointment date for blood to be drawn if they had come in after 10.00 am or were non-fasting.

#### Statistical analysis

Data entry and analyses were performed by using the Statistical Package for the Social Sciences (SPSS) software, version 22. The numerical variables are expressed as the means and standard deviations. Regarding categorical variables, the frequency and percentage were calculated. The chi-square test was used for comparison of types of FSD between overweight and obese women. Simple logistic regression was used to screen for factors potentially associated with FSD, and multiple logistic regression was used to determine the factors associated with FSD while adjusting for other confounders in the model. The dependent variable was FSD. The independent variables were age, race, education level, employment, monthly family income, husband's age, husband's medical illnesses, duration of marriage, frequency of sexual intercourse, parity, BMI, serum testosterone, fasting blood sugar (FBS), total cholesterol (TC) level, low-density lipoprotein cholesterol (LDL) level, triglyceride (TG) level and high-density lipoprotein cholesterol (HDL) level.

#### Results

A total of 212 overweight and obese participants were screened for eligibility. However, 8 of them were not eligible due to not fasting and being unable to come again to KRK. Therefore, only 204 participants were recruited and completed the study for a response rate of 100%. The mean age of the study subjects was 39 years old. The participants were mainly Malay (95.6%) and employed (85.3%) and had non-tertiary educational levels (75%). The distribution of BMI was skewed to the right with a median (IQR) of 29.5 (6.05)  $\text{kg}/\text{m}^2$ . The socio-demographic and clinical characteristics of the participants are summarized in Table 2.

Of the 204 participants, a total of 25 participants had FSD, with prevalence of 12.3% (95% CI: 7.79, 16.81). Sexual desire was the most common problem reported by the participants (23%), compared to the other types of FSD (Table 3).

**Table 1: FSFI scoring for each domain.**

Sexual function domain	Item number	Score range	Minimum score	Maximum score	Cut-off point
Desire	1,2	1–5	2	10	5
Arousal	3,4,5,6	0–5	0	20	9
Lubrication	7,8,9,10	0–5	0	20	10
Orgasm	11,12	0–5	0	10	4
Satisfaction	13,14,15,16	0/1–5 <sup>a</sup>	2	20	11
Pain	17,18,19	0–5	0	15	7
Total	1–19		4	95	55

<sup>a</sup> Range for item 14 = 0–5; range for items 15 and 16 = 1–5.

Satisfaction ( $p = 0.007$ ) and sexual pain ( $p = 0.008$ ) disorders were noted to have significant associations with the overweight and obese groups (Table 4).

Comparison of the socio-demographic data, marital status, husband's age and clinical characteristics between the participants with and without FSD are shown in Table 5. No significantly associated factors were noted in simple logistic regression analysis (Table 6). Multiple logistic regression analysis showed that parity was a significantly positive associated factor, while duration of marriage was a significantly negative associated factor with FSD (Table 7).

## Discussion

Sexuality and intimacy are essential elements of a marital relationship. Good sexual quality of life contributes to physical, as well as psychosocial and emotional, well-being. An intimate relationship provides a feeling of security and balance, and it also provides support during times of distress.<sup>20</sup> Most overweight and obese people consider

themselves to be less attractive, less sexually interesting and incapable of developing a satisfying romantic relationship, compared to people with normal weight.<sup>20</sup> Therefore, they have a higher risk of developing sexual dysfunction, compared to women with normal weight.

The present study revealed a prevalence of 12.3% (95% CI: 7.79, 16.81) of women with FSD among overweight and obese premenopausal women who attended a hospital-based primary care clinic, according to the MVFSFI. The prevalence observed in this study was far lower than that reported in the Turkish population. A study conducted by Yaylali et al. among premenopausal, otherwise-healthy overweight and obese Turkish women using the FSFI revealed that 86% of them had FSD.<sup>4</sup> The mean BMI of the participants in Yaylali et al.'s study was higher than in the present study, at 37.5 (9.1) kg/m<sup>2</sup> compared 29.5 (6.05) kg/m<sup>2</sup> in our study.<sup>4</sup>

Another Turkish study performed among 64 healthy premenopausal obese women using the FSFI found the prevalence of FSD to be 50%.<sup>3</sup> However, in this study, only obese women with BMIs of 30 kg/m<sup>2</sup> or greater were recruited, while in the present study, overweight women with BMIs of 25 kg/m<sup>2</sup> were also included. In both Turkish studies, the sample sizes are relatively smaller than in this study, which might explain the difference in the prevalence of sexual dysfunction. The numbers of participants studied by Yaylali et al.<sup>4</sup> and Kadioglu et al.<sup>3</sup> were 45 and 64, respectively, while in the present study, the total number of subjects was more than two fold greater, at 204 women.

