Letters

Study on Female Sexual Dysfunction in Type 2 Diabetic Chinese Women*

SHI Yao Fang[1,△], SHAO Xin Yu[1,△], LOU Qing Qing[2,3,#], CHEN Ya Juan[4], ZHOU Hui Juan[1], and ZOU Jian Ying[1]

1. Department of Endocrinology, The First Affiliated Hospital of Soochow University, Suzhou 215006, Jiangsu, China; 2. Department of Health Education, Jiangsu Provincial Hospital on Integration of Chinese and Western Medicine, Nanjing University of Chinese Medicine, Nanjing 210028, Jiangsu, China; 3. Department of Nursing, The Affiliated Sir Run Run Shaw Hospital, School of Medicine, Zhejiang University, Hangzhou 310016, Zhejiang, China; 4. Department of Endocrinology, the First Affiliated Hospital, Zhejiang University of Traditional Chinese Medicine, Hangzhou 310006, Zhejiang, China

Abstract

Objective To investigate the female sexual dysfunction (FSD) in type 2 diabetes patients, by comparing the sexual function between type 2 diabetic women and non-diabetic women with Female Sexual Function Index (FSFI).

Methods 115 type 2 diabetic women and 107 age-matched non-diabetes women were enrolled with similar backgrounds. Their sexual functions were evaluated with FSFI. Metabolic parameters such as body mass index, blood lipid profile, hemoglobin A1C, plasma glucose were also collected.

Results Total score of FSFI of the type 2 diabetic women were significantly lower than that of the non-diabetic controls (18.27±8.96 *vs.* 23.02±5.78, *P*=0.000). Scores of the FSFI domains (desire, arousal, lubrication, orgasm, satisfaction, pain) of the type 2 diabetic group were also lower than those of the control group. According to the FSD criterion (FSFI<25) available in China, the percentage of FSD in the type 2 diabetic group was significantly higher than that of the control group (79.2% *vs.* 55.0%, *P*<0.001). These trends seemed more prominent in pre-menopause subgroups. The logistic regression analysis indicated that age and diabetes were independent risk factors of FSD. Body Mass Index (BMI) also had influence in the diabetes group.

Conclusion Findings from this study showed that there are more FDS in Chinese type 2 diabetic women than in their non-diabetic counterparts, especially in pre-menopause participants.

Key words: Type 2 Diabetes; Woman; Female Sexual Dysfunction; Female Sexual Function Index (FSFI)

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INTRODUCTION

For cultural and ethnical reasons, sexual dysfunction has been neglected in China for a long time, as people are more likely to conceal their sexual problems than to ask for help[1]. Even in USA, the sexual dysfunction of men has always attracted more attention from academic circles than that of women[2]. Questionnaire study performed in physicians gave unoptimistic results of

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#Correspondence should be addressed to LOU Qing Qing. Tel: 86-25-85637831, Fax: 86-25-85502829, E-mail: louqq188@163.com

△SHI Yao Fang and SHAO Xin Yu contributed equally to this work.

Biographical note of the first authors: SHI Yao Fang, female, born in 1963, Bachelor of Nursing, majoring in Diabetes Education and Administration. SHAO Xin Yu, male, born in 1974, Ph.D, majoring in Clinical and Molecular Endocrinology.

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their knowledge, perceptions, and practices regarding female sexual dysfunction (FSD)[3]. On the other hand, surveys also showed that when women came up with sexual dysfunction, majority (53%) did not seek for help from health professionals[4]. As the result, social and psychological problems emerged[4].

Similarly, we have reasons to predict similar trends in China, in consideration of the conservativeness of most Chinese women. Also, studies from other ethnical groups indicated the positive relation between sexual dysfunction and diabetes mellitus[5-8].The past 20 years has witnessed the booming of diabetes in China, with which its complications are doomed to be a nightmare of public medical insurance system in the next 20 years[9-10]. This study was designed to investigate the status quo of FSD in China, the largest hometown of diabetes, calling more attention from all circles, and exploring factors influencing FSD in diabetic women.

RESEARCH DESIGN AND METHODS

From December 2010 to May 2011, 115 Chinese type 2 diabetic women from outpatient clinic of three major medical centers of Suzhou and Hangzhou were enrolled in the study. Patients were eligible if they 1) were 20-60 years old urban women, 2) had type 2 diabetes according to WHO criterion, 3) involved in a stable heterosexual relationship for the preceding 6 months and were not on oral contraceptives or corticosteroids, 4) were free of severe acute or other chronic complications of diabetes, 5) had no evidence of infection, malignant diseases, thyroid dysfunction, paralysis, heart failure, hepatic failure, uremia, psychiatric diseases or drug abuse, 6) were not in pregnancy or breast-feeding. Patients were compared with a control group of 107 age and background matched non-diabetic women from the same three medical centers. The study was approved by local ethical committees, and all participants signed an informed consent prior to participation.

