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## Effect of counseling model on sexual dysfunction among women with diabetes

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### Abstract

**Background:** Diabetes mellitus (DM) is an important cause of sexual dysfunction both in men and women. In Egypt, Ibrahim *et al.* reported that the prevalence of FSD in 2013 was 52.8%.

**Aim of the study:** To evaluate the effect of sexual counseling model on sexual dysfunction among women with diabetes.

**Research design:** Quasi experimental research design was used.

**Setting:** The study was conducted at outpatient clinic & internal medicine department at Minia university hospital. Subjects a purposive sample of one hundred diabetic women who suffered from sexual dysfunctions.

**Tools of data collection:** Two tools were used as following: 1- A structured interviewing questionnaire, 2- The Female Sexual Function Index scale to measures sexual function of diabetic women.

**Results:** The frequency of sexual dysfunction was more prevalent in diabetic women in which the mean age of studied women was  $(39.68 \pm 6.2)$  years. There were statistically significant differences regarding to the Female Sexual Function Index total mean scores between pre and post six months of counseling sessions.

**Conclusion:** Implementation of counseling sessions based on PLISSIT model had a significant effect in improving the sexual function among diabetic women in pre and after six months of sexual counseling.

**Recommendations:** Applying ongoing educational programs based on PLISSIT model for diabetic women in all available diabetic clinics with preparation of secure environment to discuss sexual problems with women freely. In service educational programs for care givers on how to deal and manage various sexual dysfunctions for diabetic women by using PLISSIT counseling model.

**Keywords:** Counseling model, sexual dysfunction & diabetes

### Introduction

A normal sex life is an important part of life and relationships. Diabetes mellitus (DM) is an important cause of sexual dysfunction both in men and women. This problem is more difficult to be diagnosed and treated in women than in men because of the intricacy of the female sexual response. Also, the literature is limited addressing female sexual dysfunction (FSD) in DM, and this aspect of female health, is often ignored in clinical practice in women with DM. Early screening, diagnosis, and appropriate counseling are the cornerstone for managing FSD in women with DM <sup>[1]</sup>.

Diabetes mellitus is an endocrine disorder in which our body confronts a lack of insulin or resistance to insulin. DM is known to cause different medical, psychological and sexual complications. Sexual dysfunction (SD) can also be an early sign of DM. Diabetes mellitus is the leading systematic disease located in the etiology of sexual dysfunction. This effect is formed by neurogenic, psychogenic, and vascular factors or a combination of them <sup>[2]</sup>. Recent evidence indicates that diabetic women are at higher risk for developing sexual dysfunction compared to those without diabetes <sup>[3]</sup>.

Sexual dysfunction refers to a difficulty experienced by an individual or a couple during any stage of a normal sexual activity, including desire, arousal and/or orgasm that interfere with the individual or the couple satisfaction during the sexual activity <sup>[4]</sup>. Sexual activity is important to the overall health and well-being of an individual. A sexual counseling model for care providers might be a useful tool in improving general practionners' skills when discussing sexual issues with their patients. Over the past few decades, several models have been developed, such as ALARM and PLISSIT. These models all take a somewhat different approach to sexual counseling <sup>[5]</sup>.

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### Significance of the study

The global prevalence of SD in women with DM is estimated to be 20-28%. A report from Hong Kong showed that sexual dysfunction among patients with diabetes had an association with increased age, duration of diabetes, and chronic complications of diabetes [6].

Diabetes currently affects 246 million people worldwide. In Egypt alone, 2,623,000 people are already affected with diabetes, with the expectation of 6,726,000 in 2030 [7]. The exact prevalence of FSD in the Middle East is exceptionally difficult to be determined in light of its sensitive nature. In a study from Lower Egypt, it was found that 68.9% of 936 women (16–49 years) had one or more sexual problems. In another study from Upper Egypt, it was found that 76.9% from 601 women (18–60 years) reported one or more sexual dysfunction problems [8].