The difference in prevalence rates between the previous and present studies might be due to the difference in cut-off points used for determining FSD. In the present study, the cut-off point used in the MVFSFI to determine FSD was 55, while in the Turkish population studies,<sup>3,4</sup> which used the FSFI, a cut-off point of 26.55 was used for defining FSD.

In a study conducted by Kolotkin et al., approximately 54.7%–61.2% of obese women reported having sexual dysfunction at least some of the time.<sup>5</sup> However, the type of questionnaire used to assess sexual dysfunction in that study was different from the present study. Kolotkin et al.

**Table 2: Socio-demographic and clinical characteristics of participants (n = 204).**

Variables	Mean (SD) <sup>a</sup>	n (%)
Age (year)	39.0 (8.22)	
Monthly family income (RM)	3000 (2000) <sup>b</sup>	
<b>Race</b>		
Malay		195 (95.6)
Non-Malay		9 (4.4)
<b>Education level</b>		
Tertiary		51 (25.0)
Non-tertiary		153 (75.0)
<b>Employment</b>		
Employed		174 (85.3)
Unemployed		30 (14.7)
<b>Marital and husband characteristics</b>		
Marriage duration (years)	14.9 (8.91)	
Parity	3.1 (1.86)	
Husband's age (years)	42.4 (8.98)	
<b>Frequency of sexual intercourse</b>		
≥3×/week		23 (11.3)
1–2×/week		124 (60.8)
≤3×/month		57 (27.9)
<b>Husband with medical illness</b>		
Yes		53 (26.0)
No		151 (74.0)
<b>Clinical characteristics</b>		
BMI (kg/m <sup>2</sup> )	29.5 (6.05) <sup>b</sup>	
Overweight		113 (55.4)
Obese		91 (44.6)
Serum testosterone (nmol/L)	1.2 (0.08) <sup>b</sup>	
FBS (mmol/L)	4.7 (0.90) <sup>b</sup>	
TC (mmol/L)	5.5 (1.01)	
TG (mmol/L)	1.2 (0.68) <sup>b</sup>	
LDL (mmol/L)	3.5 (0.84)	
HDL (mmol/L)	1.5 (0.29)	

Abbreviations: BMI = Body mass index; FBS = Fasting blood sugar; TC = Total cholesterol; TG = Triglyceride; LDL = Low density lipoprotein; HDL = High density lipoprotein.

<sup>a</sup> Standard deviation.

<sup>b</sup> Median (interquartile range).

**Table 3: Types of sexual dysfunction among participants.**

Types	FSD	No FSD	n (%)
<b>Desire disorder</b>			
Yes	20 (80.0)	27 (15.1)	47 (23.0)
No	5 (20.0)	152 (84.9)	157 (77.0)
<b>Arousal disorder</b>			
Yes	17 (68)	0 (0.0)	17 (8.3)
No	8 (32)	179 (100.0)	187 (91.7)
<b>Lubrication disorder</b>			
Yes	16 (64)	3 (1.7)	19 (9.3)
No	9 (36)	176 (98.3)	185 (90.7)
<b>Orgasm disorder</b>			
Yes	9 (36)	1 (0.6)	10 (4.9)
No	16 (64)	178 (99.4)	194 (95.1)
<b>Satisfaction disorder</b>			
Yes	15 (60.0)	4 (2.2)	19 (9.3)
No	10 (40.0)	175 (97.8)	185 (90.7)
<b>Sexual pain disorder</b>			
Yes	9 (36.0)	5 (2.8)	14 (6.9)
No	16 (64.0)	174 (97.2)	190 (93.1)



