Effect of PLISSIT Based Sexual Counseling Model on Sexual Dysfunction among Diabetic Pregnant Women

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Abstract

Sexual dysfunction is a common problem in women. It extremely affects reproductive health and quality of life. This study **aimed** to investigate the effectiveness of permission, limited information, specific suggestions, and intensive therapy (PLISSIT) based sexual counseling model on sexual dysfunction among diabetic pregnant women. **Methods:** A quasi-experimental design was utilized at Antenatal Clinic, Mansoura University Hospital, Egypt. A nonprobability purposive sample of 68 pregnant women with diabetes was allocated to either the control group (received routine antenatal care) or intervention group (received PLISSIT based sexual counseling). Data were collected using a structured interview schedule, Pregnancy Sexual Response Inventory (PSRI), and Sexual Quality of Life-Female (SQOL-F). **Results:** At baseline assessment there were no statistical significant difference between control and PLLIST groups regarding the total mean scores of PSRI and SQOL-F. However, there were highly significant differences in the PSRI (P < 0.0001) and SQOL-F (P < 0.001) scores after implementation of PLISSIT based sexual counseling model among the studied groups. Moreover, the total PSRI score showed direct significant correlation with the total SQOL-F score before (p = 0.028) and after (p < 0.001) application of PLISST. **Conclusion:** The PLISSIT-based sexual counseling model has a positive effect on sexual function of pregnant women with diabetes. It improves the quality of their sexual life. **Recommendations:** The PLISSIT model of sexual therapy should be integrated into routine antenatal care for pregnant women with diabetes.

Keywords: Diabetic Pregnant Women, PLISSIT Model, Sexual dysfunction

Introduction

Sexual well-being throughout the life span is a basic human right and essential part of humans' general satisfaction with their life and well-being. It is complex interaction of human behaviors, attitudes, and physical, psychological, interpersonal, and cultural factors. Meanwhile, the perceived difficulty at any stage of normal sexual activity, including physical pleasure, desire, preference, arousal, or orgasm, is female sexual dysfunction **(Bień, Rzońca, Iwanowicz-Palus, & Lenkiewicz, 2016)**. Generally, women's experience and expression of sexuality are influenced by general well-being, body image, social context in which a woman develops and lives, and psychological and biological changes that women undergo **(Kračun, Tul, Blickstein, & Velikonja, 2019)**.

One of the biological factors that profoundly affect sexual health, behavior, and

sexual satisfaction of women is pregnancy **(Erbil, 2018)**. It has been established that, during pregnancy, 75% of pregnant women have reported changes in sexual function and desire **(Gałązka, Drosdzol-Cop, Naworska, Czajkowska, & Skrzypulec-Plinta, 2015)**. In fact, the alteration in sexual activity, frequency, and function during pregnancy resulting from hormonal, physical, psychological, and social changes which fluctuate according to each trimester of pregnancy, are higher at the first and third trimester of pregnancy, including avoidance of sexual activity, vaginismus, low coital frequency, decreased satisfaction, and anorgasmia **(Ozcan, & Kirca, 2018)**.

Another factor influencing women's sexual activity and function is diabetes mellitus (DM), one of the most prevalent and costly chronic diseases affecting 422 million people worldwide, of whom 8% are women and approximately 8.9 million are from Egypt **(Rodriguez-Saldana, 2019; Saeedi et al,**

2019). Sexual dysfunction in women with DM remained completely neglected, and associated with serious and negative effects on their sexual life **(Rahmanian, Salari, Mohammadi, & Jalali, 2019)**. Moreover, a previous study by **Maiorino et al., (2017)** reported a high prevalence of sexual dysfunction in diabetic women compared to non-diabetic women. Impairment of sexual function in diabetic women may be caused by tissue hypotrophy and sensitivity impairment, which are related to the synergetic effects of vasculopathy, neuropathy and presence of positive association between clitoral vascular resistance and insulin resistance **(Maseroli et al., 2016)**.

Women's sexual dysfunction is associated with negative consequences and multiple psychosocial effects leading to disturbance in sexual desire and/or response resulting in marked distress, which negatively affects the quality of life **(Ferreira et al., 2015)**. However, there are several strategies that assist many healthcare providers to implement an efficient and acceptable plan for the treatment of sexual health issues or dysfunction. The permission, limited information, specific suggestions, and intensive therapy (PLISSIT) model created by Jack S. Annon, in 1976, is also known as the PLISSIT model of sex therapy. This model is one of the most frequently used designs by health professionals for sexual assessment and counseling to determine the different levels of intervention for individual clients **(Shahbazi, Farshbaf-Khalili, Sattarzadeh, & Kamalifard, 2018; Annon, 1976)**.

The PLISSIT model allows sexuality to be addressed, providing practical suggestions such as changing of positions, using lubricants, offering advice according to the needs of individual in treatment, and referring to intensive therapy with specialized practitioners in more complex situations **(Almeida et al., 2019)**. Therefore, the provision of accurate and scientific information by maternity care nurses and healthcare providers with sexual counseling for diabetic pregnant women is considered an essential component of antenatal education to promote quality of life of diabetic women **(MacPhedran, 2018)**.