In a calm and private environment, information was collected by means of questionnaires and Female Sexual Function Index (FSFI), which is a 19-item questionnaire providing scores on six domains of sexual function (desire, arousal, lubrication, orgasm, satisfaction, and pain) as well as a total score[11]. It is a well-accepted self-report instrument for assessing sexual function of women world-wide. According to the FSD survey performed in China[12], the criterion of the Female Sexual Dysfunction (FSD) on the total score of FSFI was less than 25, different from that of USA (less than 26.55)[13]. Other necessary information such as age, metabolic parameters, blood lipid profile, and personal history were also recorded. All the staff working for the study were trained and examined before the enrollment.

The data obtained from this study were presented as mean±standard deviation, and analyzed with *t*-test of independent samples, Pearson's chi-square test, and logistic regression by means of SPSS 11.5 software.

RESULTS

Altogether, 9 cases of type 2 diabetic women and 7 non-diabetic women were excluded for missing items or inconsistency in the filling of FSFI forms. After the screening procedure, there were 106 type 2 diabetic patients (55 from Hangzhou, 51 from Suzhou) and 100 non-diabetic controls (57 from Hangzhou, 43 from Suzhou). Data availability was 92.8%. Comparison of the general condition and metabolic parameters of the type 2 diabetic and control groups was listed in Table 1. The two groups were comparable in almost all aspects except for the course of diabetes, which was unavailable in the control group. The differences in the FSFI total score and six dimensions of sexual function between the two groups were also shown in Table 1, as we can see that significant differences exist in all aspects of the sexual function evaluated with FSFI.

To avoid the possible difference of multiple centers, we also compared FSFI and metabolic parameters of subjects from two cities, showing no significant difference (data not shown). And when analyses were performed separately in the two cities, there were similar differences between type 2 diabetic patients and controls (data not shown) in total score and six dimensions of FSFI as in Table 1, in which the participants from the two cities were analyzed together.

In consideration of menopause, the milestone on women's road of sexual function, we analyzed the sexual function separately with Pearson's chi-square test. As shown in Table 2, in pre-menopause groups, there were 28 women with FSD in total 68 non-diabetic controls (41.2%), and 43 with FSD in 61 type 2 diabetic patients (70.5%). The difference of FSD in pre-menopause diabetic and non-diabetic subgroups was statistically significant ($P<0.01$). In comparison, in post-menopause groups,

there were 27 women with FSD in total 32 non-diabetic controls (84.4%), and 41 with FSD in 45 diabetic patients (91.1%), showing that the difference was not statistically significant (P>0.05). Totally, there were 55% (55 in 100) FSD women in non-diabetic controls, and 79.2% (84 in 106) FSD women in diabetic patients, with statistically significant difference (P<0.01).

Table 1. General Condition and Female Sexual Function of the Participants

	Controls (n=100)	Patients (n=106)	P Value
Age	46.40±6.99	47.30±7.91	0.706
Education			0.654
Elementary school	28	19	
Junior middle school	41	24	
Senior middle school	20	21	
College and above	23	36	
Body mass index (BMI)	22.76±2.95	23.55±3.50	0.054
Menopause			0.121
Post-	32	45	
Pre-	68	61	
Childbirth delivery times			0.857
0	2	3	
1	71	72	
>=2	27	31	
Hemoglobin A1c (%)	5.28±0.51	7.73±1.93	0.000
Course of Diabetes (years)	N/A	4.90±4.21	N/A
HDL (mmol/L)	1.57±0.86	1.48±0.81	0.491
LDL (mmol/L)	2.44±1.10	2.79±1.55	0.133
TG (mmol/L)	1.43±0.83	1.79±1.95	0.134
Desire	3.04±1.04	2.43±0.99	0.000
Arousal	3.26±1.31	2.54±1.50	0.001
Lubrication	4.22±1.72	3.25±1.89	0.001
Orgasm	3.76±1.66	2.89±1.76	0.002
Satisfaction	4,27±1.33	3.63±1.25	0.002
Pain	4.37±1.74	3.52±2.03	0.009
Total FSFI Score	22.94±7.88	18.25±8.49	0.000
FSD number (percentage)†	55/100 (55.0%)	84/106 (79.2%)	0.000

Note. abreviations: HDL=High density lipoprotein; LDL=Low density lipoprotein; TG=Total triglyceride; FSD is defined as FSFI<25.

Table 2. FSD Numbers in Type 2 Diabetic and Control Groups Pre- or Post-menopause

	Controls (n=100)	Patients (n=106)	P Value
Pre-menopause (n=129)	28	43	0.001
Post-menopause (n=77)	27	41	0.289
Total (n=206)	55	84	0.000

Note. P value of comparison between type 2 diabetic group and control group.

As for the FSFI total score and six aspects, when we grouped the participants into pre-menopause and post-menopause subgroups, the difference between the diabetic and control groups seems more significant in pre-menopause subjects, as shown in Table 3. More fertile women with diabetes have problems in Desire, Arousal, Satisfaction and the total FSFI score, while the difference in post-menopause women with or without diabetes only exists in the dimension of Orgasm.