**Table 4: Types of sexual dysfunction among overweight and obese patients.**

Variable	Overweight n (%)	Obese n (%)	<i>p</i> value <sup>a</sup>
Desire disorder			
Yes	26 (23.0)	21 (23.1)	0.991
No	87 (77.0)	70 (76.9)	
Arousal disorder			
Yes	8 (7.1)	9 (9.9)	0.470
No	105 (92.9)	82 (90.1)	
Lubrication disorder			
Yes	7 (6.2)	12 (13.2)	0.080
No	106 (93.8)	79 (86.8)	
Orgasm disorder			
Yes	5 (4.4)	5 (5.5)	0.730
No	108 (95.6)	86 (94.5)	
Satisfaction disorder			
Yes	5 (4.4)	14 (15.4)	0.007
No	108 (95.6)	77 (84.6)	
Sexual pain disorder			
Yes	3 (2.7)	11 (12.1)	0.008
No	110 (97.3)	80 (87.9)	

<sup>a</sup> Chi-square.

evaluated a group of obese men and women using the Impact of Weight on Quality of Life-Lite questionnaire. Sexual life is part of the quality of life evaluated on the questionnaire, and it is assessed by four items: sexual enjoyment, sexual desire, sexual performance and sexual avoidance,<sup>5</sup> whereas in this present study, the MVFSFI was used, which has more questions and undertakes a more extensive assessment of female sexual function, for example, assessment of pain during sexual intercourse.

Different sociodemographic backgrounds and cultural beliefs of the participants might also have contributed to the different findings regarding the prevalence of FSD. In the present study, although the participants were sexually active, with more than half having at least 1 to 2 episodes of sexual intercourse per week, they might not have been ready to disclose their sexual problems to other people because sexuality is still considered a taboo subject to discuss openly in Malaysian culture, leading to under-diagnosis of sexual difficulties. A study performed in Asia showed that, among patients with sexual dysfunction, nearly half of them did not seek any help or advice for their sexual problems.<sup>21</sup> When asked about the reason for not consulting a physician, approximately one-third of them linked it to embarrassment.<sup>21</sup>

### Types of sexual dysfunction in overweight and obese women

The present study showed that approximately one-fourth (23%) of the subjects had decreased sexual desire, which is the most frequently reported sexual dysfunction, compared to other sexual domains. This finding was similar to local studies performed in general populations by Sidi et al.<sup>8</sup> and Ishak et al.,<sup>22</sup> which also found sexual desire disorder to be the most prevalent FSD condition (69.6% and 39.3%, respectively). The finding of the highest prevalence for sexual desire disorder compared to other sexual domains was also demonstrated by other studies performed in

various countries among non-overweight and obese populations, ranging from 22% to 60.3%.<sup>11,23–26</sup>

Adolfsson et al. reported that obese women aged 18–49 years old experienced the greatest decrease in sexual desire, compared to a normal weight group.<sup>20</sup> Although there were no differences in sexual dysfunction (lack of sexual desire, arousal problems, painful intercourse) observed among overweight, obese and normal-weight women, Bajos et al. showed a significant trend towards decreasing sexual desire with increasing BMI.<sup>27</sup> Assimakopoulos et al. reported that severely obese women seeking bariatric surgery had significant impairments in most sexual function domains, including sexual desire, arousal, lubrication, orgasm and satisfaction,<sup>28</sup> while a study performed by Kolotkin et al. among obese women and men found that approximately 32.8%–37.6% of women reported that they always or usually had little sexual desire, experienced sexual performance difficulties, did not enjoy sexual activity and/or avoided sexual encounters because of their weight.<sup>5</sup>

However, our data showed that arousal and lubrication were significantly associated with overweight and obesity in patients. This finding was supported by Esposito et al., who claimed that arousal, lubrication, satisfaction and orgasm were affected by obesity.<sup>29</sup>

A study from Iran revealed that, when women were asked to explain the causes of the sexual disorders from which they were suffering, most of them linked the problems to poor partner performance (87%) and the partner's sexual dysfunction (82%).<sup>30</sup> Fugl-Meyer and Fugl-Meyer demonstrated that women with partners suffering from erectile dysfunction had a higher incidence of sexual problems, including lack of sexual interest, inadequate lubrication and orgasmic difficulty, compared to the general community.<sup>31</sup> Another study conducted in Turkey found that women whose partners had erectile dysfunction had significant lower scores in total and on all sexual domains except for sexual desire, compared to those with a healthy partner.<sup>23</sup>

### Factors associated with female sexual dysfunction

In this study, two factors were found to be associated significantly with sexual dysfunction among overweight and obese women. These factors were parity and duration of marriage.