Significance of the study

In conservative cultures such as Egypt and other Arab countries, women's sexuality is a sensitive issue, possibly due to the lack of a proper tool to analyze the problem **(Ahmed, Shaaban, Sedik, & Mohamed, 2018)**. However, during the different trimesters of pregnancy, the prevalence of sexual dysfunction is between 23.4 % and 70 % **(Bouzouita et al., 2018)**. An Egyptian study conducted by **Younis, El-Esawy, Salem, & Eid, (2017)** explored the factors associated with female sexuality found that, pregnancy led to a statistically significant decrease in libido, 69.3% during the first and second trimesters and 50.5% during the third trimester. Moreover, a study by **Maiorino et al., 2017** indicated that DM is another health problem that negatively affects women's sexual function and quality of their lives.

Despite the fact that many Egyptian studies were interested in assessing sexual dysfunction among pregnant and diabetic women, there are few studies on the nursing literature interested in studying the effect of sexual counseling on sexual dysfunction in diabetic pregnant women. Moreover, sexual problems in women are not well highlighted and gained little attention than diabetic men **(Rahmanian et al., 2019)**. However, the effectiveness of PLISSIT based sexual counseling model on managing sexual dysfunction in rheumatoid and postnatal women was proven **(Abdelhakm, Said, & Elsayed, 2018)**. For these reasons, the researchers were interested in examining the effectiveness of PLISSIT based sexual counseling model on sexual dysfunction among diabetic pregnant women.

Aim of the study

This study aimed to investigate the effects of PLISSIT based sexual counseling model on sexual dysfunction among diabetic pregnant women.
Hypotheses of the study
Hypothesis 1

Diabetic pregnant women who received individualized sexual counseling based on the PLISSIT model exhibit higher Pregnancy Sexual Response Inventory (PSRI) score than

those who did not receive individual sexual counseling.

Hypothesis 2

Diabetic pregnant women who received individualized sexual counseling based on the PLISSIT model exhibit higher Sexual Quality of Life-Female (SQOL-F) score than those who did not receive individual sexual counseling.

Subjects and Method

Research design

The quasi-experimental (pretest and posttest) design was adopted for the current study. The effect of the independent variable (i.e., PLISSIT based sexual counseling model) on the dependent variable (i.e., sexual dysfunction among diabetic pregnant women) was assessed in this study.

Study setting

This study was performed at Antenatal Clinic in the Obstetric and Gynecological Specialty Center at Mansoura University Hospital, Mansoura, Egypt.

Sampling

A nonprobability purposive sample of 75 pregnant women with DM was invited to participate in the current study. Data were collected between the beginning of July 2018 and end of December 2018 in a six-month period. The inclusion criteria were, diabetic pregnant women had sexual dysfunction (means; PSRI score <50), age of 18-39 years, single viable fetus, regular sexual relationship with their husbands, absence of chronic medical conditions affecting sexuality (e.g., hypertension, and kidney or liver disease), complications related to pregnancy (e.g., antepartum bleeding), absence of mental problems, or use of antidepressants or anti-epileptic medications, and similar educational programs.

1.4 *Sample size calculation*

Based on literature data from **Abdelhakm et al. (2018),** considering significance level = 5 %, power = 80 %, test type = two-sided, the following formula is used for sample size calculation: $n = [2(Z_{\alpha/2} + Z_{\beta})\,2 \times p\,(1-p)]/(p1 - p2)\,2$ Where; n = sample size required in each group, p = pooled proportion (proportion of event in group 1+ proportion of event in group 2)/2, p1-p2 = difference in proportion of events in two groups, $Z_{\alpha/2}$:This depends on level of significance, for 5% this is 1.96, Z_{β} :This depends on power, for 80% this is 0.84, $n = [2(1.96 + 0.84)\,2 \times 0.291\,(1-0.291)]/(0.445 - 0.136)\,2 = 33.9$. The sample size required per group is 34, based on the previous formula.

Allocation of the study Groups

Seventy-five pregnant women with DM were examined for research eligibility. Five women were excluded because they declined to participate in the study (personal details will not be discussed), and two women did not meet the study inclusion requirements, while the majority of the subjects were eligible to participate in the study (34 subjects per group). The sample groups were allocated using the lottery process, (i.e., the first woman was assigned to the intervention group, while the second woman was assigned to the control group and so on, until recruitment was completed). Four subjects in the control group were lost to follow-up, but they were substituted, and the statistical analysis was performed on 68 subjects.
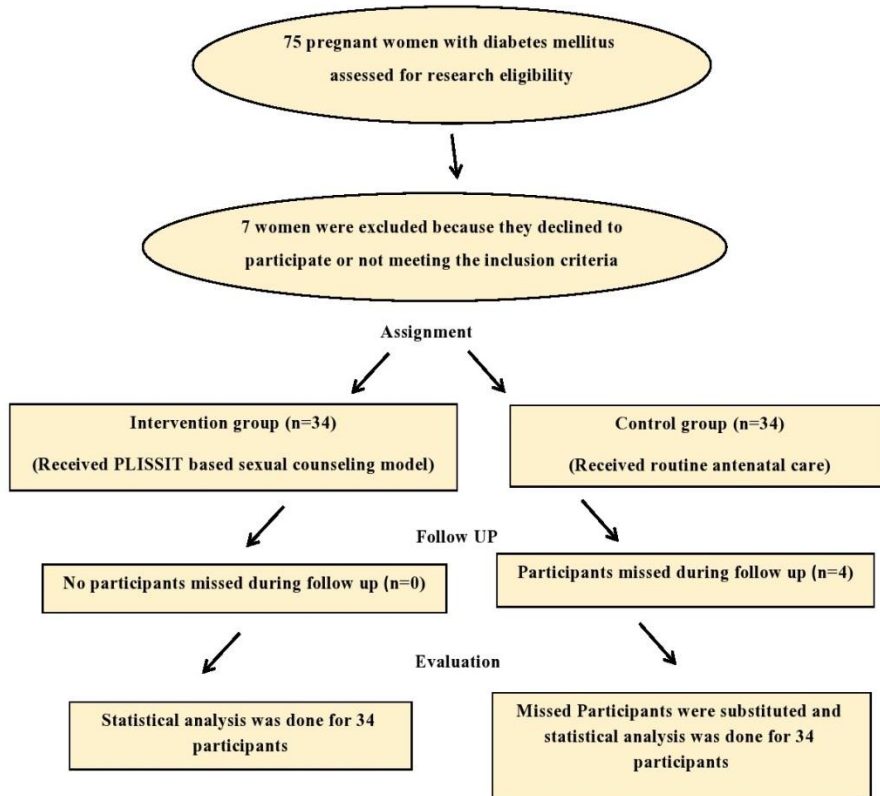
The Flowchart of participant's recruitment process, Figure 1.

