ISSN 2475-529X

Research Article

Journal of Nursing & Healthcare

Sexual Function and Depressive Symptoms in Middle-Aged Women with Long-Lasting Type 1 Diabetes – A Cross-Sectional Study

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Submitted: 11 March 2021; **Accepted:** 17 March 2021; **Published:** 05 Jun 2021

Citation: *Anne-Marie Wangel and Karin Stenzelius (2021) Sexual Function and Depressive Symptoms in Middle-Aged Women with Long-Lasting Type 1 Diabetes – A Cross-Sectional Study, Journal of Nursing & Healthcare V6(2): 1-7.*

Abstract

Background & aim: *Women and men with diabetes, type 1 (T1D) and type 2 (T2D) develop complications in small and large blood vessels as well as in nerve pathways over time. In men, erectile dysfunction is a well-documented complication. However, sexual dysfunction in women with different types of diabetes is less studied. Sexual dysfunction is associated with lowered health-related quality of life and depression. The aim of the study was to investigate self-reported sexual function and signs of depression in middle-aged women with long-lasting T1D.*

Methods: *A cross-sectional questionnaire study including the Female Sexual Function Index (FSFI) and the Patient Health Questionnaire (PHQ-9) together with background questions was designed. The sample was women aged 45-66 with T1D for at least 15 years, identified from clinical medical records at four hospitals in southern Sweden. Descriptive statistical analysis of background factors, depression, and self-reported sexual dysfunction, as well as correlation and regression analysis, are presented.*

Results: *A total of 212 women completed the questionnaire, mean age 54.1 (SD: 5.83), mean years with T1D 36.2 (SD: 11.42). Almost half of the women had sexual dysfunction (45.2%; FSFI < 26.55, max 36) and the mean full score was 23.73 (SD: 10.57). The FSFI domains are desire, arousal, lubrication, orgasm, satisfaction and pain. Symptoms of depression measured by PHQ-9 were reported by 39.8%. A low FSFI was significantly associated with severe depression ($p<0.001$).*

Conclusions: *Problems with sexual dysfunction and depression in middle-aged women with long-lasting T1D are common and may be unreported unless addressed in clinical care. Nurses could start asking women about problems with lubrication and vaginal pain in relation to sexual activity. Lubricants or local estrogen therapy could prevent those problems. Routinely assessing depressive status is equally important in improving quality of life for women with T1D.*

Keywords: type 1 diabetes, depression, middle-aged women, sexual dysfunction

Introduction

Diabetes is a common chronic disease affecting more than 460 million people worldwide; about 9% of whom have type 1 diabetes and 40-50% of whom are women, according to the World Health Organization [1]. The World Diabetes Atlas (by the International Diabetes Federation) reports that the incidence of juvenile type 1 diabetes (T1D) in the Nordic countries is five to tenfold higher compared to the rest of the world [2]. Data from the Swedish National Diabetes Registry shows that 453 000 people have diabetes; 10% have T1D and among those about 20 000 are women (mean age 47 years, SD: 17.4) [3]. Complications from T1D and T2D in small as well as in large blood vessels and nerve pathways develop over time [4]. Neuropathy is also common in diabetes and affects both the sympathetic and the parasympathetic nervous system; takes several years to develop but can also occur at any time during the disease period (ibid). It is suggested that women have a higher risk of developing neurovascular injuries due to their diabetes compared to men [5]. Diabetic neuropathy can also occur in the gastric system and in the urinary bladder, i.e., diabetic cystopathy, and is associated with duration of diabetes. In men, atherosclerotic changes in the internal pudendal artery can lead to impotence [4]. This artery provides blood to the external genitalia in both men and women. Therefore, a decreased sexual response due to decreased blood flow can occur in women, as well. In men with diabetes, erectile dysfunction is a well-documented complication [4]. However, there is limited research on sexual problems among

women with diabetes and especially among those with T1D [6, 7]. Historically, sexual dysfunction in women concerns disorders of desire/libido, pain/ discomfort, arousal, and problems with orgasm [8]. In order to better measure sexual function in women, Rosen et al (2000) developed an instrument, the Female Sexual Function Index (FSFI) which includes the domains of desire, arousal, lubrication, orgasm, satisfaction and pain [9]. Studies suggest that sexual dysfunction in women is not only linked to organic factors but is also combined with psychological factors [10, 11].