A finding from this study showed that higher parity was associated with FSD, and women with higher parity were more likely to have FSD. Previous studies of FSD among overweight and obese women do not include parity or number of children as a variable when examining potentially associated factors. The existing studies have indicated that women with greater numbers of children reported a higher incidence of sexual dysfunction.<sup>8,30</sup> This finding was supported by Witting K et al., who noted that multiparous women had fewer orgasm and pain problems and were sexually more satisfied than nulliparous women.<sup>32</sup>

The results of our study also showed a significant, negative association of FSD with longer duration of marriage. Those who have longer marriages were less likely to have FSD. Longer duration of marriage is an indication of

**Table 5: Sociodemographic, marital, spousal and clinical characteristics of participants with and without sexual dysfunction.**

Variables	FSD (n = 25)		Non-FSD (n = 179)	
	Mean (SD) <sup>a</sup>	n (%)	Mean (SD) <sup>a</sup>	n (%)
<b>Sociodemographic characteristics</b>				
Age (year)	40.6 (9.61)		38.8 (8.01)	
Monthly family income (RM)	3146.9 (2436.55)		3384.2 (2185.52)	
<b>Race</b>				
Malay		23 (92.0)		172 (96.1)
Non-Malay		2 (8.0)		7 (3.9)
<b>Education level</b>				
Tertiary		6 (24.0)		45 (25.1)
Non-tertiary		19 (76.0)		134 (74.9)
<b>Employment</b>				
Employed		22 (88.0)		152 (84.9)
Unemployed		3 (12.0)		27 (15.1)
<b>Marital and spousal characteristics</b>				
Marriage duration (years)	16.8 (9.96)		14.7 (8.75)	
Parity	2.8 (1.41)		3.2 (1.91)	
Husband's age (years)	44.7 (10.37)		42.1 (8.76)	
<b>Frequency of sexual intercourse</b>				
≥3×/week		1 (4.0)		22 (12.3)
1–2×/week		9 (36.0)		115 (64.2)
≤3×/month		15 (60.0)		42 (23.5)
<b>Husband with medical illness</b>				
Yes		9 (36.0)		44 (24.6)
No		16 (64.0)		135 (75.4)
<b>Clinical characteristics of participants</b>				
BMI (kg/m <sup>2</sup> )	29.6 (3.21)		30.6 (4.57)	
Overweight		12 (48.0)		101 (56.4)
Obese		13 (52.0)		78 (43.6)
Serum testosterone (nmol/L)	1.3 (0.62)		1.3 (0.70)	
FBS (mmol/L)	4.7 (0.69)		4.8 (0.69)	
TC (mmol/L)	5.5 (0.91)		5.5 (1.03)	
TG (mmol/L)	1.2 (0.37)		1.3 (0.61)	
LDL (mmol/L)	3.5 (0.75)		3.5 (0.86)	
HDL (mmol/L)	1.4 (0.24)		1.5 (0.29)	

Abbreviations: BMI = Body mass index; FBS = Fasting blood sugar; TC = Total cholesterol; TG = Triglyceride; LDL = Low density lipoprotein; HDL = High density lipoprotein.