Data collection tools

Three tools were used for data collection: structured interview schedule, pregnancy sexual response inventory, and sexual quality of life-female questionnaires.

Tool I. Structured interviewing schedule

It includes general characteristics and reproductive and sexual function histories of the study subjects.

Tool II. Pregnancy Sexual Response Inventory (PSRI)

It was adopted and validated by **Rudge (2009)** to evaluate sexual activity and related health issues during pregnancy. The PSRI is a 38-item (12 demographic characteristics and 26 sexual behavior) clinical instrument providing a brief semi-structured interview to assess sexual dysfunction before and during pregnancy. It was divided into 10 domains:

Eight domains relating to a woman's feelings assessed the frequency of sexual intercourse, sexual desire, arousal or quality of sexual activity, frequency of orgasm, sexual pleasure, dyspareunia, intercourse initiation, and woman's sexual difficulties before and during pregnancy. The other two domains relating to a woman's perception of her partner assessed the woman's view of male sexual pleasure and sexual difficulties before and during pregnancy.

Scoring system of PSRI; the score varied from 0 to 100 for each domain, and its average value was used to obtain the general score. The composite score was determined by adding all the specific domain score for each period (before and during pregnancy) divided by the full domain number. Finally, PSRI-specific and composite scores were combined to evaluate the sexual function and categorized the scale into quartiles by sexual response as ''very low'' (0 < 25), ''low'' (25 < 50), ''high'' (50 <

75), and ''very high'' (75–100), before and during pregnancy. Turn point was established as 50 (without sexual dysfunction) and <50 (with sexual dysfunction) based on PSRI quartiles.

Tool III. Sexual Quality of Life-Female (SQOL-F)

Symonds, Boolell, and Quirk (2005) developed the SQOL-F questionnaire**.** It is specific and self-reported instrument assesses the quality of a woman's sexual life. It consisted of 18 Likert type statements with response categories scored from 1 to 5 ranging from strongly agree to strongly disagree, with a total score of 0–90. The higher score indicates better quality of female sexual life.

Validity of tools

To validate the prepared tools for data collection, first, the researchers designed the structured interview schedule; then, the English version of both SQOL-F and PRSI was translated into Arabic language. Accordingly, the tools were given to three professors of maternity nursing specialty to confirm its content validity, their comments were considered, and modifications were conducted.

Reliability of tools

The reliability for internal consistency of the Arabic version of both SQOL-F and PRSI questionnaires was verified using the test-retest method. The SQOL-F had a Cronbach's alpha value of 0.893 while the PRSI had 0.85 between the two results, indicating reliable tools.

Pilot study

To test the reliability of the study measures, a pilot study was conducted on 10% of the total sample size (i.e., 15 subjects) not included in the study sample. The result of the pilot study indicated adequate reliability and clarity of the measures.

Ethical considerations

Ethical approval of the study was obtained from the research ethical committee of the Faculty of Nursing, Mansoura University. All participants provided their informed consent after explaining the study's aim. Moreover, they were assured that their responses would be kept strictly confidential and that they had the right to withdraw at any time.

Field work

The current study included three phases: preparation, implementation, and evaluation of the study outcomes.

A. Preparation phase

This phase included preparing tools for data collection and content of PLISSIT-based sexual counseling model. Firstly, sexual problems and needs for diabetic pregnant women were understood through 90 min semi-structured individualized interviews with 15 subjects excluded from the study. The topics of the interview included the type of sexual problems that women have (in terms of sexual desire, dyspareunia, arousal, and satisfaction) and information that the woman seek to know and that will help her to deal with sexual problems. Accordingly, based on the results of the individual interviews, the researcher designed the content of the PLISSIT- based sexual counseling model (educational booklet) after reviewing related literature **(Goldstein, Clayton, Goldstein, Kim, & Kingsberg, 2018; Kelsey, & Nagtalon-Ramos, 2018; Potter et al., 2019)**. The model content included the definition of DM, effects of physiological changes during pregnancy and DM on sexual function, types of sexual problems encountered by diabetic pregnant women, and suggestions to solve sexual problems such as use of lubricant during sexual relation.