Sexual dysfunction is prevalent in women with diabetes mellitus, but remains one of the most frequently neglected complications in diabetes care. Both women and health care providers appear to have difficulty with discussing sexual problems in diabetes care because of the sensitivity nature of the problem; so it was very necessary to shed light on this sensitive problem through the present research using PLISSIT model to facilitate data collection & counseling in order to overcome the negative consequences of that problem.

### Aim of the study

**The present study was conducted to** evaluate the effect of sexual counseling model on sexual dysfunction among women with diabetes.

### Research hypothesis

Sexual counseling based on PLISSIT model will improve sexual function among diabetic women.

### Subjects and Methods

#### Research design:

Quasi experimental research design (time series design) was utilized for the purpose of the current study.

**Research Setting:** The study was conducted at diabetic outpatient clinic & internal medicine department at Minia university hospital.

### Subjects

**Sample type:** A purposive sample was utilized according to the following criteria:

#### Inclusion criteria

- Age 18- 45 year
- Chronic diabetic women with sexual dysfunction (sexual problems)
- Mentally healthy.
- Married women
- Educated women

#### Exclusion criteria

- Divorced women
- Woman receive chemotherapy or radiotherapy
- Widowed woman & whose husband travels for long period
- Woman with gestational diabetes.

- Women with other chronic diseases, reproductive tract infection & urinary tract infections.

**Sample Size:** 100 diabetic women with sexual dysfunctions were recruited for the current study purpose.

$$N = \frac{T^2 \times p(1-p)}{m^2}$$

$$N = \frac{(1.96)^2 \times 0.07(1-0.07)}{0.05^2} \quad N = 100 \text{ women}$$

### Description

N = required sample size

t = confidence level at 95 % (standard value of 1.96)

p = estimated prevalence of diabetic women in internal medicine department at Minia University Hospital, 2016 (0.07)

m = margin of error at 5 % (standard value of 0.05)

### Tools for Data Collection:

**Tool 1:** A structured interviewing questionnaire (pretest). Was designed by the researcher after reviewing relevant literatures it included 16 questions to collect data related to:

**Part 1:** Socio-demographic characteristics including: age, educational level, occupation, family size, duration of marriage, residence & body mass index.

**Part 2:** Medical history including: duration of diabetes, type of diabetes treatment & complications of diabetes,

**Part 3:** Present sexual problems, its duration, circumcision, frequency of sexual intercourse, if getting help for sexual problems & reasons for not getting help were recorded for each diabetic woman with sexual dysfunction.

**Tool 2:** Female Sexual Function Index (FSFI) scale (Pre and posttest). It was developed by [9]. This is a multidimensional scale consisted of 19 items that are subdivided into six domains: desire (2 items), arousal (4 items), lubrication (4 items), orgasm (3 items), satisfaction (3 items) and pain (3 items). It was adopted to evaluate sexual problems in diabetic women in the preceding 4 weeks. Each domain is rated on a scale of 0 or 1 to 5; a domain score of 0 indicated that the subject reported (having no sexual activity) or 1 (suggestive of dysfunction) & 5 score (suggestive of normal sexual activity).

### Scoring system

To obtain the individual domain scores, added the scores of the individual questions that comprised the domain & multiplied the sum by the domain factor then coded the sum of each domain into dysfunction scores. Questions were graded on a Likert scale, domains were weighted and scores were summed to give the full scale score ranging from 2 minimum to 36 maximum score. If the total female score was below or equal (26.55), she was considered to have female sexual dysfunction it's was taken as the cutoff point for the FSFI to distinguish between women with FSD and those with normal function. (See table below).