Sexual dysfunction is more prevalent among women with diabetes than among those without. However, the prevalence of sexual dysfunction varies depending on definition, measurement, age group and chosen population [12]. The authors conclude that many studies on sexual function linked to diabetes tend to be more than 20 years old, and do not differentiate between men and women, or between types of diabetes or age groups (ibid). In a more recent Egyptian study, women with diabetes of both types had impaired sexual function compared to a control group, but those with T1D were more affected compared to those with T2D [13]. Results from a longitudinal study, including women having T1D (n = 508), in the United States, showed a prevalence of sexual dysfunction of 42% [14].

However, no recent studies have been identified that include women in the Nordic countries with long-lasting T1D and sexual dysfunction. Furthermore, sexual dysfunction is strongly associated with lowered health-related quality of life [15] and depressive symptoms [12-16], and knowledge of the connection between these health issues is lacking. Hence, it seemed important to investigate the prevalence of symptoms of sexual dysfunction and depression among women with T1D in a well-defined age group who have had their diagnosis for a long time. Increasing awareness among health care professionals about these dysfunctions is vital, as most of the symptoms are preventable, and the life expectancy among the women with T1D is similar to that of the general population. Therefore, the aim was to investigate the prevalence of sexual dysfunction and depressive symptoms, and whether there is an association between them, in middle-aged women with long-lasting T1D.

Materials and Methods

A cross-sectional study using a self-reporting questionnaire including validated instruments and background questions was chosen. According to the Swedish national guidelines, all patients with T1D are monitored by hospital based endocrinological clinics. Based on an estimation of a 20% prevalence of sexual dysfunction a two-sided power of 80% and a p-value of 0.05 were calculated, which required at least 373 women. Women residing in southern Sweden aged 45-66 years with T1D for at least 15 years were identified from clinical electronic medical records at four hospital based endocrinological clinics. Compilation of names and addresses was allowed after an ethical review and approved by the respective heads of departments. A staff member at each clinic provided a list with information on current addresses from the Population Register. The list with the numerical code of each questionnaire was retained at the clinic and was confidential. The clinic sent the envelope with the questionnaire to the woman's home address, with an information letter explaining the aim of the study and how she was identified and that the investigators had no access to any medical records and had no employment at the clinics. By means of this procedure, anonymity was established. The completed questionnaire was returned in a prepaid and addressed envelope, to the investigators at the university. In order to follow the standards of research ethics and the issue of informed consent, the first question in the questionnaire was: "Do you agree to participate in this study?" with the alternatives yes or no. Contact information to the investigators and information on how to withdraw the returned questionnaire at any time in case of a change of mind, was also specified (see Figure 1).

Sexual function, depression, diabetic status, and background information

Sexual function was calculated by the validated instrument the Female Sexual Function Index – FSFI, available in Swedish [9-17]. The FSFI contains a total of 19 questions divided by six domains: desire (2 items), arousal (4 items), lubrication (4 items), orgasm (3 items), satisfaction (3 items), and pain (3 items). Each question has response alternatives on a 5-point Likert type scale (0-5, where 0 indicates no sexual activity). Within each domain a score value between 0 and 6 is computed and a value lower than 4 indicates dysfunction. The full score was calculated using a computational formula according to Rosen et al. [9] with a range from 2 to 36, and women with weighted values below 26.55 were classified as having sexual dysfunction [18].

The questions in the original version of the FSFI were designed for both heterosexual and bisexual relations including sexual activity or intercourse [9]. However, in the translated Swedish version, intercourse was defined as vaginal penetration with a penis [17]. It has been recommended to use the phrase "sexual activity" instead of intercourse to also fit women having sex with women [19]. In addition, studies show that questions about sexual activity over the past four weeks cover too short a time span [20]. Therefore, we modified the questionnaire to cover the past six months, used the expression sexual activity, and removed the word intercourse.