B. Implementation phase

This study included two groups: control group (received routine antenatal care) and intervention group (received individualized sexual counseling based on the PLISSIT model). The data collection instruments included three tools, the first one (structured interview schedule) was completed at the beginning of the inclusion process before assigning women to study groups. Then, the second and third tools (PSRI and SQOL-F) were used to assess women's sexual problems; they were answered by subjects before and after intervention. Subsequently, for 90 min, the first individual educational session was

held by one of the researchers for each participant (intervention group) in a private comfortable, and quiet room using a well-prepared PowerPoint presentation based on the study subjects' needs. Also, the participants were provided an educational booklet.

The model comprises four levels of interventions: Permission (P), Limited Information (LI), Specific Suggestions (SS), and Intensive Therapy (IT). During the session, the researcher applied PLISST model levels as follows: In the *first level "P,"* participant's permission on discussing her sexual problems and concerns was obtained. In the *second level "LI,"* the researcher provided counseling on dealing with these problems, answered the participant's questions. In the *third level "SS,"* the participant's received information on how they can manage their sexual problems. In the final and *fourth level "IT,"* the researcher referred the participant's to a specialist (e.g. gynecologist) if she could not solve the subject's sexual problems (N.B. no participant's needed to be referred). At the end of each session, the researcher scheduled the subsequent educational counseling session with the subjects according to their antenatal follow-up visits and keeping their phone numbers to assure adherence to the interventions.

C. Evaluation of the study outcomes

Sexual function and sexual quality of life of diabetic pregnant women were evaluated twice for the study groups. The first assessment of participants in both groups were performed at recruitment day using SQOL-F and PSRI questionnaires. The second assessment for the intervention group was done eight weeks after intervention with the same questionnaires to assess the effectiveness of PLISST model. Likewise, the participants in the control group were called for the second measurement when they came back to the antenatal follow-up clinic eight weeks after the first measurement, they did not receive any education during the study period. At the end of the study, in accordance with the ethical principles, the subjects in the control group were provided the educational booklet to guide them in managing their sexual problems.

Statistical analysis

All statistical analyses were conducted using SPSS version 20.0 for Windows (SPSS, Chicago, IL). Prior to any calculations, data was checked for normality of distribution. All variables displayed normal distribution with continuous data and were expressed in mean ± standard deviation (SD). Numbers and percentages of categorical data were expressed. For variables with continuous data, the comparisons were measured using the Student's t test. For comparison of variables with categorical results, a Chi-square test was used. The PSRI and SQOL-F reliability (internal consistency) were determined, and the statistical significance was set at $p<0.05$.

Limitations of the study

There were two limitations to the current study: The first limitation is that the participants were recruited from a single Antenatal Clinic; thus, it might not be representative of all diabetic pregnant women in the community. The second limitation is that, some participants declined to participate in the current study, giving a reason that they refuse to discuss such personal information; this led the researchers to waste more time to complete the predetermined sample size.

Results

Table 1 presents the comparison between the general characteristics for 68 studied diabetic pregnant women divided into two groups: PLISSIT and control groups. The mean ages of the control and PLISSIT groups were 28.2 ± 4.7 and 28.6 ± 5.4, respectively. Concerning the educational level, 76.5 % of the control group and 55.9 % of the PLISSIT group had higher education. Regarding to subject's type of diabetes mellitus, 73.5% of the control group were Type II compared to 79.4% of the PLISSIT group. The mean gestational age of the control and PLISSIT groups were 21.8 ±10.2 and 21.4 ±9.7, respectively. It is interesting to notice that only 14.7 % of the control group and 17.6 % of the PLISST group received information about sexuality. There were no significant differences in their general characteristics among the studied groups.

Table 2 shows the comparison between the reproductive history of the two groups, where 79.4 % of control group and 76.5 % of PLISSIT group were multigravida. Concerning the mode of previous delivery, the majority (85.3 %) of the control group and more than three-quarters (76.5 %) of the PLISSIT group previously delivered by Cesarean section, and most of them had just one child. Among the studied groups, almost an equal proportion (79.4 % and 73.5 %) of the control and PLISSIT groups, respectively, reported that their current pregnancy was planned. There were no significant differences in their reproductive history among the studied groups.

Table 3 clarifies subjects' history of sexual dysfunction and problems before pregnancy. There were no statistical significant differences in the total PSRI and subdomains scores for sexual dysfunction including the subject's sexual frequency, desire, arousal, orgasm, dyspareunia, male and sexual female satisfaction and, difficulties between the control and PLISSIT groups. The table illustrates that subjects in both groups had sexual dysfunction as indicated by the mean PSRI score; it was < 50% based on PSRI quartiles.

Table 4 shows a comparison of the studied groups according to their sexual dysfunction and problems before and after PLISSIT counseling: "mean PSRI scores". It revealed no statistical significant difference in the total mean PSRI and subdomains scores at the initial baseline assessment between the study groups, in which the total PSRI scores in both the control group (28.7 ± 3.5) and PLISSIT group (27.6 ± 2.7) was < 50% based on PSRI quartiles, indicating that diabetic pregnant women from both groups had sexual dysfunction. Meanwhile, the table highlighted that there was a highly statistical significant difference between the control and PLLIST groups after receiving PLLIST- based sexual counseling for 8 weeks (p = 0.0001).