Shows domain questions score range factor minimum score maximum score and dysfunction scores

Domain	Questions	Score range	Factor	Minimum score	Maximum score	Dysfunction scores
Desire	1,2	1-5	0.6	1.2	6.0	≤ 4.28
Arousal	3,4,5,6	0-5	0.3	0	6.0	≤ 5.08
Lubrication	7,8,9,10	0-5	0.3	0	6.0	≤ 5.45
Orgasm	11,12,13	0-5	0.4	0	6.0	≤ 5.05
Satisfaction	14,15,16	(0or1)-5*	0.4	0.8	6.0	≤ 5.04
Pain	17,18,19	0-5	0.4	0	6.0	≤ 5.51
Full scale score range				2.0	36	≤ 26.55

\* Range for item 14 = 0-5, range for item 15 & 16 = 1-5

### Supportive material

It was designed by researcher in the form of handout (booklet) using simple Arabic language and different illustrative pictures in order to facilitate understanding its content. It consisted of (2) parts; the first one concerned with anatomy of female reproductive system & female sexual response cycle. The second part concerned with causes, types, and management of female sexual dysfunction which included (practicing exercise such as kegle exercise, following a healthy diet & healthy life style, talking with husband about sexual concerns and using medications for treating vaginal dryness, inflammation & other factors that might alter female sexual function.

**Validity & Reliability:** The questionnaire was piloted on panel of 5 experts of Obstetrics and gynecological staff, and nursing professors who reviewed the instruments for clarity, relevance, comprehensiveness, understanding, applicability and easiness. Alpha Cronbach's test was used to check the stability of the internal consistency of instrument.

### Pilot study

A pilot study was conducted on 10 % of sample which equal (10 women) of diabetic women with sexual dysfunction from Minia university Hospital, to test feasibility of tools, time required to be applied, to evaluate study process, assessment of feasibility of fieldwork, identification of a suitable place for interviewing women, and to detect any possible obstacles that might face the researcher and interfere with data collection. Necessary modifications were done based on the pilot study findings. The participants of the pilot study were not included in the main study sample.

### Fieldwork description

#### Assessment phase (pre-test)

After an official permission to carry out the study granted from the director of Minia University Hospital. The data collection started at the beginning of October 2018 to the end of June 2019. The researcher visited data collection site (diabetic outpatient clinic & internal medicine department at Minia university hospital) from 9:00 am to 2:00 pm, for 2 days per week.

At the beginning of the interview, the researcher introduced herself to women, explained the aim of the study, oral consent for participation in the study was obtained from selected women for ethical issues, scheduled times for counseling sessions and follow up, with save mobile phone numbers to all selected women to assure adherence to the interventions. Women were informed that participation was voluntary & confidentiality of the information was ensured to gain women confidence and trust.

The researcher collected data with 2 tools: a structured interviewing questionnaire & the Female Sexual Function

Index scale. The researcher asked woman questions about their socio-demographic characteristics such as (age, educational level, occupation, family size, duration of marriage, body mass index, residence), medical history included (duration of diabetes, type of diabetes treatment, complications of diabetes), and sexual history included (sexual problems & its duration) were recorded for each diabetic woman with sexual dysfunction

Tools of data collection were answered pre and post intervention after 1, 3, and 6 months except the structured interviewing questionnaire was only used once in the first session (pretest). This phase was applied to all studied women.

### Implementation phase (conducting education program)

In this phase counseling sessions based on PLISSIT model were given on individual basis. Three sessions were organized for each woman & each session took from 40- 50 minutes. The researcher used discussion as a teaching method & used a handout (booklet) written in simple Arabic language, including different illustrative pictures in order to facilitate understanding its content. At the end of each session the researcher allowed the woman to ask questions for clarification and gave a conclusion about content.

**The Plissit Model of sex therapy** is an acronym for the four levels of intervention, which include Permission (P), Limited Information (LI), Specific Suggestions (SS), and Intensive Therapy (IT).

**I. Permission step:** The researcher talked about sexuality & diabetes with patients, she talked about the sexual issues, sexual feelings /relationships and normalizes this concern in a safe environment. At this step the researcher asked open-ended questions.

**II. Limited information:** during this step the researcher offered information to the patient about diabetes, effect of diabetes on sexual function and sexual quality of life, the researchers focused on addressing and correcting myths. The first two steps of the PLISSIT model focused on the invitation of the patient to talk about sexuality and on the normalization of the sexual problem.the researcher used knowledge and skills as a problem solving approach to carry out the third step of the model.