Depressive symptoms was measured by the Patient Health Questionnaire – PHQ-9 [21]. The PHQ-9 consists of nine questions intended to estimate the severity of depressive symptoms with a scale from 0 to 3 for each item, (Not at all = 0p, Several days = 1 p, More than half of the days = 2 p, Nearly every day = 3p), the maximum score being 27. Values equal to10 or higher are estimated as moderate to severe depression [22, 23]. Diabetes status was self-reported by year of diagnosis and the most recent value of HbA1c in mmol/mol (acceptable values: 52 to 62 mmol/mol) [24].

Questions about background such as social status, education, length, weight, smoking, and current medication complemented the formal instruments. BMI (body mass index) was calculated and categorized according to the established definition, i.e., normal weight >18 - 24.9, overweight 25 - 29.9, obesity 30 - 34.9, and extreme obesity >35.

Data analysis

Descriptive statistical analysis of background factors, depression and self-reported occurrence of sexual dysfunction was used. Mean values, standard deviations and frequencies were calculated

for nominal data, and median and range for categorical data. The correlation between the full scores of FSFI, age and PHQ-9 was calculated with ANOVA and p-value measured by Pearson test. Statistical significance was estimated as p-value < 0.05.

The backward logistic regression model was used to detect factors that were related to sexual dysfunction (FSFI full score ≤ 26.55). As independent variables Age, Years with T1D, PHQ-9 full score, BMI, Educational level, and Social status (living with partner or alone) were used. The model was tested with the Hosmer-Lemeshow goodness of fit test, where a non-significant p-value confirmed the model. Nagelkerke R Square was used to get an indication of how much of the variance of the dependent variable was explained by the model [25]. Before further analysis was conducted the modification of the Swedish FSFI used in this study was tested for internal consistency by Cronbach's alpha for each domain of the FSFI (i.e. desire, arousal, lubrication, orgasm, satisfaction and pain), where the acceptable level is > 0.70 [26].

Results

In total, 295 women returned the questionnaire, giving a response rate of 46% (see Figure 1). The external dropout because of not completed questionnaire or wrong ge was 73 women. Internal drop out was 35 i.e. the number of women women who did not complete the FSFI questions. The background data of the participating women is presented in Table 1.

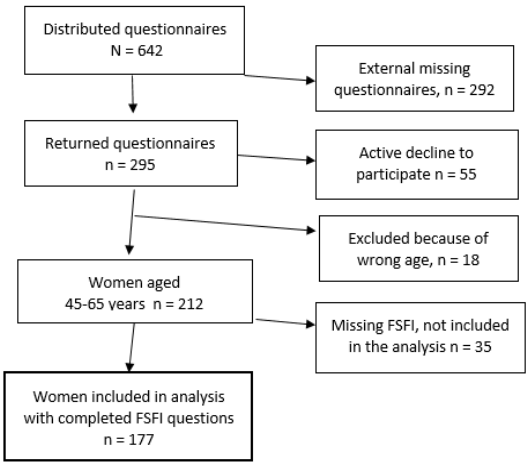

***Figure* 1:** Flow chart, included women in analysis

Table 1: Background data of the responders

Responders	All n = 212	FSFI n = 177
Age years, mean (SD ±)	54.04 (5.83)	54.84 (5.87)
45–55 years (%)	54.7	57.4
56–66 years (%)	44.3	42.6
Level of education (%)		
Primary school, <10 years	7.6	7.4
Secondary school, 10–12 y	43.3	43.1
Higher/ University, >13 y	49.0	49.1
Social status: (%)		
No partner	20.4	12.5

The health status data is presented in Table 2. The self-reported status indicates that the women had had T1D for more than 30 years and acceptable values of HbA1c. Almost half of the women were of normal weight but 6.5% had extreme obesity, according to the calculated BMI. Among all the women one in five reported feeling depressed and used antidepressant medication. However, cross-tabulation showed that 27.5% of those feeling depressed did not use anti-depressants (p = <0.0001).

