Depression, Anxiety and Sexual Dysfunction Among Jordanian Women With Type 2 Diabetes Mellitus

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Abstract- The aims of this study are to determine the prevalence of sexual dysfunction and to examine the relationships of sexual function and psychological factors of depression and anxiety and diabetes-related factors in Jordanian women with type 2 diabetes mellitus. This study employed a cross-sectional, descriptive, correlational design. All eligible participants with type 2 diabetes mellitus were consequently recruited from primary care centers. All enrolled participants were asked to complete questionnaires: Arabic version of the Female Sexual Function Index, Beck Depression Inventory-II, Beck Anxiety Inventory, and demographic questionnaires. Physical and biological measures were collected from the patient's medical records. 107 women with type 2 diabetes mellitus were recruited with a mean of age of 52.46±8.38 years. The prevalence of female sexual dysfunction was 94.4%. Regarding the mean scores of the Arabic version of the Female Sexual Function Index domains, the highest mean score was for pain (5.09±1.51), and the lowest mean score was for sexual arousal (2.44±1.28). This study found significant inverse relationships between female sexual function and age (r= -0.340, *P*<0.01), duration of diabetes (r= -0.211, *P*=0.029), fasting blood sugar (r= -0.234, *P*=0.015), anxiety (r= -0.375, *P*<0.01), and depression (r= -0.480, *P*<0.01). Our study found female sexual dysfunction is widely prevalent in Jordanian women with type 2 diabetes mellitus (94.4%). There were significant correlations between anxiety, depression, and female sexual function among women with type 2 diabetes mellitus.

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Keywords: Type 2 diabetes mellitus; Sexual dysfunction; Depression; Anxiety

Introduction

Diabetes mellitus is one of the major chronic diseases in Jordan, and it was ranked as the third leading cause of death, killing 1.7 thousand people in 2012 (1). In 2008, Ajlouni *et al*., reported that the age-standardized prevalence of type 2 diabetes mellitus (T2DM) was 17.1%, and this percentage was increased by 31.5% compared with a result of a study conducted 10 years before this dates (2). Diabetes mellitus is usually associated with several complications, and sexual dysfunction is one of these complications.

Sexual dysfunction in T2DM was extensively investigated in men with less focus on its occurrence within women. There are many theories about how diabetes mellitus could affect sexual function (3). On the one hand, some theories focused on organic etiologies. These theories proposed that the vascular changes happening during the course of diabetes mellitus contribute to significant alterations in the nervous system, which indirectly influence women's sexual functions such as desire, arousal, lubrication, orgasm, satisfaction, and ability to participate in sexual activity without pain (4,5). On the other hand, some theories proposed that there are other factors that may contribute to sexual dysfunction in women with T2DM, such as depression and anxiety (5). These theories were based on the psychological etiologies of female sexual dysfunction (FSD). According to Elyasi *et al*., (2016), the prevalence of sexual dysfunction in Iranian women with T2DM was 78.7%; 58.7% of them had depression, and 96.7% of them had anxiety (6).

Sexual dysfunction in individuals with diabetes mellitus can be defined as the inability to maintain an adequate sexual response to complete sexual intercourse that is needed to induce a satisfactory orgasmic sensation (7). Sexual dysfunction in T2DM may affect males and females, and it had negative outcomes on their libido, arousal, and orgasm sensation. Nine studies used the

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Female Sexual Function Index (FSFI) to estimate the prevalence of sexual dysfunction in women with diabetes; the first group included participants with type 1 and 2. This group estimated the prevalence of sexual dysfunction in a range of 59.6-88% (8-11). The second group enrolled only participants with T2DM. This group reported a prevalence of sexual dysfunction in a range of 53.5-94.4% (6,12-15). In Jordan, there was only one study estimated the prevalence of sexual dysfunction in women with diabetes mellitus without differentiation between types. This study found 59.6% of women with sexual dysfunction (8).

Jordan is one of the Arabic countries; the majority of populations were Muslims. In Jordan, sexual relationships only accepted within the context of marriages. However, the conservative culture, as in Jordan, prohibits speaking in subjects of sexual function within families and communities. To this date, there was no study in Jordan that investigates this phenomenon with a clear theoretical model, and there are no studies that consider other factors that may contribute to this phenomenon, such as psychological factors. Therefore, this study aimed to determine the prevalence of sexual dysfunction and to examine the relationships of sexual function and psychological factors of depression and anxiety and diabetes-related factors in Jordanian women with T2DM.