**III. Specific suggestion:** The researcher used a problem solving approach in addressing women's issues which experienced personally. Counseling was given depending on women's necessities, (the effects of the diabetes on their sexuality, sexual problems that may be experienced in their lives, coping methods, and so on).

**IV. Intensive Therapy:** This step always includes referring the patient to specialized care for complex sexual problems or problems that were not efficiently helped

in the previous steps. For example, referral to a gynecologist or psychologist may be necessary in case of relationship problems.

### Follow up and evaluation phase (post-test)

Evaluation and follow up phases after one, three & six months of educational program were done. Each session the researcher took a feedback from diabetic women about influence of last session instructions through utilizing 2nd tool to evaluate the effectiveness of PLISSIT model in enhancing sexual function among diabetic women.

### Ethical considerations

Research proposal was approved from Research ethical committee in Faculty of Nursing at Minia University. The research purpose didn't not contradict with the cultural, traditional and religious issues. Study subjects had the right to refuse to participate and or withdraw from the study without any rational at any time. Study subjects' privacy & dignity were respected during collection of data. No health hazards were present. & Participants were assured that all their data were highly confidential & anonymity was maintained.

### Statistical Design

The collected data were organized, tabulated & statistically analyzed using software program and statistical package for social science (SPSS 25.0) to evaluate women under study. The statistically analysis included frequencies and percentages for qualitative variables, mean and standard deviations (SD) for quantitative variables. Fisher's exact test & chi-square test were utilized to determine relations between qualitative data. Quantitative continuous data were compared by using Friedman test in case of comparisons between the mean scores of the studied group. Graphs were done for data visualization using Microsoft Excel. Correlation test and P - value of  $\leq 0.05$  indicates a significant result while, P value of  $> 0.05$  indicates a non-significant result.

### Limitations of the study

- Some women refused to cooperate; other women didn't want to speak about their sexual experiences because of embarrassment so long time was taken to collect sample.

- There was no suitable place to maintain privacy for conducting counseling sessions.

## Results

**Table 1:** Percentage distribution of diabetic women related to their socio-demographic characteristics (n = 100)

Socio-demographic characteristics	No. (100)	%
<b>Age / years</b>		
18- 24	6	6.0
25- 31	12	12.0
32- 38	34	34.0
39- 45	48	48.0
Mean $\pm$ SD	39.68 $\pm$ 6.2 years	
<b>Educational level</b>		
Literate	19	19.0
Primary school	7	7.0
Secondary school	46	46.0
Diploma	22	22.0
University	6	6.0
<b>Occupational level</b>		
Work	15	15.0
Housewives	85	85.0
<b>Family size</b>		
Small(2-5 members)	71	71.0
Large(>5members)	29	29.0
<b>Duration of marriage/years</b>		
1 -< 5	6	6.0
5- <10	14	14.0
10- < 15	24	24.0
More than 15	56	56.0
Mean $\pm$ SD	16.5 $\pm$ 4.6 years	
<b>Residence</b>		
Urban	25	25.0
Rural	75	75.0

Table (1) Table (1) illustrates that, diabetic women ranged between 18-45 years old with a mean age of 39.68  $\pm$  6.2 years. It was noticed that, slightly half of the sample were at secondary school (46.0%). Most of them (85.0%) were housewives. Nearly three quarters of studied sample had a small family (71.0%), more than half of them married for more than 15 years (56.0%) with mean  $\pm$  SD 16.5  $\pm$  4.6 years. It was obvious that three quarters of the sample had lived in rural areas (75%).