Table 2: Self-reported health status

Responders	All n =212	FSFI n =177
Diabetes years: Mean (SD ±)	36.2 (11.42)	35.89 (11.22)
HbA1c latest mmol/mol Mean (SD ±)	58.81 (11.69)	59.06 (11.38)
Smoking: Daily/occasionally (%)	13.2	12.2
BMI: Mean (SD ±)	26.54 (5.83)	26.45 (4.85)
BMI grouped (%)		
Normal <24.9	45.8	47.6
Overweight 25–29.9	30.8	29.4
Obese 30–34.9	16.9	16.5
Extremely obese >35	6.5	6.5
Medication, Yes (%)		
Estrogen, oral	5.7	6.2
Estrogen, local	8.5	9.0
Anti-depressant	19.3	19.2
Self-reported depression, Yes (%)	18.9	17.5

Of the 212 women 177 completed all the FSFI questions and among these 87.5% had a partner. In total, 45.2% (n=80) had sexual dysfunction defined as full score less than 26.55, whilst 54.8% (n=97) of the women were classified as having no dysfunction according to the cutoff level. The lowest to the highest (max = 6) domain scores were: Desire 3.15 (SD: 1.34), Arousal 3.97 (SD: 2.07), Lubrication 4.07 (SD: 2.18), Pain 4.08 (SD: 2.43), Orgasm 4.22 (SD: 2.16), and Satisfaction 4.24 (SD: 1.75). The FSFI full score mean was 23.73 (SD: 10.57). However, the distribution was skewed, as 16.4% (n=29) scored less than 10 and 14.1% (n=26) scored 10-19. Those having the lowest FSFI scores (sexual dysfunction) were significantly older compared to those with no sexual dysfunction (mean age 57.0 vs. 53.9, p = 0.002), but years with diabetes did not significantly influence the value (p=0.85). For a more complete overview of the distribution of item replies by level of difficulties or problems within each domain see Table 3.

Table 3: Percentage of replies within each FSFI domain by level of difficulties or problems (n =177)

FSFI Domain Questions n=177 Over the past six months what level of difficulties or problems did you experience with sexual activity a? Experience on a Likert scale (1-5, 0 = no sexual activity)	No sexual activity with a partner %	Problems/ difficulties level 1 to 3 %	No problems/ difficulties level 4 or 5 %
How often did you feel sexual *desire* Rate level of sexual *desire*	n.a. n.a.	77.4 19.7	22.6 80.2
How often did you feel sexually *aroused* Rate level of sexual *arousal* Were you confident in becoming sexually *aroused* How often were you satisfied with your sexual *arousal*	13.6 11.9 13.6 14.7	24.3 35.6 30.4 23.2	62.1 52.5 56.0 62.1
How often did you become *lubricated /wet* How difficult was it to become *lubricated* How often did you maintain *lubrication* How difficult was it to maintain *lubrication*	15.3 15.3 16.4 16.4	22.6 26.0 23.7 18.1	62.1 58.7 59.9 65.5
How often did you reach *orgasm* during sexual stimulation How difficult was it to reach *orgasm* How satisfied were you with your ability to reach *orgasm*	14.1 14.7 14.7	22.5 15.9 20.3	36.6 69.4 65.0
How *satisfied* were you with emotional closeness with your partner How *satisfied* were you with sexual relationship with your partner How often were you *satisfied* overall with your sexual life	18.6 n.a. n.a.	14.7 42.9 42.9	66.7 57.1 57.1
How often did you feel *pain* during vaginal penetration How often did you feel *pain* following vaginal penetration Rate level of *pain* during or after vaginal penetration	22.0 [b] 20.9 [b] 20.3 [b]	16.9 11.9 17.5	61.1 67.2 62.2

[a] Sexual activity includes caressing, masturbation with or without a partner, foreplay, vaginal or anal penetration.
[b] No sexual attempts n= 39, 37, 36,

In all, 206 women completed the PHQ-9 questions, and of these 15.5% (n=32) had moderate to severe symptoms of depression (10-27p), 24.3% (n=50) had mild symptoms (5-9p), and 60.2% (n=124) had minimal symptoms of depression (0-4p). Table 4 shows the distribution of how often the women experienced specific symptoms of the PHQ-9. Note that 14.3% of the women (n=30) had thoughts of self-harm daily or several days a week.