<sup>a</sup> Standard deviation.

relationship stability; couples spend more time together in leisure and religious activities.<sup>33</sup> Hence, they are more acquainted with each other's preferences, including sexual preferences<sup>34</sup>. However, in Ishak et al.'s study, the results showed that duration of marriage was not significantly associated with FSD.<sup>22</sup> Their study was undertaken among women attending a primary care clinic in Kuala Lumpur. The different in result was probably due to the high prevalence of FSD (25.8%) noted in their study compared to our study (12.3%), and the study population was also different despite the use of a similar questionnaire. At the same time, in another study conducted in Egypt, Zakia et al. reported that the duration of marriage was significantly associated with FSD. These authors reported that the women with FSD in their study experienced marital disharmony and had difficult economic and/or social lives.<sup>35</sup>

In this study, obesity and BMI did not show significant associations with FSD. This result was in accordance with the study by LM Nackers et al. They concluded that, despite BMI increases, there was no association with changes in

sexual functioning, sexual desire or intercourse frequency.<sup>36</sup> Another recent study also supported our findings.<sup>37</sup>

In contrast, Kirchengast et al. reported that obesity was associated with reduced sexual interest. The dissimilarity in findings occurred because their subjects were menopausal women, and in menopause, fat deposits tend to increase in the chest, waist and hip areas.<sup>38</sup> In contrast, a study by Kolotkin et al. claimed that higher BMI was associated with greater impairment of sexual quality of life in women, such as lack of enjoyment, little desire, difficulty with performance and avoidance of sexual encounters. These authors, however, measured sexual quality using the Impact of Weight on Quality of Life-Lite questionnaire.<sup>5</sup>

Other studies in overweight and obese women linking FSD to measured lipid profiles have been scarce. Atherosclerosis causes clitoral and vaginal vascular insufficiency, leading to vaginal dryness, dyspareunia and impaired sexual arousal, which subsequently result in female sexual dysfunction.<sup>10</sup> Total cholesterol (TC) is distributed primarily among three major lipoprotein classes — very-low-density lipoprotein (VLDL), LDL and HDL — and in smaller

**Table 6: Associated factors for FSD among participants using simple logistic regression.**

Variables	SLR <sup>a</sup>			
	B	Crude OR (95% CI)	Walf (df)	p value
<b>Age (years)</b>	0.03	1.03 (0.98, 1.08)	1.05 (1)	0.306
<b>Monthly family income (RM)</b>	0.00	1.00 (1.00, 1.00)	0.25 (1)	0.615
<b>Race</b>				
Malay		1.00		
Non-Malay	0.76	2.14 (0.42, 10.91)	0.83 (1)	0.361
<b>Education level</b>				
Non-tertiary		1.00		
Tertiary	-0.06	0.94 (0.35, 2.50)	0.015 (1)	0.902
<b>Employment</b>				
Employed		1.00		
Unemployed	-0.26	0.77 (0.22, 2.74)	0.17 (1)	0.684
Marriage duration (years)	0.03	1.03 (0.98, 1.08)	1.23 (1)	0.267
Husband's age	0.03	1.03 (0.99, 1.08)	1.84 (1)	0.175
Parity	-0.12	0.90 (0.71, 1.13)	0.83 (1)	0.362
<b>Frequency of sexual intercourse</b>				
≥3×/week		1.00		
1–2×/week	0.54	1.72 (0.21, 14.28)	0.25	0.615
≤3×/month	2.06	7.86 (0.97, 63.46)	3.74	0.053
<b>Husband with medical illness</b>				
No		1.00		
Yes	0.55	1.73 (0.71, 4.18)	1.46 (1)	0.227
BMI (kg/m <sup>2</sup> )	-0.05	0.95 (0.85, 1.05)	0.95 (1)	0.303
Overweight		1.00		
Obese	0.34	0.71 (0.31, 1.65)	0.63 (1)	0.429
Serum Testosterone (nmol/L)	-0.03	0.97 (0.52, 1.79)	0.01 (1)	0.919
FBS (mmol/L)	-0.29	0.75 (0.39, 1.42)	0.79 (1)	0.373
TC (mmol/L)	-0.07	0.93 (0.61, 1.42)	0.12 (1)	0.732
TG (mmol/L)	-0.56	0.57 (0.24, 1.37)	1.59 (1)	0.208
LDL (mmol/L)	0.70	1.07 (0.65, 1.76)	0.07 (1)	0.785
HDL (mmol/L)	-0.61	0.55 (0.12, 2.53)	0.60 (1)	0.439

Abbreviations: BMI = Body mass index; FBS = Fasting blood sugar; TC = Total cholesterol; TG = Triglyceride; LDL = Low density lipoprotein; HDL = High density lipoprotein.