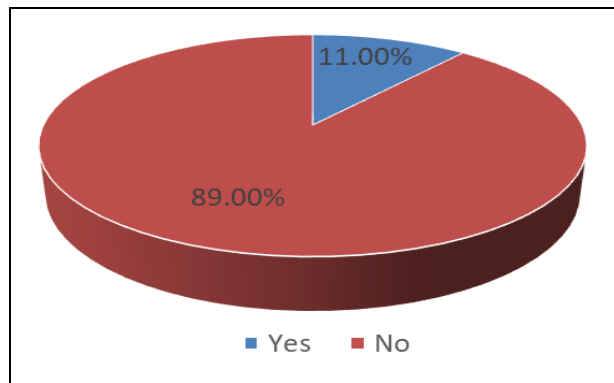
**Table 2:** Percentage distribution of diabetic women related to their sexual history (n = 100):

Sexual history	No.(100)	%
<b>Circumcision</b>		
Yes	91	91.0
No	9	9.0
<b>Present sexual problems</b>		
Loss of genital sensation(arousal)	37	37.0 $\neq$
Dyspareunia	37	37.0 $\neq$
Inability to orgasm	25	25.0 $\neq$
Reduced libido (desire)	50	50.0 $\neq$
Reduced vaginal lubrication	13	13.0 $\neq$
<b>Frequency of sexual intercourse</b>		
Once a week	20	20.0
One – two weeks	42	42.0
Two- four weeks	35	35.0
More than 1 month	3	3.0
<b>Duration of sexual problems</b>		
<one year	6	6.0
1-2 years	27	27.0
> 2 years	67	67.0

$\neq$  More than one answer

Table (2) describes distribution of diabetic women related to their sexual history. It's obvious that the majority of sample was circumcised (91.0%), the most reported sexual problem was reduced libido (50%), followed by loss of genital sensation & dyspareunia (37) %, in ability to orgasm (25)%,

while only (13%) suffered from reduced vaginal lubrication. It was found that (42.0%) of diabetic women were practicing sexual intercourse one – two weeks & that two thirds of them (67.0%) had sexual problems for more than two years.



**Fig 1:** Percentage distribution of diabetic women who had got help for their sexual problems (n = 100)

Figure (1): Illustrates that, most of the studied sample (89.0%) didn't seek help for their sexual problems

**Table 3:** Percentage distribution of diabetic women according to their sexual dysfunctions (n= 100)

Domains	Pre		After 1 month		After 3 months		After 6 months		Fisher test	P – value
	No.	%	No.	%	No.	%	No.	%		
<b>Desire domains</b>										
yes	79	79.0	77	77.0	71	71.0	52	52.0	21.553	.0001**
No	21	21.0	23	23.0	29	29.0	48	48.0		
<b>Arousal domains</b>										
yes	96	96.0	94	94.0	89	89.0	82	82.0	13.268	.004**
No	4	4.0	6	6.0	11	11.0	18	18.0		
<b>Lubrication domains</b>										
yes	91	91.0	91	91.0	88	88.0	83	83.0	4.123	.249NS
No	9	9.0	9	9.0	12	12.0	17	17.0		
<b>Orgasm domains</b>										
yes	41	41.0	32	32.0	28	28.0	16	16.0	15.596	.001**
No	59	59.0	68	68.0	72	72.0	84	84.0		
<b>Satisfaction domains</b>										
yes	82	82.0	59	59.0	30	30.0	15	15.0	107.768	.0001**
No	18	18.0	41	41.0	70	70.0	85	85.0		
<b>Pain domains</b>										
yes	46	46.0	41	41.0	40	40.0	29	29.0	6.473	.05*
No	54	54.0	59	59.0	60	60.0	71	71.0		

\*Statistically significant difference at 0.05

\*\* Highly statistically significant difference 0.001

Table (3) shows that, in pretest more than three quarters of diabetic women 79% had reported problems regarding their sexual desire domain, the majority of sample 96% had sexual arousal problems during sexual activity, most of them 91% suffered from reduced lubrication during sexual activity, while orgasmic problems appeared in 41%, in

addition to 82% of them had problems with sexual satisfaction and nearly half of the sample 46% suffered from pain during or following sexual relation improved to 52.0%, 82.0%, 83.0%, 16.0%, 15.0%, 29% after 6 months of educational program respectively.