Table 4: Distribution of replies to each separate question in PHQ-9[a] (n=206)

Question: Over the last 2 weeks have you been bothered by any of the following problems?	Not at all %	Several days %	More than half of the days or nearly daily %
Little interest or pleasure in doing things	54.1	28.7	17.2
Feeling down, depressed or hopeless	58.8	30.8	10.4
Trouble falling or staying asleep or sleeping too much	43.1	33.6	23.3
Feeling tired or having little energy	30.7	40.1	28.8
Poor appetite or overeating	63.8	25.2	11.0
Feeling bad about yourself or that you are a failure or have let yourself or your family down	66.4	22.7	10.9
Trouble concentrating on things such as reading the newspaper or watching television	70.8	22.6	6.6
Moving or speaking so slowly that other people could have noticed OR being so fidgety or restless that you have been moving around a lot more than usual	85.7	11.9	2.4
Thoughts that you would be better off dead or of hurting yourself	85.7	11.9	2.4

[a] English original version by Kroenke et al., 2001

A significant correlation (r=-0.242) was identified between sexual dysfunction and symptoms of depression (p = 0.01), i.e., between a lower FSFI score and a higher PHQ score. The backward logistic regression model showed that increasing age in years, higher BMI, and increasing PHQ-9 score had significant importance for having sexual dysfunction (FSFI ≤ 26.55).

Table 5: Result of logistic regression (backwards) FSFI full score ≤ 26.55 as sexual dysfunction (value 1)

Variable Step [a]	B	S:E.	Wald	Df	Sig.	Exp (B)
Age in years	.077	.029	6.948	1	0.008	1.080
BMI	.67	.35	3.626	1	0.05	1.070
PHQ Sum score (0-27p)	.116	.041	7.836	1	0.005	1.123
Constant	-6.725	1.997	11.338	1	0.001	.001
Model test [b]						

[a] Variables entered in the equation: Age, Years w/ DT1, Single, Education level, PHQ-9 sum (higher score indicate more depressive symptoms), significant variables shown
[b] Hosmer Lemeshow test: Chi-square: 6.800 p-value 0.558, Nagelkerke R square: 0.146

Discussion

Sexual dysfunction measured by FSFI was reported by almost every other woman with T1D in this study. To our knowledge, this is the first prevalence study that has investigated sexual functioning in middle-aged women with long lasting T1D, in a Nordic country. The result of this study is important, as many women could be affected, considering that Sweden and the other Nordic countries rank among the top ten globally with regards to T1D incidence [27]. Like previous international studies on women with T1D or T2D the result from our sample showed a high proportion of female sexual dysfunction. The prevalence of sexual dysfunction in our study (45.2%) was higher compared to that of an Egyptian study (43.9%) including younger women (age 32.5 years) with T1D [13] and compared to a US study (42%) in a similar age group (40-69 years) of women with T1D [14]. The mean FSFI score from our study was lower, indicating more severe sexual dysfunction in women with T1D than in healthy clinical control women in the Swedish validation study [17]. We also found a significant association between lower FSFI scores with increasing age and BMI as previously reported [28]. However, in our study years with diabetes did no influence the level of sexual dysfunction. In addition, one out of three women had symptoms of depression. This is comparable with other studies, which also show that depression is more common in women with T1D than in men with T1D and also that it is more common in women with T1D than in women with T2D [29, 30]. Having depression, in addition to diabetes, has also been shown to cause lower levels of self-care, lower adherence to diet and exercise advice, and impaired quality of life [31]. Like other studies, we also found an association between symptoms of depression and a lower FSHI score [28-31].

The result from our study showed difficulties or problems within the domain of desire, arousal, lubrication, orgasm, satisfaction, and vaginal pain. In comparison, the occurrence of signs of sexual dysfunction was lower in the Swedish sexual health survey from 2017 than in our study, in all corresponding domain areas. The results of the survey showed that 21% of the women lacked sexual desire, 9% lacked sexual arousal, 13% had problems with vaginal lubrication, and 11% experienced pain during or after sex [32]. Remarkably, only 14% of the women in our study reported some sort of estrogen therapy (Table 2). Problems with lubrication and vaginal pain are common in postmenopausal women and more common in women with diabetes, and those problems are highly underreported [6]. Therefore, vaginal lubricants and local estrogen should be recommended to a higher extent [33].