Figure 2 demonstrates that the total mean PSRI scores during pregnancy decreased in both the control and intervention groups (28.7 ± 3.5 and 27.6 ± 2.7, respectively) compared to those before pregnancy (control group 44.7 ± 4.1 and intervention group 45.0 ± 3.2), indicating that diabetic pregnant women from both groups had greater sexual dysfunction during pregnancy than that before pregnancy based on the PSRI score (total PSRI score < 50% indicating sexual dysfunction). However, after receiving PLISSIT counseling, these scores were significantly improved in the intervention group (33.4 ± 2.5) compared to the control group (27.0 ± 3.4), with a significant difference between both groups (p = 0.0001).

Figure 3 shows that, before implementing PLISSIT counseling, there were no significant differences among the studied groups, in which 52.9% and 50% of control group and PLISSIT groups, respectively, had low SQOL-F scores. After implementing PLISSIT counseling, it is clear that the majority (82.4%) of the PLISSIT group had higher SQOL-F score compared to the control group, in which nearly half (58.8%) of the subjects had low SQOL-F score. The figure highlighted that there were significant differences in the SQOL-F score after implementing PLISSIT counseling among the studied groups (x^2 = 47.717, p < 0.001).

Figure 4 illustrates that the subject of PLISSIT group exhibits an improvement in the total mean SQOL-F scores after intervention. Data revealed that, before PLISSIT counseling, the total mean SQOL-F scores of the PLISSIT and control groups were 36.2 ± 6.7 and 35.9 ± 5.8, respectively. After receiving PLISSIT counseling, the total scores were 51.7 ± 6.0 in the PLISSIT group and 35.6 ± 5.6 in the control group. The figure highlighted that there were significant differences in the total SQOL-F scores after PLISSIT counseling among the studied groups (t = 11.470, p < 0.001).

Table 5 shows correlation between the PSRI and SQOL-F scores before and after application of PLISST based sexual model; data reveals that the total PSRI score showed direct significant correlation with the total SQOL score before the application of PLISST (p = 0.028) and after application of PLISST (p < 0.001).

Table 1. Comparison of the studied groups according to their general characteristics

	Control group N = 34	%	PLISSIT group N = 34	%	Chi square test χ^2	P
Age (years)						
Mean ±SD	**28.2 ±4.7**		**28.6 ±5.4**		0.264	0.793
Educational Level						
Can't read and write	1	2.9	5	14.7		
Basic & secondary	7	20.6	10	29.4		
Higher education	26	76.5	19	55.9	4.285	0.11
Occupation						
Housewife	23	67.6	25	73.5		
Employee	11	32.4	9	26.5	0.283	0.595
Residence						
Urban	20	58.8	15	44.1		
Rural	14	41.2	19	55.9	1.472	0.225
Income						
Not sufficient	15	44.1	18	52.9		
Just sufficient	19	55.9	16	47.1	0.530	0.467
Duration of marriage (years)						
Mean ±SD	**4.4 ±2.2**		**4.5 ±2.2**		0.187	0.851
Diabetes Mellitus						
Type I	9	26.5	7	20.6		
Type II	25	73.5	27	79.4	0.327	0.567
Gestational age (weeks)						
<14	13	38.2	11	32.4		
14 – 27	7	20.6	11	32.4		
>27	14	41.2	12	35.3	1.209	546
Mean ±SD	**21.8 ±10.2**		**21.4 ±9.7**		**0.183**	**0.855**
Received information about sexuality	5	14.7	6	17.6	0.108	0.742

Table 2. Comparison of the studied groups according to their reproductive history

|	Control group N = 34	%	PLISSIT group N = 34	%	Chi square test χ^2	p
Gravidity						
Primigravida	7	20.6	8	23.5		
Multigravida	27	79.4	26	76.5	0.086	0.769
Mode of previous delivery						
Cesarean section	29	85.3	26	76.5		
SVD*	5	14.7	8	23.5	0.856	0.355
Previous episiotomy						
No	29	85.3	26	76.5		
Yes	5	14.7	8	23.5	0.856	0.355
Number of children						
None	6	17.6	7	20.6		
One	20	58.8	17	50.0		
Two or more	8	23.5	10	29.4	0.542	0.762
Planned pregnancy						
Unplanned	7	20.6	9	26.5		
Planned	27	79.4	25	73.5	0.327	0.567

*SVD = Spontaneous vaginal delivery

Table 3. Comparison between the studied groups according to their history of sexual dysfunction and problems before pregnancy: "mean PSRI scores"

PSRI domains	Control group Mean ± SD	PLISSIT group Mean ± SD	t [p]
Sexual frequency	41.0 ± 11.9	39.8 ± 12.9	0.400 [0.690]
Sexual desire	38.5 ± 15.4	36.4 ± 14.2	0.589 [0.558]
Arousal	42.5 ± 12.1	37.5 ± 13.2	1.634 [0.107]
Orgasm	38.5 ± 7.9	37.4 ± 8.1	0.604 [0.548]
Satisfaction	45.1 ± 11.2	46.7 ± 9.6	0.607 [0.546]
Dyspareunia	33.3 ± 14.8	35.2 ± 14.4	0.532 [0.597]
Initiation of relation	33.4 ± 16.1	40.0 ± 19.5	1.522 [0.133]
Female difficulties	51.6 ± 3.6	50.7 ± 3.8	0.908 [0.367]
Male satisfaction	53.1 ± 6.7	54.3 ± 7.0	0.484 [0.630]
Male difficulties	60.6 ± 3.5	61.2 ± 3.4	0.742 [0.461]
Total PSRI score	**44.7 ± 4.1**	**45.0 ± 3.2**	**0.336 [0.738]**