**Table 4:** Comparison between means scores' of female sexual function index domains for diabetic women in pretest & after 1, 3 and 6 months of educational program

Domain	Pre	After 1 months	After 3 months	After 6 months	F	P - value
Desire	3.0 ± 1.273	3.3 ± 1.173	3.7 ± 1.097	4.2 ± 1.008	20.891	.000**
Arousal	3.5 ± 0.976	3.8 ± 0.917	4.1 ± 0.791	4.5 ± 0.679	25.865	.000**
Lubrication	4.2 ± 1.316	4.4 ± 1.149	4.7 ± 0.923	5.0 ± 0.731	10.866	.000**
Orgasm	4.0 ± 1.290	4.3 ± 1.254	4.5 ± 1.134	4.9 ± 0.926	11.697	.000**
Satisfaction	4.5 ± 0.680	4.9 ± 0.506	5.3 ± 0.596	5.6 ± 0.505	71.124	.000**
Pain	4.5 ± 1.766	4.9 ± 1.436	5.2 ± 1.104	5.5 ± 0.778	10.150	.000**
Total FSDI	23.8 ± 3.499	25.5 ± 3.138	27.6 ± 2.795	29.9 ± 2.565	74.045	.000**

\*Statistically significant difference at 0.05

\*\* Highly statistically significant difference 0.001

Table (4) explains that after 6 months of educational program diabetic women had the highest mean score related to their female sexual function index domains & total mean

scores of female sexual function had a significant improvement from 23.8 pre education to 29.9 after six months of education with P – value  $\leq 0.000$ .

**Table 5:** Relationship between female sexual dysfunctions of diabetic women and their socio-demographic characteristics (n= 100)

Socio-demographic characteristics	Female sexual dysfunction											
	Desire (n = 79)		Arousal (n = 96)		Lubrication (n= 91)		Orgasm (n= 41)		Satisfaction (n= 82)		Pain (n= 46)	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
<b>Age / years</b>												
18- 24	3	3.8	6	6.3	3	3.3	5	12.2	4	4.9	0	0.0
25- 31	10	12.7	12	12.5	12	13.2	5	12.2	9	11.0	8	17.4
32- 38	22	27.8	31	32.2	30	33.0	12	29.3	25	30.4	13	28.3
39- 45	44	55.7	47	49.0	46	50.5	19	46.3	44	53.7	25	54.3
<b>p. value</b>	12.007 (.007**)		3.269 (.352)		15.188 (.002**)		4.945 (.176)		6.046(.109)		8.715 (.03*)	
<b>Educational level</b>												
Literate	18	22.8	19	19.7	19	20.8	7	17.1	17	20.7	10	21.7
Primary school	5	6.3	7	7.3	7	7.7	3	7.3	6	7.3	3	6.5
Secondary school	35	44.3	43	44.8	41	45.1	17	41.5	39	47.6	13	28.3
Diploma	19	24.1	21	21.9	19	20.9	11	26.8	18	22.0	17	37.0
University	2	2.5	6	6.3	5	5.5	3	7.3	2	2.4	3	6.5
<b>p. value</b>	11.575 (.02*)		2.112 (.715)		3.776 (.437)		1.394 (.845)		10.654 (.03*)		4.667 (.005**)	
<b>Family size</b>												
Small (2-5 members)	50	63.3	67	69.8	62	68.1	24	58.5	58	70.7	32	69.6
Large (>5members)	29	36.7	29	30.2	29	31.9	17	41.5	24	29.3	14	30.4
<b>p. value</b>	10.858 (.001**)		1.702 (.192)		4.040 (.04*)		5.243 (.02*)		.016 (.900)		.085 (.770)	
<b>Duration of marriage /years</b>												
1 -< 5	2	2.5	6	6.3	3	3.3	5	12.3	4	4.9	1	2.2
5- <10	7	8.9	14	14.6	14	15.4	6	14.6	10	12.2	7	15.2
10- < 15	21	26.6	21	21.8	19	20.9	6	14.6	17	20.7	10	21.7
More than 15	49	62.0	55	57.3	55	60.4	24	58.5	51	62.2	28	60.9
<b>p. value</b>	18.123 (.0001**)		6.064 (.109)		21.362 (.0001**)		7.085 (.069)		7.165(.067)		2.711 (.438)	

\*statistically significant difference \*\* Highly statistically significant difference

Table (5) explains that most of diabetic women with sexual dysfunction were in the age group (39-45 years old) with secondary education & married for more than 15 years & had small family with statistical significant difference related to all domains except for arousal domain  $p \leq 0.05$ .