In women, the sexual response cycle and functioning is a complex psycho-physio-social system; it is multifaceted and distinct from that in men [10, 34, 35]. With regard to addressing sexual issues, others have suggested applying the PLISSIT model (Permission, Limited Information, Specific Suggestions and Intensive Therapy) and starting to ask women about their sexual health [36, 37]. Applying the PLISSIT in clinical practice requires the professionals to get permission from the woman to ask questions about sexual issues and then give simple advice, but for more complex problems knowledge on where and when to refer to a specialist is necessary [34-38].

In diabetic care, the focus is mainly on the biological markers of the disease and on adherence to treatment, and not on the psychosocial side effect; therefore a more holistic proactive approach from the health care professionals is needed. Professionals within diabetes care could focus on issues of lubrication and vaginal or vulva pain in connection with sexual activity, and if the women were given relevant information and advised to use vaginal lubricants or local estrogen products these problems could be minimized. However, problems with desire, orgasm, and satisfaction might also relate to a partner and would then require referral for therapy. Because sexual dysfunction was quite often found to be associated with levels of depression, assessing mental health status becomes equally important and should be done on a regular basis to prevent severity of depression and risk of self-harm.

One limitation of this study is its cross-sectional design and the fact that causal effect cannot be established for sexual dysfunction and depression or vice versa. Still, we identified statistically significant associations between the main outcome variables, using validated instruments for sexual dysfunction and symptoms of de-

pression [9, 18, 21] and the result is in line with previous research [28-30]. Although the women in this study had a mean age of 54 years we did not investigate their menopausal status because our focus was on long-lasting T1D. Another limitation is the response rate. It might have been higher after a reminder, but this was not possible because the name list was confidential and kept at the clinic. Despite this and the inclusion of sensitive questions on sexuality, the response rate (43%) was higher than that (31%) of the latest Swedish national population based (age 16-68 years) survey on sexual health [32]. Moreover, our sample was representative regarding higher education (49% vs. 44%), compared to all Swedish born women in the same age group [39].

Conclusion

This study is important because women with diabetes are not routinely asked about their sexual functioning nor about the occurrence of symptoms of depression. The result provides new knowledge about a neglected area and can lead to an improved person-centered care for women with diabetes. Half of the women with a long-lasting T1D diagnosis had sexual dysfunction and one in three reported symptoms of depression. However, these problems in women with T1D will not be identified unless addressed on a regular basis. Applying a holistic approach within health care would involve asking women with T1D specific questions about problems concerning lubrication and vaginal pain in connection with sexual activity. For those reporting such problems vaginal lubricants or local estrogen therapy should be recommended or a referral made to a gynecologist. Similarly assessing depressive symptoms in women with T1D is most important and should be done on a regular basis to prevent severity of depression and risk of self-harm and to improve quality of life.

Abbreviations

BMI: Body Mass Index; DT1: Diabetes type 1; DT2: Diabetes type 2; FSFI: Female Sexual Function Index; PHQ-9: Patient Health Questionnaire.

Declarations

Ethics approval and consent to participate. The Swedish Ethical Review Authority, Reg. No. 2018/855.

Consent for publication. Not applicable.

Availability of data and materials. Not applicable.

Competing interests. None declared.

Funding. The study was supported in part by a grant from the Centre for Sexology and Sexuality Studies at Malmo University.

Author contributions. AMW and KS jointly conceptualized and designed the study, constructed and modified the questionnaire, visited the four clinics that assisted in the distribution of the envelopes with the questionnaire, designed the analysis and interpreted the data and drafted the manuscript. Distribution of the envelopes with the questionnaire was possible through the collaboration of the staff at the four endocrinology clinics in southern Sweden caring for the study population

Acknowledgements. The authors thank, the women for participating in the Women and Diabetes study and for answering the questionnaire, the staff for identifying and assembling the study population from the clinical records and the Chief supervisors for allowing the study and for their clinical contributions.