Materials and Methods

Study design, setting, and recruitment

This study deployed a cross-sectional descriptive design. All eligible participants with T2DM were consequently recruited between January and June of 2017 from primary care centers that were managed by the Ministry of Health, Amman, Jordan. Before enrollment, if potential participants accepted to be part of this study, they were asked to sign a consent form compatible with the Helsinki Declaration of World Medical Association and was a part of a study approved by the Institutional Review Board at the Ministry of Health, Amman, Jordan.

Participants were legible to be part of the study if they were diagnosed with T2DM, fluent in Arabic language, over the age of 18 years and less than 65 years, married at least for 1 year and had a stable marital relationship. Participants who had a mastectomy, bilateral oophorectomy-hysterectomy, pregnancy, severe illnesses, and taking psychotropic drugs were excluded. Also, women reported the presence of sexual disorders before developing T2DM or had a spouse with ongoing sexual disorders were excluded from the study.

Variables and data collection

At the time of consent, participants completed a demographic survey and three self-reported questionnaires. After completing questionnaires, participant's medical records were accessed by investigators to get data on biological and physical measures.

Demographic Data

Self-reported questionnaires were used to obtain participant's demographics and clinical data, which include age, level of education, living environment, menopause, occupation, duration of the marriage, smoking history, and physical activities.

Female Sexual Function

Sexual function was measured by the Arabic version of the Female Sexual Function Index (Ar-FSFI), which includes 6 domains: desire, arousal, lubrication, orgasm, satisfaction, and pain (16). The Ar-FSFI questionnaire has 19 items (17). There were weight factors for each domain, and these weights were used in a formula to calculate the individual domain scores and a total (overall) score of the Ar-FSFI. A higher score of the Ar-FSFI indicates fewer sexual problems. The value of Ar-FSFI overall score $\leq$28.1 was used as an optimal cutoff to differentiate between women with sexual dysfunction from women with normal sexual function (16). The cutoff points used for these domains were as follows: 3.8 for satisfaction and pain, 3.4 for arousal, lubrication, and orgasm, and 3.3 for desire (18, 19). The Ar-FSFI total score and sub-scores of domains showed high test-retest reliability ranging from 0.92 to 0.98 (16). Moreover, the Arabic version of FSFI domains showed high internal consistency ranging from 0.85 to 0.94 (16).

Depression

Depression was measured by the Arabic version of the Beck Depression Inventory-II (Ar-BDI-II). Ar-BDI-II has 21 items; each item was measured through 4 points Likert scale ranging from 0 to 3 (20). The total score ranged from 0 to 63; a higher score of Ar-BDI-II indicates a higher level of depression. The total score was classified into four levels of depression: minimal (0-13), mild (14-19), moderate (20-28), and severe level of depression (29-63) (21). Cronbach's alpha coefficients of this questionnaire were ranged between 0.82 and 0.93 (22).

Anxiety

Anxiety was measured by the Arabic version of the Beck Anxiety Inventory (Ar-BAI). Ar-BAI has 21 items,

each item was measured through 4 points Likert scale ranging from 0 to 3 (21). The total score ranged from 0 to 63; a higher score of Ar-BAI indicates a higher level of anxiety. The total score was classified into four levels of anxiety: minimal (0-7), mild (8-15), moderate (16-25), and severe level of anxiety (26-63) (21). It was reported that Ar-BAI Cronbach's alpha coefficients were ranged between 0.83 and 0.90, and the test-retest coefficients were 0.79 (21).

Medical History, Biological, and Physical Measures

Data on medical history, biological, and physical measures were collected by investigators from the participant's medical record. The medical record of every participant was checked for a history of smoking, hypertension, and diabetes-related information. In addition, medical records were checked for: body mass index (BMI) and the most recent laboratory values for fasting blood sugar, HbA_{1c}, blood urea nitrogen (BUN), and creatinine.