## Discussion

The present study shows that 100 diabetic women were included, their age ranged between 18-45 years old with a mean age  $39.68 \pm 6.2$  years. These results are agreed with [10] who studied "Effect of educational program based on PRECED model on quality of life in patients with type II diabetes" & reported that middle and late adulthood populations are thought to be the major drivers of the increasing prevalence of diabetes in Egypt and Africa in general.

These results came also in line with [11] who studied "Effect of PLISSIT Model Sexual Counseling on Sexual Function among Women with Diabetes" & mentioned that the higher percent of diabetic women suffered from sexual dysfunction lies between 40-48 years. Also these findings are in agreement with the results of [12] which reported that the largest age group currently affected by diabetes is between 40-59 years.

Furthermore, the current findings came in line with the study results of [13] who emphasized that most people with diabetes in low and middle income countries are between 40 and 60 years old for both sexes, while the current study results disagreed with [14], who studied "Sexual dysfunction in women with diabetes mellitus" & stated that, people who develop diabetes are usually under the age of 20 years old, this contradiction might be due to differences in the sample characters & environment.

Regarding educational level it was noticed that, nearly half of the sample was at secondary school (46.0%) & only (6.0%) of them were highly educated these findings are in agreement with [15], who stated that, the prevalence rates of diagnosed diabetes are significantly lower among adults with higher levels of educational attainment. Also the results in agreement with [11] who addressed in their study that around the half of women 52.3% for intervention group had secondary level of education.

Moreover, regarding duration of marriage it was noticed that more than half of studied diabetic women had married for more than 15 years, while the results of a study done by [11] reported that more than thirds of study group women were married for more than ten years.

Additionally these results agreed with [16], who studied

"Effect of Adaptation Program for Diabetic Women about Sexual Dysfunction" & stated that nearly half of studied diabetic women were married for more than ten years. Also agreed with who revealed that women who are married for longer periods are supposed to be older & more years of marriage carry extra burdensome tasks that interfere with sexual functioning.

As regards occupation & residence it was clear that more than three quarters of the sample were housewives & three quarters of them lived in rural areas, these results are in the same line with <sup>[17]</sup>; who demonstrated that the unemployed and low educated females had more FSD as women with lower education and women who have no job are may be exposed to stressful economic conditions that may interfere with sexual functioning.

In addition regarding duration of diabetes & type of diabetes treatment the present results displayed that more than one third of the studied sample had diabetes since 6-10 years & slightly three quarters of diabetic women had type 1 diabetes mellitus who treated by insulin only, these results were supported by <sup>[18, 19]</sup>; they mentioned that prevalence of sexual dysfunction is higher in type one diabetic women, compared to type two this because of that diabetes type one is more common to appear before the age of 40 years, this similarity between the two results may be due to matched age groups of the two study samples. While these results were in contrast with <sup>[20]</sup>; they reported the prevalence of diabetic women's sexual dysfunction was as low as 27% in type 1 diabetes compared to type two, this contradiction possibly due to different sample sizes and age groups.

Regarding sexual history, through the current research findings it was observed that the majority of the sample were circumcised & practiced sexual relation at least once per month & this was supported by <sup>[16]</sup>; who reported that regarding frequency of sexual intercourse, more than three quarters of women were practicing sexual relation by regular way (not less than once per month).