References

1. World Health Organization (WHO). Diabetes Key Facts www.who.org 2018.
2. International Diabetes Federation. IDF Diabetes Atlas Ninth Editon www.diabetesatlas.org2019.
3. Nationella Diabetesregistret (the Swedish National Diabetes Registry). Årsrapport 2018 [In Swedish]. 2019 [
4. Sinnreich M, Taylor BV, Dyck PJB. Diabetic Neuropathies: Classification, Clinical Features, and Pathophysiological Basis. The Neurologist 2005;11(2)
5. Benitez-Aguirre P, Craig ME, Cass HG, et al. Sex Differences in Retinal Microvasculature Through Puberty In Type 1 Diabetes: Are Girls at Greater Risk of Diabetic Microvascular Complications? Invest Ophthalmol Vis Sci 2015;56(1):571-77. doi: 10.1167/iovs.14-15147
6. Enzlin P, Mathieu C, Vanderschueren D, et al. Diabetes mellitus and female sexuality: a review of 25 years' research. Diabet Med 1998;15(10):809-15. doi: 10.1002/(SICI)1096-9136(199810)15:10<809::AID-DIA689>3.0.CO;2-Z
7. Maiorino MI, Bellastella G, Esposito K. Diabetes and sexual dysfunction: current perspectives. Diabetes, metabolic syndrome and obesity: targets and therapy 2014;7:95.
8. Laumann EO, Paik A, Rosen RC. Sexual Dysfunction in the United StatesPrevalence and Predictors. JAMA 1999;281(6):537-44. doi: 10.1001/jama.281.6.537
9. Rosen R, Brown C, Heiman J, et al. 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. doi: 10.1080/009262300278597
10. Salonia A, Giraldi A, Chivers ML, et al. Physiology of women's sexual function: Basic knowledge and new findings. The journal of sexual medicine 2010;7(8):2637-60.
11. Wallner LP, Sarma AV, Kim C. Sexual functioning among women with and without diabetes in the Boston area community health study. J Sex Med 2010;7(2, Pt 2):881-87. doi: 10.1111/j.1743-6109.2009.01510.x
12. Giraldi A, Kristensen E. Sexual Dysfunction in Women with Diabetes Mellitus. The Journal of Sex Research 2010;47(2-3):199-211. doi: 10.1080/00224491003632834
13. Ahmed MR, Shaaban MM, Sedik WF, et al. Prevalence and differences between type 1 and type 2 diabetes mellitus regarding female sexual dysfunction: a cross-sectional Egyptian study. Journal of Psychosomatic Obsterics & Gynecology 2018;39(3):176-81. doi: 10.1080/0167482X.2017.1318123
14. Wessells H, Braffett BH, Holt SK, et al. Burden of Urological Complications in Men and Women With Long-standing Type 1 Diabetes in the Diabetes Control and Complications Trial/Epidemiology of Diabetes Interventions and Complications Cohort. Diabetes Care 2018;41(10):2170. doi: 10.2337/dc18-0255
15. Jacobson AM, Braffett BH, Cleary PA, et al. Relationship of Urologic Complications With Health-Related Quality