Statistical analysis

IBM SPSS version 24 (IBM Corp., Armonk, NY, USA) was used to analyze data. All nominal and ordinal data were reported in frequencies and percentages, and numerical data were reported in terms of means and SD. Statistical tests of Pearson's correlation analysis were used to detect the relationships between demographic, clinical characteristics, and female sexual function. Furthermore, student *t*-test and *Chi*-squared tests were used to detect the differences in the means of female sexual function based on the participant's status. All hypotheses were tested as two-sided at a significance level of $P \leq 0.05$ and 95% confidence intervals.

Results

The study enrolled 107 participants with T2DM. The mean of participant's age was 52.5±8.3 years. One-quarter of participants completed their college and graduate studies (24.3%), and the majority were not working at the time of the study (78.3%). The mean of marriage duration was 29.6±9.7 years, and only 43% were reported symptoms of menopause. There were 42.1% of participants were diagnosed with hypertension. The average BMI was 32.7±5. Approximately one-quarter of participants was performing physical activity, and 10.3% of participants were current smokers (Table 1).

Table 1. Participant's demographic and clinical characteristics (n=107)

Variables		Mean (Standard Deviation) or Number (%)
Age (years)		52.5 (8.3)
Employment	**Working for pay**	20 (18.7)
	Homemaker	84 (78.5)
	Retired	3 (2.8)
Education	**Elementary**	36 (33.6)
	Secondary	45 (42.1)
	College	8 (7.5)
	Bachelor and higher	18 (16.8)
Duration of marriage (years)		29.6 (9.7)
Menopause	**Yes**	61 (57.0)
	No	46 (43.0)
BMI		32.7 (5.0)
Smoking	**Yes**	11 (10.3)
	No	96 (89.7)
Physical activity	**Yes**	22 (20.6)
	No	85 (79.4)
Hypertension	**Yes**	45 (42.1)
	No	62 (57.9)
Duration of diabetes mellitus		7.6 (5.7)
Therapy of diabetes mellitus	**Oral hypoglycemic agent**	84 (78.5)
	Insulin	2 (1.9)
	Oral hypoglycemic agent+Insulin	20 (18.7)
	Dietary regimen	1 (0.9)
Complications of diabetes mellitus		48 (44.9)
Retinopathy		7 (6.5)
Nephropathy		1 (0.9)
Cardiovascular		6 (5.6)
Neuropathy		42 (39.3)
Others		5 (4.7)
Fasting blood sugar (mmol/L)		8.7 (2.9)
HbA_{1c}		7.4 (1.7)
BUN (mmol/L)		1.8 (1.0)
Creatinine (µmol/L)		70.7 (17.7)

BMI, body mass index; BUN: Blood urea nitrogen

Regarding diabetes mellitus, data of participants show majorities were on the use of an oral hypoglycemic agent as alone (78.5%) or as in combination with insulin therapy (18.7%). The mean for the duration of diabetes mellitus was 7.6±5.7 years. The means for the last reading of their fasting blood sugar and HbA_{1c} were 8.7±2.9 mmol/L, and 7.4±1.7, respectively. Among complications of diabetes mellitus, diabetic neuropathy was most frequent (39.3%), followed by diabetic retinopathy (6.5%), and cardiovascular problem (5.6%) (Table 1).

The average total score of Ar-FSFI was 19.3±6.7. Among the mean scores of the six domains of Ar-FSFI, the lowest three means were for sexual arousal (2.44±1.28) followed by the orgasmic function (2.48±1.34) and sexual desire (2.74±1.35), respectively. Whereas, the three highest reported scores were for pain (5.09±1.51) followed by sexual satisfaction (3.63±1.63), and lubrication function (2.94±1.59) (Table 2).

Table 2. Ar-FSFI Scores: total and domains (n=107)

Ar-FSFI scores	Mean (Standard Deviation)
Desire score	2.74 (1.35)
Arousal score	2.44 (1.28)
Lubrication score	2.94 (1.59)
Orgasm score	2.48 (1.34)
Satisfaction score	3.63 (1.63)
Pain score	5.09 (1.51)
Total score	19.30 (6.70)

Ar-FSFI, Arabic version of the Female Sexual Function Index.