Table 4. Comparison of the studied groups according to their sexual dysfunction and problems before and after PLISSIT counseling: "mean PSRI scores"
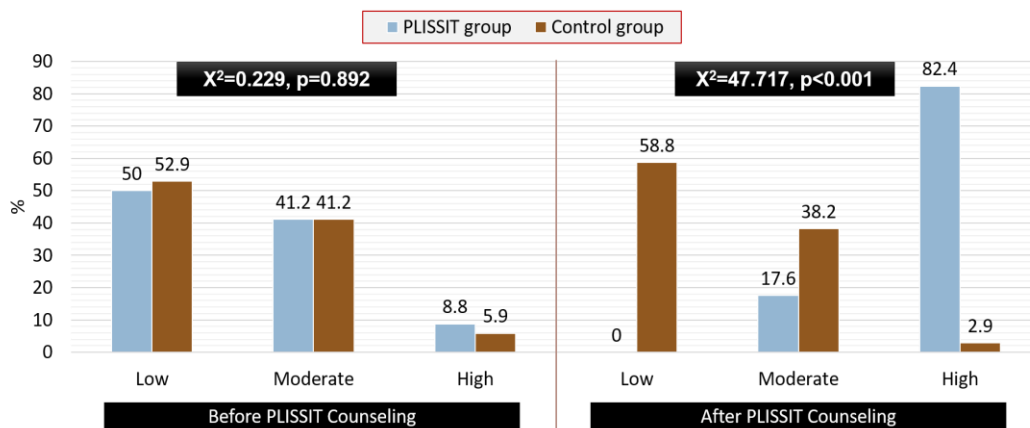
	Before PLISSIT counseling				After PLISSIT counseling			
	Control group	PLISSIT group			Control group	PLISSIT group		
PSRI domains	Mean ± SD	Mean ± SD	t	[p]	Mean ± SD	Mean ± SD	t	[p]
Sexual frequency	15.6 ± 7.5	14. ± 8.3	0.815	[0.418]	15.4 ± 9.6	23.1 ± 9.0	3.434	[<0.001]**
Sexual desire	1.4 ± 13.8	29.7 ± 12.6	0.542	[0.590]	27.3 ± 13.2	35.5 ± 14.9	2.385	[0.020]*
Arousal	23.8 ± 10.4	19.5 ± 11.2	1.662	[0.101]	19.9 ± 8.4	25.4 ± 11.1	2.301	[0.025]*
Orgasm	34.8 ± 8.9	33.5 ± 9.0	0.597	[0.553]	33.4 ± 8.1	39.3 ± 9.1	2.810	[0.007]**
Satisfaction	27.5 ± 11.7	25.8 ± 13.0	0.579	[0.564]	29.6 ± 8.5	34.3 ± 9.4	2.196	[0.03]*
Dyspareunia	26.5 ± 13.7	29.1 ± 12.9	0.812	[0.420]	24.7 ± 12.2	34.2 ± 12.1	3.239	[0.002]**
Initiation of relation	22.3 ± 9.9	19.3 ± 9.1	1.564	[0.103]	20.8 ± 10.9	39.6 ± 12.6	3.072	[0.003]**
Female difficulties	29.3 ± 7.2	27.5 ± 7.8	0.969	[0.336]	28.3 ± 7.2	33.6 ± 5.6	3.426	[<0.001]**
Male satisfaction	25.2 ± 7.0	26.4 ± 4.2	0.685	[0.496]	22.2 ± 7.5	27.1 ± 7.3	2.685	[0.009]**
Male difficulties	50.1 ± 6.8	51.4 ± 6.2	0.839	[0.404]	48.4 ± 6.4	52.2 ± 7.5	2.252	[0.028]*
Total PSRI score	**28.7 ± 3.5**	**27.6 ± 2.7**	**1.451**	**[0.152]**	**27.0 ± 3.4**	**33.4 ± 2.5**	**8.843**	**[0.0001]****