<sup>a</sup> Simple logistic regression.

amounts among two minor lipoprotein classes: intermediate-density lipoprotein (IDL) and lipoprotein (a) {Lp (a)}.<sup>39</sup> In addition to LDL and VLDL cholesterol, IDL and Lp (a) are also atherogenic.<sup>39</sup> However, in our study, they showed no significant associations with FSD. Similarly, a study by Esposito K et al. showed no significant association between TC and FSD.<sup>29</sup> The study was undertaken to determine the relationships of body weight and body fat distribution with sexual function in women.

In the present study, we found no significant association between serum testosterone and FSD. This finding was in agreement with a study by Yaylali et al., who assessed

FSD among overweight and obese women in Turkey using the FSFI questionnaire, finding no significant association between total testosterone and total FSFI score.<sup>4</sup> The findings of the present study were also supported by another study from Turkey among premenopausal, obese women, indicating that total testosterone had no effect on FSD.<sup>3</sup>

The present study, however, did have some limitations. The study population consisted of patients from a hospital-based primary care clinic. Thus, the results might not represent the sexual function of the entire population. The study only included married women with sexually

**Table 7: Associated factors for FSD among participants using multiple logistic regression.**

Variable	MLR <sup>a</sup>				
	B	SE of B	Adjusted OR (95% CI)	Wald stat (df)	p value
Parity	0.074	0.03	1.08 (1.01, 1.15)	5.60 (1)	0.018
Duration of marriage	-0.366	0.168	0.70 (0.50, 0.96)	4.77 (1)	0.029

There were no significant interactions between the significant independent variables and no multicollinearity problem. The Hosmer and Lemeshow goodness-of-fit test was not significant (*p* value 0.273), showing that the model fit. The model fitness was also supported by the classification table of 87.7% and an area under the ROC curve of 0.636.

<sup>a</sup> Backward LR multiple logistic regression model was applied.

functioning partners, so it might have underestimated the percentage of FSD in sexually active overweight and obese women. There was no control group in this study; therefore, we could not ascertain whether the prevalence of FSD was lower in obese and overweight women or was merely comparable to the normal rate in the population.

## Conclusions

The prevalence of sexual dysfunction among overweight and obese women was 12.3%. Sexual desire disorder was the most prevalent sexual dysfunction compared to the other domains. Parity was a significantly associated factor, while duration of marriage was a protective factor against FSD.

## Recommendations

The findings of this study provided a better understanding of and increased our awareness of the magnitude of FSD among overweight and obese women. It is recommended that health care providers, particularly in primary care settings, initiate and facilitate discussions about these issues by asking patients a few simple, general questions, such as '*Are you satisfied with your sexual relationship?*' or '*Is there any problem or concern in your sexual activity that you would like to raise and discuss?*' as part of the initial screening process. If a patient appears to have sexual problems, more appropriate questions based on available questionnaires could be used in diagnosing FSD.

There should be routine screening for FSD in overweight and obese women, particularly those with other potential risk factors for FSD, such as other chronic diseases. Because female sexual dysfunction is prevalent among obese and overweight women, this issue could be emphasized in weight loss programs as an encouragement for weight reduction.

## Conflict of interest

The authors have no conflicts of interest to declare.

## Authors' contributions

All of the authors have contributed significantly to this article, including designing the study, collecting data, data analysis and interpretation, and preparing and approving the final draft of the article.

## Ethical approval

The study was approved by the Ethics Committee of USM on 12 January 2012 (USM/KK/PP/JEPeM [245.3.(8)]).

## Acknowledgements

We would like to thank Universiti Sains Malaysia for providing a short-term grant (USM/PPPSP/2012/JKP-56 [56.3(2)]). We also do not want to forget the KRK staff and those have who helped us in seeing this study through to its completion.