Table 3 shows that the prevalence of sexual dysfunction among our participants was 94.4%. Among these participants, 74.8% reported problems in sexual arousal, 73.8% complained of orgasmic dysfunction, 69.8% had decreased sexual desire, 56.1% reported sexual dissatisfaction, 52.3% reported problem of dryness, and only 12.1% had dyspareunia (Table 3).

Table 3. Characteristics of female sexual dysfunction (n=107)

Ar-FSFI scores		Number (%)
Decreased sexual desire	**Yes**	75 (69.8)
	No	32 (30.2)
Sexual arousal problem	**Yes**	80 (74.8)
	No	27 (25.2)
Sexual lubrication problem (dryness)	**Yes**	56 (52.3)
	No	51 (47.7)
Orgasmic dysfunction	**Yes**	79 (73.8)
	No	28 (26.2)
Sexual dissatisfaction	**Yes**	60 (56.1)
	No	47 (43.9)
Dyspareunia (pain)	**Yes**	13 (12.1)
	No	94 (87.9)
Sexual dysfunction	**Yes**	101 (94.4)
	No	6 (5.6)

Ar-FSFI, Arabic version of Female Sexual Function Index

Table 4 shows the means of total scores and frequencies of depression and anxiety among participants. The mean for the total score of Ar-BDI-II was 10.8±7.44. On these participants, 67.3% reported minimal signs of depression, 18.7% mild level, 11.2% moderate level, and only 2.8% reported severe level of depression. Regarding anxiety, 52.3% of participants reported a minimal level of anxiety, and 22.4% reported mild level of anxiety. A moderate level of anxiety was reported in 21.5% of patricians, and only 3.8% reported a severe level of anxiety. The mean for a total score of Ar-BAI was 10.29±7.63.

Table 5 shows the total score of Ar-FSFI was inversely correlated with the total score of Ar-BDI-II (r= -0.48, P<0.01), and Ar-BAI (r= -0.38, P<0.01). Table 5 shows total score of Ar-FSFI was inversely correlated

with age (r= -0.34, *P*<0.01), duration of marriage (r= -0.24, *P*=0.014), fasting blood sugar (r= -0.23, *P*=0.015), and duration of diabetes (r= -0.21, *P*=0.029). However, the total score of Ar-FSFI was found not to be correlated with BMI, and HbA_{1c} [non-significant results were not provided in Tables]. Moreover, the mean of Ar-FSFI was found to be significantly different based on participant's status of education (*P*=0.04), menopause (*P*=0.01), type of diabetes treatment (*P*=0.04), and complications of diabetes mellitus (*P*<0.001). However, the mean of Ar-FSFI was found to be not significantly differed based on the participant's status of working, smoking, physical activity, and hypertension. Results for differences in the mean of Ar-FSFI based on participant's status were not reported in Tables.

Table 4. Depression and anxiety status of Participants (n=107)

Variables	Mean (Standard Deviation) or Number (%)
Depression (Ar-BDI-II)	10.80 (7.44)
Minimal level of depression	72 (67.3)
Mild level of depression	20 (18.7)
Moderate level of depression	12 (11.2)
Severe level of depression	3 (2.8)
Anxiety (Ar-DAI)	10.29 (7.63)
Minimal level of anxiety	56 (52.3)
Mild anxiety	24 (22.4)
Moderate anxiety	23 (21.5)
Severe anxiety	4 (3.8)

Ar-BDI-II, Arabic version of Beck Depression Inventory-II; Ar-DAI, Arabic version of Beck Anxiety Inventory

Table 5. Correlation between Ar-FSFI total score and other variables (n=107)

	Correlation Coeffeicent (r)*	*P*
Age	- 0.34	< 0.01
Duration of marriage	- 0.24	0.014
Fasting blood sugar	- 0.23	0.015
Duration of diabetes mellitus	- 0.21	0.029
Depression	- 0.48	< 0.01
Anxiety	- 0.38	< 0.01

*The correlation coefficient (r) was obtained using Pearson's correlation analysis

Discussion

Female sexual function is not routinely discussed by healthcare providers with their patients during their regular visits. There were several factors that prohibit the initiation of this discussion. In certain cultures, like Islamic/Arabic culture, topics of sexual function considered as taboo and social attitudes prohibit discussion of these topics (6,13). Lack of specialized or trained healthcare providers to initiate a discussion in sensitive topics is another factor that might be responsible for such negligence (23,24).