Regarding sexual problems reported by women the present study revealed that reduced libido followed by loss of genital sensation & dyspareunia were the most reported sexual problems among diabetic women; these results were supported by a long-term research, entitled "epidemiology of diabetes interventions and complications" in which women with SD reported loss of libido (57%), orgasmic dysfunction (51%), problems in lubrication (47%), arousal dysfunction (38%) and pain during intercourse (21%) <sup>[20]</sup>. This agreement may be as a result of using similar sample types.

As regards women trials for getting help for their sexual problems it was found that the minority of sample (11%) had got help for their sexual problems; this came in the same line with <sup>[21]</sup>; they conducted the Global study on Sexual Attitudes and Behaviors in 29 countries & demonstrated that although about half of all sexually active respondents had experienced at least one sexual problem, less than 18.8% of them had sought medical help for their sexual problems.

As regards FSFI domains; the present findings confirmed that diabetic women had a significant impairment in all domains pre education & this was congruent with the results of a study conducted by <sup>[22]</sup>, which concluded that women with diabetes had more problems in the domains of orgasm and lubrication as compared to non-diabetic group. They also showed lower levels of sexual satisfaction in diabetic

women in comparison with non-diabetics.

Also the results of the present study results were in the line with what reported by <sup>[23]</sup> they studied "The Relation of Diabetes Type 2 with Sexual Function among Reproductive Age Women in Iran", & revealed that all dimensions of sexual function in the diabetic women groups were impaired compared to the healthy women.

Also the present results were congruent with the results of <sup>[24]</sup>; they studied " Factors associated with sexual dysfunction in reproductive age women" & stated the scores of all dimensions of sexual function were significantly lower pre education ( $p < 0.05$ ) had improved after education which shows the interrelationship between various domains of women's sexual functioning.

The present results were in contradiction with the results of <sup>[25]</sup>; they examined "Factors affecting sexual function in premenopausal age women with type 2 diabetes" & revealed that there was no significant association between sexual function and age. While the present results came in the same line with <sup>[26]</sup>; they studied "Determinants of female sexual dysfunction in type 2 diabetes" and reported that age is a determinant of SD in patients with DM.

Based on our obtained results it's clear that there were statistical differences between FSD regarding to (desire, satisfaction & pain) and educational level which came in agreement with <sup>[17]</sup>. While the present findings are contradicted with <sup>[27]</sup>; who reported that there was no significant correlation between demographic and clinical characteristics and sexual dysfunction in diabetic women except for duration of diabetes. This contradiction might be due to conduction of studies in different socio-cultural environments & sociodemographic characteristics.

## Conclusion and Recommendations

### Based on the present study findings, the study concluded that

The current study concluded that implementation of counseling sessions based on PLISSIT model had a significant effect in improving the sexual function among diabetic women regarding to sexual desire, arousal, lubrication, orgasm and pain after six months of sexual counseling ( $P < 0.001$ ).

### In the light of the findings of the present study, the following recommendations are suggested:

- Increase women's awareness about factors affecting sexual health, how to manage and encourage them to seek help & discuss their sexual concerns with health care providers.
- Application of ongoing educational programs based on PLISSIT model for diabetic women in all available diabetic clinics or centers to improve women's sexual function.
- Adopting of sexual counseling based on PLISSIT model in addressing sexual dysfunction for diabetic women with Preparation of secure environment in the hospital outpatient units to discuss sexual problems with women freely.
- Integrate the concept of sexual counseling based on PLISSIT model in addressing sexual dysfunctions among diabetic women into undergraduate curricula of faculties of nursing.
- In service educational programs for care givers on how

to deal and manage various sexual dysfunctions for diabetic women by using PLISSIT counseling model.

- Sexual problems should be included in the Ministry of Health and Population plan to care for diabetic women with sexual dysfunctions using PLISSIT counseling model.

#### Further researches

- Further researches are needed in a larger probability sample in different geographical areas in Egypt, especially rural areas to figure out the main aspects of these problems & to implement PLISSIT counseling model for women with diabetes undergoing treatment.
- Further studies are needed to compare effect of PLISSIT model versus other models as ALARM model on improving sexual function among women with diabetes.

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