## References

- Hatzimouratidis K, Hatzichristou D. Sexual dysfunctions: classifications and definitions. *J Sex Med* 2007; 4(1): 241–250.
- Basson R, Berman J, Burnett A, Derogatis L, Ferguson D, Fourcroy J, Goldstein I, Graziottin A, Heiman J, Laan E, Leiblum S, Padma-Nathan H, Rosen R, Segraves K, Segraves RT, Shabsigh R, Sipski M, Wagner G, Whipple B. Report of the international consensus development conference on female sexual dysfunction: definitions and classifications. *J Urol* 2000; 163(3): 888–893.
- Kadioglu P, Yetkin DO, Sanli O, Yalin AS, Onem K, Kadioglu A. Obesity might not be a risk factor for female sexual dysfunction. *BJU Int* 2010; 106(9): 1357–1361.
- Yaylali G, Tekekoglu S, Akin F. Sexual dysfunction in obese and overweight women. *Int J Impot Res* 2010; 22(4): 220–226.
- Kolotkin RL, Binks M, Crosby RD, Østbye T, Gress RE, Adams TD. Obesity and sexual quality of life. *Obesity* 2012; 14(3): 472–479.
- Sarwer DB, Lavery M, Spitzer JC. A review of the relationships between extreme obesity, quality of life, and sexual function. *Obes Surg* 2012; 22(4): 668–676.
- Hayes RD, Dennerstein L, Bennett CM, Sidat M, Gurrin LC, Fairley CK. Risk factors for female sexual dysfunction in the general population: exploring factors associated with low sexual function and sexual distress. *J Sex Med* 2008; 5(7): 1681–1693.
- Sidi H, Puteh SEW, Abdullah N, Midin M. Original Research—Epidemiology: the prevalence of sexual dysfunction and potential risk factors that may impair sexual function in Malaysian women. *J Sex Med* 2006; 4(2): 311–321.
- Jha S, Thakar R. Female sexual dysfunction. *Eur J Obstet Gynecol Reprod Biol* 2010; 153(2): 117–123.
- Berman JR, Bassuk J. Physiology and pathophysiology of female sexual function and dysfunction. *World J Urol* 2002; 20(2): 111–118.
- Laumann EO, Paik A, Rosen RC. Sexual dysfunction in the United States. *JAMA J Am Med Assoc* 1999; 281(6): 537–544.
- Lewis RW, Fugl-Meyer KS, Bosch R, Fugl-Meyer AR, Laumann EO, Lizza E, Martin-Morales A. Epidemiology/risk factors of sexual dysfunction. *J Sex Med* 2004; 1(1): 35–39.
- Esposito K, Giugliano D. Obesity, the metabolic syndrome, and sexual dysfunction. *Int J Impot Res* 2005; 17(5): 391–398.
- Raina R, Pahlajani G, Khan S, Gupta S, Agarwal A, Zippe CD. Female sexual dysfunction: classification, pathophysiology, and management. *Fertil Steril* 2007; 88(5): 1273–1284.
- Berman JR, Goldstein I. Female sexual dysfunction. *Urologic Clin N Am* 2001; 28(2): 405.
- Hollingsworth M, Berman J. The role of androgens in female sexual dysfunction. *Sex Reprod Menopause* 2006; 4(1): 27–32.
- Sidi H, Abdullah N, Puteh SEW, Midin M. The female sexual function index (FSFI): validation of the Malay version. *J Sex Med* 2007; 4(6): 1642–1654.
- Rosen R, Brown C, Heiman J, Leiblum S, Meston C, Shabsigh R, Ferguson D, D'Agostino R. The Female Sexual Function Index (FSFI): a multidimensional self-report instrument for the assessment of female sexual function. *J Sex Marital Ther* 2000; 26(2): 191–208.
- Seidell JC. Epidemiology—definition and classification of obesity. *Clin Obes Adults Child* 2005; 3–11.
- Adolfsson B, Elofsson S, Rössner S, Undén AL. Are sexual dissatisfaction and sexual abuse associated with obesity? A population-based study. *Obes Res* 2012; 12(10): 1702–1709.
- Nicolosi A, Glasser DB, Kim SC, Marumo K, Laumann EO. Sexual behaviour and dysfunction and help-seeking patterns in adults aged 40–80 years in the urban population of Asian countries. *BJU Int* 2005; 95(4): 609–614.