Our study enrolled 107 women with T2DM. Huge proportions (94.4%) of participants were found to have sexual dysfunction. To a certain degree, our finding was consistent with earlier studies used FSFI. These studies estimated the proportion of sexual dysfunction in women with T2DM in a range of 53.5-94.4% (6,12-15). The prevalence of our study was exactly similar to a study conducted in Iran, which enrolled 420 women with an average of age 54.4±9.8 years (14). However, our study estimated a higher prevalence of sexual dysfunction than that of the study conducted in Jordan in 2009 (94.4% vs. 59.6%) (8). The lower prevalence in 2009 study may rationalize by lower mean of participant's age than our study (46±11 vs. 52.5±8.3), and the prevalence of sexual dysfunction was estimated in women with diabetes mellitus without differentiation between types. In our study, the average total score of Ar-FSFI was 19.3±6.7. Our findings were closed to the finding reported by Shi *et al*., (2012) (15) and Esposito *et al*., (2010) (12); it was 18.25±8.49 and 20.9±6.4, respectively. However, the mean of Ar-FSFI in our study was higher than the mean of FSFI reported by Shadman *et al*., (2014) (19.3 vs. 14.61) (14).

Regarding the sexual function domain, our study found 74.8% reported problems in arousal, 73.8% complained of orgasmic dysfunction, 69.8% had

decreased libido, 56.1% reported sexual dissatisfaction, 52.3% reported problems in lubrication, and only 12.1% had dyspareunia. In a cross-sectional study used similar cutoff for the domains found, 50% had arousal problem, 32.7% orgasmic dysfunction, 50% had decreased libido, 42.7% had sexual dissatisfaction, 58% had lubrication problem, and 47.3% reported dyspareunia (6). These findings were close to our study for most of the domain; however, in our study, the proportion of orgasmic dysfunction was higher, and the proportion of dyspareunia was lower than this study. Another study enrolled individuals with type 1, and 2 found 91% of participants had arousal problems, 91% had orgasmic dysfunction, 66% had decreased libido, 85% had sexual dissatisfaction, 26% had lubrication problems, and 31% reported dyspareunia (11).

Concerning mean scores for Ar-FSFI domains; the lowest three mean scores were for sexual arousal (2.44±1.28), orgasmic function (2.48±1.34), and sexual desire (2.74±1.35); whereas the three highest reported scores were for pain (5.09±1.51), sexual satisfaction (3.63±1.63), and lubrication function (2.94±1.59). Interestingly, three studies reported similar findings (9,10,15). In these three studies, the lowest three scores were for arousal, orgasmic function, and sexual desire with a mean in the range of 2.19-4.10, 2.35-4.50, and 2.43-3.50, respectively. The highest three scores were for sexual satisfaction, pain, and lubrication function with a means in a range of 3.25-4.80, 2.74-4.70, and 2.71-4.60, respectively. However, other studies were reported findings inconsistent with our order for the domain score (8,12). Despite the existence of variations in the literature about the domains of sexual function, it was clear that T2DM has a great impact on female sexual function, and such effect may varies from one domain to another.

This study found 32.7% of participants had mild to severe levels of depression, and 47.7% of participants had mild to severe levels of anxiety. In our study, the proportion of depression and anxiety was lower than that reported by Elyasi *et al*., (2014) (32.7% vs. 58.7%, and 47.7% vs. 96.7%, respectively); however, Elyasi *et al*., used a different questionnaire (6). Also, our study had lower frequencies of depression compared to those reported by Rutte *et al.*, (2016) (69%) (13). The total scores of depression and anxiety scales were found to be inversely correlated with the total scores of female sexual function. There were several studies reported similar findings of the inverse association between depression and female sexual function (10,14,25,26). Furthermore, one large study in 595 Italian women with T2DM reported depression as a predictor for FSD (12). Finally, there was one review reported that the incidence of sexual dysfunction in women with diabetes was more likely to be associated with psychological factors than the organic factors, especially the coexisting of depression (27).