of Life and Perceived Value of Health in Men and Women With Type 1 Diabetes: The Diabetes Control and Complications Trial/Epidemiology of Interventions and Complications (DCCT/EDIC) Cohort. Diabetes Care 2015;38(10):1904. doi: 10.2337/dc15-0286
16. Enzlin P, Mathieu C, Van den Bruel A, et al. Sexual Dysfunction in Women With Type 1 Diabetes. Diabetes Care 2002;25(4):672. doi: 10.2337/diacare.25.4.672
17. Ryding EL, Blom C. Validation of the Swedish Version of the Female Sexual Function Index (FSFI) in Women with Hypoactive Sexual Desire Disorder. The Journal of Sexual Medicine 2015;12(2):341-49. doi: 10.1111/jsm.12778
18. Wiegel M, Meston C, Rosen R. The Female Sexual Function Index (FSFI): Cross-Validation and Development of Clinical Cutoff Scores. J Sex Marital Ther 2005;31(1):1-20. doi: 10.1080/00926230590475206
19. Shindel AW, Rowen TS, Lin TC, et al. An Internet Survey of Demographic and Health Factors Associated with Risk of Sexual Dysfunction in Women Who Have Sex with Women. The Journal of Sexual Medicine 2012;9(5):1261-71. doi: 10.1111/j.1743-6109.2012.02659.x
20. Tracy JK, Junginger J. Correlates of Lesbian Sexual Functioning. J Womens Health 2007;16(4):499-509. doi: 10.1089/jwh.2006.0308
21. Kroenke K, Spitzer RL, Williams JBW. The PHQ-9. J Gen Intern Med 2001;16(9):606-13. doi: 10.1046/j.1525-1497.2001.016009606.x
22. Manea L, Gilbody S, McMillan D. A diagnostic meta-analysis of the Patient Health Questionnaire-9 (PHQ-9) algorithm scoring method as a screen for depression. Gen Hosp Psychiatry 2015;37(1):67-75. doi:10.1016/j.genhosppsych.2014.09.009
23. Reddy P, Philpot B, Ford D, et al. Identification of depression in diabetes: the efficacy of PHQ-9 and HADS-D. Br J Gen Pract 2010;60(575):e239. doi: 10.3399/bjgp10X502128
24. Landin-Olsson M, Jeppsson J, Nordin G. HbA1c--new standardization introduced in Sweden. The new unit is mmol/mol. Lakartidningen 2010;107(51-52):3282-85.
25. Hair JF, Black WC, Babin BJ, et al. Multivariate Data Analysis: Pearson New International Edition: Pearson Education Limited 2013.
26. Garson GD. Testing statistical assumptions. Asheboro, NC: Statistical Associates Publishing 2012
27. Patterson CC, Karuranga S, Salpea P, et al. Worldwide estimates of incidence, prevalence and mortality of type 1 diabetes in children and adolescents: Results from the International Diabetes Federation Diabetes Atlas, 9th edition. Diabetes Res Clin Pract 2019;157:107842. doi:10.1016/j.diabres.2019.107842
28. Pontiroli AE, Cortelazzi D, Morabito A. Female Sexual Dysfunction and Diabetes: A Systematic Review and Meta-Analysis. J Sex Med 2013;10(4):1044-51. doi:10.1111/jsm.12065
29. Gendelman N, Snell-Bergeon JK, McFann K, et al. Prevalence and Correlates of Depression in Individuals With and Without Type 1 Diabetes. Diabetes Care 2009;32(4):575. doi: 10.2337/dc08-1835
30. Enzlin P, Rosen R, Wiegel M, et al. Sexual dysfunction in women with type 1 diabetes: long-term findings from the DCCT/ EDIC study cohort. Diabetes Care 2009;32(5):780-85. doi: 10.2337/dc08-1164 [doi]
31. Schram MT, Baan CA, Pouwer F. Depression and Quality of Life in Patients with Diabetes: A Systematic Review from the European Depression in Diabetes (EDID) Research Consortium. Curr Diabetes Rev 2009;5(2):112-19. doi:10.2174/157339909788166828
32. Public Health Agency of Sweden. Sexuell och reproduktiv hälsa och rättigheter i Sverige 2017 [Sexual and reproductive health and rights in Sweden. [In Swedish], Electronic resources, 2019.
33. Edwards D, Panay N. Treating vulvovaginal atrophy/genitourinary syndrome of menopause: how important is vaginal lubricant and moisturizer composition? Climacteric 2016;19(2):151-61. doi: 10.3109/13697137.2015.1124259
34. Berman JR, Berman LA, Werbin TJ, et al. SSI Prize Essay for Female Sexual Dysfunction—Clinical 'Clinical evaluation of female sexual function: effects of age and estrogen status on subjective and physiologic sexual responses'. Int J Impot Res 1999;11(1):S31-S38. doi: 10.1038/sj.ijir.3900468
35. Basson R. The Female Sexual Response: A Different Model. J Sex Marital Ther 2000;26(1):51-65. doi: 10.1080/009262300278641
36. Rutte A, van Oppen P, Nijpels G, 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(1):69. doi: 10.1186/s12875-015-0283-0
37. Rochester-Eyeguokan C, Meade L. A practical approach to managing hypoactive sexual desire disorder in women with diabetes. Diabetes Ther 2017;8(5):991-98.
38. Bijlsma-Rutte A, Braamse AMJ, van Oppen P, et al. Screening for sexual dissatisfaction among people with type 2 diabetes in primary care. J Diabetes Complications 2017;31(11):1614-19. doi:10.1016/j.jdiacomp.2017.07.020
39. Statistics Sweden SCB. Utbildningsnivån i Sverige, [The Educational level in Sweden] [in Swedish]. Stockholm, Sweden: www. scb.se 2018.