22. Ishak IH, Low WY, Othman S. Prevalence, risk factors, and predictors of female sexual dysfunction in a primary care setting: a survey finding. **J Sex Med** 2010; 7(9): 3080–3087.
23. Çayan S, Akbay E, Bozlu M, Canpolat B, Acar D, Ulusoy E. The prevalence of female sexual dysfunction and potential risk factors that may impair sexual function in Turkish women. **Urol Int** 2004; 72(1): 52–57.
24. Shifren JL, Monz BU, Russo PA, Segreti A, Johannes CB. Sexual problems and distress in United States women: prevalence and correlates. **Obstet Gynecol** 2008; 112(5): 970–978.
25. Oksuz E, Malhan S. Prevalence and risk factors for female sexual dysfunction in Turkish women. **J Urol** 2006; 175(2): 654–658.
26. Elnashar A, EL-Dien Ibrahim M, EL-Desoky M, Ali O, El-Sayd Mohamed Hassan M. Female sexual dysfunction in Lower Egypt. **BJOG Int J Obstet Gynaecol** 2007; 114(2): 201–206.
27. Bajos N, Wellings K, Laborde C, Moreau C. Sexuality and obesity, a gender perspective: results from French national random probability survey of sexual behaviours. **BMJ Br Med J** 2010; 340.
28. Assimakopoulos K, Panayiotopoulos S, Iconomou G, Karaivazoglou K, Matzaroglou C, Vagenas K, Kalfarentzos F. Assessing sexual function in obese women preparing for bariatric surgery. **Obes Surg** 2006; 16(8): 1087–1091.
29. Esposito K, Ciotola M, Giugliano F, Bisogni C, Schisano B, Autorino R, Cobellis L, Sio MD, Colacurci N, Giugliano D. Association of body weight with sexual function in women. **Int J Impot Res** 2007; 19(4): 353–357.
30. Safarinejad M. Female sexual dysfunction in a population-based study in Iran: prevalence and associated risk factors. **Int J Impot Res** 2006; 18(4): 382–395.
31. Fugl-Meyer KS, Fugl-Meyer AR. Sexual disabilities are not singularities. **Int J Impot Res** 2002; 14(6): 487–493.
32. Witting K, Santtila P, Alanko K, Harlaar N, Jern P, Johansson A, Pahlen BVD, Varjonen M, Algars M, Sandnabba NK. Female sexual function and its associations with number of children, pregnancy, and relationship satisfaction. **J Sex Marital Ther** 2008; 34(2): 89–106.
33. Stroope S, McFarland MJ, Uecker JE. Marital characteristics and the sexual relationships of US older adults: an analysis of national social life, health, and aging project data. **Archives Sex Behav** 2015; 44(1): 233–247.
34. Laumann EO. *The social organization of sexuality: sexual practices in the United States*. University of Chicago Press; 1994.
35. Ibrahim ZM, Ahmed MR, Ahmed WAS. Prevalence and risk factors for female sexual dysfunction among Egyptian women. **Archives Gynecol Obstet** 2013; 287(6): 1173–1180.
36. Nackers LM, Appelhans BM, Segawa E, Janssen I, Dugan SA, Kravitz HM. Associations between body mass index and sexual functioning in midlife women: the Study of Women's Health across the Nation. **Menopause** 2015; 22(11): 1.
37. Moore RH, Sarwer DB, Lavenberg JA, Lane IB, Evans JL, Volger S, Wadden TA. Relationship between sexual function and quality of life in obese persons seeking weight reduction. **Obesity** 2013; 21(10): 1966–1974.
38. Kirchengast S, Hartmann B, Gruber D, Huber J. Decreased sexual interest and its relationship to body build in postmenopausal women. **Maturitas** 1996; 23(1): 63–71.
39. Bachorik PS, Ross JW. National cholesterol education program recommendations for measurement of low-density lipoprotein cholesterol: executive summary. The National Cholesterol Education Program Working Group on lipoprotein measurement. **Clin Chem** 1995; 41(10): 1414–1420.

**How to cite this article:** Abidin A, Draman N, Ismail SB, Mustaffa I, Ahmad I. Female sexual dysfunction among overweight and obese women in Kota Bharu, Malaysia. *Journal of Taibah University Medical Sciences* 2016;11: 159–167.