In our study, we found a significant inverse association between female sexual function and age. A similar result was reported in a study conducted in Jordan (8), and many other countries (4,14); those studies reported a significant association between age and female sexual function. Also, there were studies reported that age was significantly associated with FSD (12), and age acts as an independent predictor for FSD (12,15). However, other studies were reported age was not correlated with FSD (6,11). Our study found a significant association between sexual function and duration of the marriage; however, the contrary finding was reported by Yencilek *et al*., (2010) (28).

This study found the duration of diabetes mellitus and fasting blood sugar were found to be significantly correlated with female sexual function; however, HBA_{1c} and BMI were not found to be correlated with female sexual function. Studies examined the association between diabetes duration and sexual function were reported similar findings (4,8,14), but studies examined the association of diabetes mellitus, and sexual dysfunction reported no significant association (6,11,12). Concerning HBA_{1c}, the majority of studies were reported similar findings; there was no significant association between HbA_{1c} and female sexual function (4,8) or dysfunction (6,9,11,12). However, there was only one study reported contradictory findings (10). Finally, concerning BMI, two studies reported similar findings of no correlations between BMI and female sexual function (4), or FSD (6). However, a contrary finding was reported by other studies (8,15).

Based on our findings, we can say FSD is widely prevalent in Jordanian women with T2DM. Both organic factors and psychological factors were found to be correlated with female sexual function. It seems that our findings were similar to other studies with small differences that could be due to variation in age, sample size, methods (questionnaire vs. interview), cutoffs used to differentiate between normal and sexual dysfunction. Also, certain studies enrolled participants without differentiation between types of diabetes mellitus.

The strength of our study lies in assessment for psychological factors side by side with biological, physical, and demographic factors. Despite that, our study has several limitations. The cross-sectional design of this study precludes the causal association between examined factors and female sexual function. Further

longitudinal studies are needed to explain such association. Sexual function, anxiety, and depression were assessed through a self-reported questionnaire without conducting a clinical interview by a psychiatrist. Our sample had a high prevalence of FSD, which result in large Numbers with sexual dysfunction and small Number with normal sexual function; therefore, the comparison between subgroups was not possible. This study did not include the control group; however, there was a study in Jordan found women with diabetes mellitus had a higher prevalence of FSD. In this study, we compared our findings with studies from other countries, but such comparisons should be warranted due to sociocultural variations.

In conclusion, this study found FSD is widely prevalent in Jordanian women with T2DM (94.4%). There were significant correlations between anxiety, depression, and female sexual function among women with T2DM. Study findings should be used to improve policies, services, and the direct care provided to this population to minimize the occurrence of sexual dysfunction and to enhance their quality of life.