Statistical significance at P < 0.05
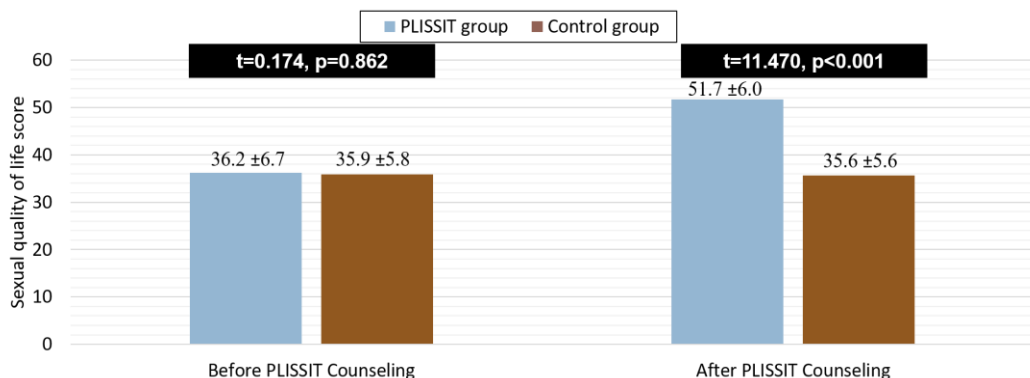**High statistical significance at P < 0.001*
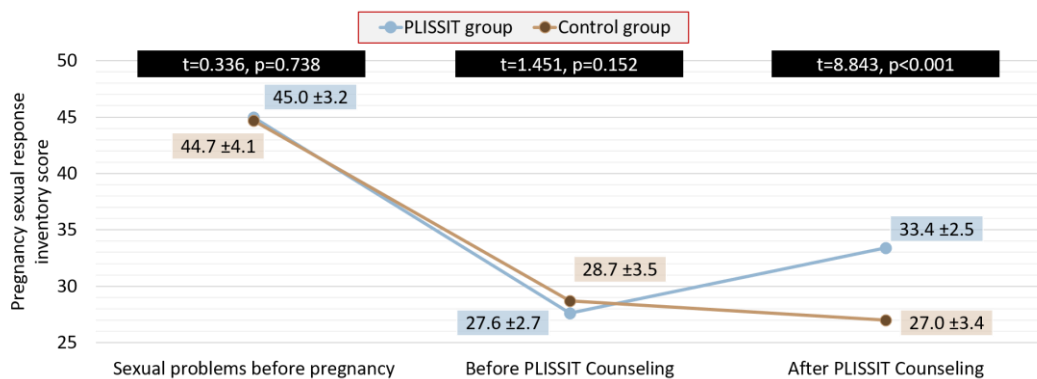
Figure 2: Comparison of the studied groups according to their total PSRI scores before pregnancy and before and after PLISSIT counseling

***High statistical significance at P < 0.001**

Figure 3. Comparison of the studied groups according to their SQOL-F scores before and after PLISSIT counseling

***High statistical significance at P < 0.001**

Figure 4. Comparison of studied groups according to their total SQOL-F scores before and after PLISSIT counseling

***High statistical significance at P < 0.001**

Table 5. Correlation between the PSRI score and SQOL-F score before and after PLISST Counseling

	r	p
Before PLISST based sexual model	0.267	0.028
After PLISST based sexual model	0.587	**<0.001**[**]

[**]**r = Correlation**

Discussion

Sex during pregnancy can fluctuate according to physical and psychological changes. Likewise, diabetes mellitus is among the factors that decrease libido and negatively affect women's sexuality **(Bouzouita et al., 2018)**. Meanwhile, a previous study by **Shahbazi et al. (2018)** reported that PLISSIT sexual education-based model can improve the sexual function of diabetic women during pregnancy.

This study aimed to investigate the effect of PLISSIT- based sexual counseling model on sexual dysfunction among diabetic pregnant women. This aim was achieved through the present study findings, which revealed that there was a highly significant improvement in the quality of sexual function and life among subjects in the PLISSIT group compared to those in the control group. Therefore, the hypothesis of the current study "diabetic pregnant women who received individual sexual counseling based on the PLISSIT model exhibit higher PSRI and SQOL-F scores than those who did not receive it, was reinforced.

The current study findings revealed that there was no statistically difference in the general characteristics and reproductive history among the studied groups. However, it is interesting to note that a small number of subjects received information about sexuality from both the PLISSIT and control groups, indicating that the studied groups were homogenous. Thus, subjects are in critical need for guidance and advice about their sexual health. These findings are in accordance with **Abdelhakm et al. (2018)**, studied the "effect of PLISSIT model sexual counseling on sexual quality of life for postpartum women, Egypt" and reported that the majority of women did not receive information about sexuality. The current study findings could

be related to that the Eastern culture and social attitudes on the topic of sexual health are still taboo for most women in Egypt and they avoid talking about it because they consider it as shameful and sensitive matter embarrassed to discussed it.

Diabetes mellitus is a well-known risk factor for sexual dysfunction among women **(Rahmanian et al., 2019)**. In the current study, diabetic pregnant women in both the control and PLLISIT groups had history of sexual dysfunction before pregnancy, as indicated by the mean PSRI and subdomains scores. However, data revealed that the history of sexual problems did not significantly differ between the studied groups, indicating the importance of considering women's sexual health as a public health problem that affects women's life and needs to be managed. Such findings are supported by **Paningbatan, Aragon, Landicho-Kanapi, and Rodriguez-Asuncion (2018)** aimed to "identify the prevalence of sexual dysfunction among premenopausal Filipino women with type 2 diabetes mellitus" found that, nearly three quarters of the subjects had low scores of sexual function, especially in the lubrication, orgasm, and dyspareunia domains.

Pregnancy is among the factors that affect women's sexual activity as it is a critical time of life associated with numerous biological and psychological changes that affect women's libido and sexual function **(Erbil, 2018)**. The current study findings support this idea; therefore, the subjects in both groups have low mean PSRI and subdomain scores at the initial baseline assessment. The PSRI was < 50 %, showing that diabetic pregnant women had sexual problems, with no significant difference between the studied groups. The researchers revealed these findings on the effect of hormonal changes with pregnancy as most of studied subjects in both groups were at

their first and third trimester of pregnancy. This result was supported in a study by **Khalesi, Bokaie, and Attari (2018)**, aims to "assess effects of pregnancy on sexual function of couples", who found significant regressions in sexual function over time during pregnancy, mostly during the third trimester.