References

1. WHO. Jordan: WHO statistical profile [Internet]. 2015 (Accessed 2016 Jun 1, at http://www.who.int/gho/countries/jor.pdf?ua=1.)
2. Ajlouni K, Khader YS, Batieha A, Ajlouni H, El-Khateeb M. An increase in prevalence of diabetes mellitus in Jordan over 10 years. J Diabetes Complications 2008;22:317-24.
3. Berry MD, Berry PD. Contemporary treatment of sexual dysfunction: Reexamining the biopsychosocial model. J Sex Med 2013;10:2627-43.
4. Fatemi SS, Taghavi SM. Evaluation of sexual function in women with type 2 diabetes mellitus. Diab Vasc Dis Res 2009;6:38-9.
5. Ramalho-Santos J, Amaral S, Oliveira PJ. Diabetes and the impairment of reproductive function: possible role of mitochondria and reactive oxygen species. Curr Diabetes Rev 2008;4:46-54.
6. Elyasi F, Kashi Z, Tasfieh B, Bahar A, Khademloo M. Sexual dysfunction in Women with type 2 diabetes mellitus. Iran J Med Sci 2015;40:206-13.
7. Arrellano-Valdez F, Urrutia-Osorio M, Arroyo C, Soto-Vega E. A comprehensive review of urologic complications in patients with diabetes. Springerplus 2014;3:1-8.
8. Abu Ali RM, Al Hajeri RM, Khader YS, Shegem NS, Ajlouni KM. Sexual dysfunction in Jordanian diabetic women. Diabetes Care 2008;31:1580-1.
9. Celik S, Golbası Z, Kelleci M, Satman I. Sexual dysfunction and sexual quality of life in women with diabetes: The study based on a diabetic center. Sex Disabil 2015;33:233-41.
10. Cortelazzi D, Marconi A, Guazzi M, Cristina M, Zecchini B, Veronelli A, et al. Sexual dysfunction in pre-menopausal diabetic women: clinical, metabolic, psychological, cardiovascular, and neurophysiologic correlates. Acta Diabetol 2013;50:911-7.
11. Ziaei-Rad M, Vahdaninia M, Montazeri A. Sexual dysfunctions in patients with diabetes: a study from Iran. Reprod Biol Endocrinol 2010;8:50.
12. Esposito K, Maiorino M, Bellastella G, Giugliano F, Romano M, Giugliano D. Determinants of female sexual dysfunction in type 2 diabetes. Int J Impot Res 2010;22:179.
13. Rutte A, Welschen LM, Van Splunter MM, Schalkwijk AA, de Vries L, Snoek FJ, et al. Type 2 diabetes patients' needs and preferences for care concerning sexual problems: a cross-sectional survey and qualitative interviews. J Sex Marital Ther 2016;42:324-37.
14. Shadman Z, Akhoundan M, Poorsoltan N, Larijani B, Arzaghi SM, Khoshniat M. Factors associated with sexual function in Iranian women with type 2 diabetes mellitus: partner relationship as the most important predictor. Iran Red Crescent Med J 2014;16:e14941.
15. SHI YF, SHAO XY, LOU QQ, CHEN YJ, ZHOU HJ, ZOU JY. Study on female sexual dysfunction in type 2 diabetic Chinese women. Biomed Environ Sc 2012;25:557-61.
16. Anis TH, Aboul Gheit S, Saied HS, Al-kherbash SA. Arabic translation of Female Sexual Function Index and validation in an Egyptian population. J Sex Med 2011;8:370-8.
17. Al-Sherbeny MF. Evaluation of impact of birth trauma on female sexual activity in primiparous women: A comparative study. J Am Sci 2012;8:289-96.
18. Mohammadi K, HEYDARI M, Faghihzadeh S. The female sexual function index (FSFI): validation of the Iranian version. Payesh 2008;7:269-78.
19. Rosen CB, J. Heiman, S. Leiblum, C. Meston, R. Shabsigh, D. Ferguson, R. 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;26:191-208.
20. Maamria B. Application of Beck Depression Inventory II (BDI-II) in both gender in Algerian enviroment. Journal of Arab Net of Psychology 2010;25-26:92-105.
21. Al-Shatti TS. Psychometric properties of the Arabic version of the Beck Anxiety Inventory in the State of Kuwait. J Educ Psychol Sci 2015:431-63.

22. Alansari BM. Gender differnces in depression among among undergradutes from seventeen Islamic countries. Soc Behav Pers 2006;34:729-38.
23. Humphery S, Nazareth I. GPs' views on their management of sexual dysfunction. Fam Pract 2001;18:516-8.
24. Rutte A, van Oppen P, Nijpels G, Snoek FJ, Enzlin P, Leusink P, et al. Effectiveness of a PLISSIT model intervention in patients with type 2 diabetes mellitus in primary care: design of a cluster-randomised controlled trial. BMC Fam Pract 2015;16:69.
25. Wing RR, Bond DS, Gendrano IN, Wadden T, Bahnson J, Lewis CE, et al. effect of intensive lifestyle intervention on sexual dysfunction in women with type 2 diabetes: results from an ancillary Look AHEAD study. Diabetes Care 2013;36:2937-44.
26. Sivrikaya SK, Ünsal A, Karabulutlu EY. Sexual dysfunction and depression in Turkish women with type 2 diabetes mellitus. Sex Disabil 2014;32:3-13.
27. Giraldi A, Kristensen E. Sexual dysfunction in women with diabetes mellitus. J Sex Res 2010;47:199-211.
28. Yencilek F, Attar R, Erol B, Narin R, Aydın H, Karateke A, et al. Factors affecting sexual function in premenopausal age women with type 2 diabetes: a comprehensive study. Fertil Steril 2010;94:1840-3.