Considering the effect of PLISSIT-based sexual counseling model on sexual function; the present study findings converted to highly statistical significant improvement and higher PSRI subdomains scores on the level of sexual activity among subjects in the intervention group compared to those in the control group in terms of sexual desire, frequency, arousal, orgasm, dyspareunia, initiation of sexual activity, and couple's satisfaction with sex and couple's sexual problems from women's prospective. From the researcher's prospective, the results could be explained as the designed PLISSIT model succeeded in providing the subjects with focused and directed counseling with limited information regarding their sexual problems and concerns.

These findings are in accordance with the results of **Abdelhakm et al. (2018)**, who found a significant improvement in the women's sexual life after implementing the PLISSIT counseling program. Likewise, findings are in agreement with the results of a study by **Hassan, Metwally, and Salama (2018)** studied "effect of PLISSIT model on sexual function among women with diabetes, Egypt", found that, the participants in intervention group were highly satisfied with the PLISSIT model and the total score of female sexual function was significantly different between the studied groups (p = 0.001).

The findings of the present study indicated that the sexual function of diabetic pregnant women was greatly affected by both DM and pregnancy, in which there were no significant differences in the total mean PSRI scores for sexual activities before pregnancy among the studied groups. Meanwhile, both groups had history of sexual dysfunction before pregnancy as indicated by the PSRI scores. The problem aggravated during pregnancy, but after receiving PLISSIT counseling, the score was improved

with a highly significant difference observed between both groups. From the researcher's point of view, the current findings reflects the women's need for sexual health guidance during this critical period of life and considers this sexual issue as a public health problem that affects most women before and during pregnancy.

This in agreement with the results of **Abdelhakm et al. (2018)**, who reported that more than three- quarters of pregnant women had sexual problems compared to half of them before pregnancy, indicating improvement after PLISSIT sexual counseling. Such findings in agreement with the results of a Brazilian study by **Holanda, Abuchaim, Coca, and Abrao (2014)**, reported that the subjects' sexual dysfunction during pregnancy increased to more than three quarters compared to one third before pregnancy.

With regard to women's quality of sexual life, the current study findings revealed that, after implementing PLISSIT counseling the majority of the PLISSIT group exhibited high SQOL-F scores compared to the control group with significant differences among the studied groups. This result is in agreement with the findings of **Abdelhakm et al. (2018)**, who reported that the percentage of subjects who had good SQOL-F scores in the PLISSIT group significantly increased after the intervention, with significant improvement in the level and quality of sexual activity. Similarly**, Shahbazi et al. (2018)**, performed randomized controlled trial on 70 pregnant women to investigate the effect of PLISSIT-based sexual counseling on their sexual function, after intervention, there were significant improvement sexual function and the quality of life in the intervention group.

The current study showed significant increase in the total mean SQOL-F score after receiving PLISSIT model compared to the score before the intervention with significant difference between the studied groups. These findings are in line with the results of the Iranian study by **Faghani and Ghaffari, (2016)**, aimed to evaluate the "effect of sexual rehabilitation using the PLISSIT model in post-mastectomy breast cancer survivors", found that, the mean quality of sexual life was increased

in post-mastectomy women after receiving PLISSIT-based counseling.

The current study results displays that, there was a direct significant correlation with the total SQOL score before application of PLISST (p = 0.028) and after application of PLISST (p < 0.001). This reflects the improvement in the quality of sexual life resulting from the improvement in sexual function. The results of the current study corroborated with the findings by **Rutte et al. (2015)**, studied "the effect of PLISSIT model on women with type II diabetes who were unsatisfied with their sexual function", concluded that PLISSIT-based sexual counseling model showed beneficial effects in improving the sexual function and sexual satisfaction as well as improving the quality of their life. Yet, in agreement with an Iranian study by **Rezaei, Omidi, Janani, and Azadi (2017)**, the study sample included 380 postpartum women, aimed to "investigate the relationship between sexual function and quality of life". This study found that sexual dysfunction had a significant effect on women's sexual health and wellbeing.

The current study found that sexual dysfunction had a significant effect on women's sexual health and wellbeing. Meanwhile, the study findings stressed that the PLISST model was an effective sexual educational model that promotes sexual function and quality of sexual life among diabetic pregnant women, thus reducing stress associated with sexual problems, and preserving their marital relationships during this critical period of life. So, this model can be integrated by maternity nurses as a part of nursing strategies to manage sexual dysfunction in various healthcare settings.

Implications on nursing practice

PLISSIT-based sexual counseling help maternity nurses to counsel their patients on the physical and emotional aspects related to sexual health of diabetic pregnant women and helping them to freely express their sexual problems, feelings as well as wishes to receive more information around these concerns. This may lead to better sexual experience among married

couples which in turn improve couple's quality of life and marital relationships.

Conclusion

The current study concluded that there was a statistically significant improvement in PSRI and SQOL-F scores among diabetic pregnant women after receiving PLISSIT-based sexual counseling. Hence, these findings supported the main hypotheses of the study that "PLISSIT-based sexual counseling has a positive effect on sexual function of diabetic pregnant women and improves the quality of their sexual life".

Recommendation

In light of the positive effect of PLISSIT model for diabetic pregnant women, the following are recommended:

- PLISSIT model of sexual therapy should be integrated into routine antenatal care for diabetic pregnant women.

- A training program on utilizing PLISSIT model should be designed for maternity nurses.

- Future research should be directed toward exploring women's views and experiences with PLISSIT-based sexual counseling model.

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