The logistic regression analysis indicated that age (regression coefficient=1.135, P=0.000) and diabetes (regression coefficient=3.480, P=0.002) were independent risk factors of FSD. However, hemoglobin A1c did not enter the regression equation. When we analyzed the type 2 diabetic group and control group separately, BMI (regression coefficient=0.842, P=0.031) entered the regression equation only in the diabetic group, implying a possible relation between obesity and FSD in diabetes women.

DISCUSSION

Female sexual dysfunction (FSD) is a more and more important problem for both clinical practice and academic research[11-14]. In China, where people's attitude toward sex is still rather conservative, sex is considered to be unimportant, shameful, and negligible[1]. It could partly explain why until recently the prevalence and criterion of FSD was evaluated in a Nanjing survey, which showed that the overall prevalence of FSD in urban female population was 56.8%, and the prevalence increased with age[12]. According to this only survey available in China[12], the criterion of the Female Sexual Dysfunction (FSD) in terms of the total score of FSFI was determined as less than 25 which is lower

Table 3. Female Sexual Function in Type 2 Diabetic and Control Groups Pre- or Post-menopause

	Pre-menopause			Post-menopause		
	Controls (*n*=68)	Patients (*n*=61)	*P* Value	Controls (*n*=32)	Patients (*n*=45)	*P* Value
Desire	3.350±0.970	2.847±0.889	0.003	2.229±0.862	1.978±0.869	0.218
Arousal	3.563±1.211	3.173±1.070	0.050	2.540±1.353	1.940±1.530	0.084
Lubrication	4.640±1.553	4.200±1.295	0.083	3.160±1.769	2.340±1.797	0.053
Orgasm	4.067±1.160	3.763±1.272	0.229	2.990±1.723	2.000±1.681	0.015
Satisfaction	4.780±1.469	3.557±1.437	0.048	3.141±1.124	3.286±1.210	0.153
Pain	4.983±1.146	4.430±1.282	0.153	3.330±1.969	2.840±2.216	0.333
Total Score	24.944±6.732	22.566±5.598	0.032	17.800±8.388	14.246±8.287	0.070

Note. *P* value of comparison between type 2 diabetic group and control group.

than that of USA (less than 26.55)[13]. Maybe by coincidence, this cutting point (<25) is the same with that of a Korean study[14], which was performed in a country with a very similar genetic, economic and cultural background. Based on this criterion, the percentage of FSD in non-diabetic population of our study was 55.0%, being rather close to the 56.8% of the Nanjing survey made in natural Chinese community population[12]. If taking the diabetic patients into consideration, which account for 9.7% of Chinese population and with a higher FSD percentage[10], our result will be even closer to the result of the Nanjing study.

Age was indicated in our data from this study as an independent risk factor in the development of FSD. Similarly, age might have influenced the FSD prevalence from other research studies in different ethnic groups. In our study, 79.2% of Chinese type 2 diabetic women suffered from FSD, which is a rather high percentage and is only lower than that of a Nigerian study (88%). Aside from the Nigerian study, the prevalence of FSD in diabetes patients was reported to vary from 27% to 71%[6,15-18]. The Nigerian study has the eldest participants (aged 50.5±8.2) and showed the highest FSD prevalence (88%)[8] while the Belgium study enrolled the youngest participants (age 34.4±8.5) and showed the lowest FSD prevalence (27%)[15]. In our study, both the prevalence and age was moderate (79.2%, age 47.3±7.9), similar to 70.7% of those of the study in USA[13].

Instinctively, for non-diabetic women, more that 50% of them suffered from FSD. Studies from different locations and races can justify the above mentioned prevalence. Although the ethnical, economical, educational, and cultural factors made the prevalence of FSD vary greatly among studies, our results are still in concordance with previous ones. For example, the prevalence of FSD of Korean population is 43.1% (<40yr of age)[14] and 52.1% (⩾40 yr of age)[19] which is similar with our findings. And our figure is very close to that of the Nanjing study, with a prevalence of 56.8%[12]. The two highest FSD prevalence we found in MEDLINE are 73.2%[20] of south India and 61% of Italy[21].

Diabetes should be considered a vital factor affecting the onset of FSD. In our results, significant differences existed between women with and without type 2 diabetes, especially in pre-menopause groups, which is younger and should have better sexual functions. The relatively less significant difference in post-menopause groups might be the result of the overwhelming senescence and the natural worsening of sexual functions both in diabetic and control groups accompanied with aging. Though presence of diabetes affects the FSD, hemoglobin A1c showed no solid relation with female sexual functions in the logistic regression analysis. One limitation of our study is the relative smaller number of the participants, which partly resulted from the design of the study requiring excluding those with severe chronic complications of diabetes. Another one, the lack of measurable parameters, is a common inevitable limitation of this sort of researches on female sexual functions. Unlike in the researches on male sexual dysfunction, we have nothing to measure, making interviews and questionnaires of different versions the only available approaches to this issue. FSFI may not be the best, but the most suitable parameter now. Even the hormone levels would not help much in the definition of female sexual functions, no more than ruling out the organic diseases.

Obesity was presented as a factor affecting FSD

in a survey made in New York[22]. Our study implied the same trend in the diabetic women group, whereas BMI did not affect the FSD that much in the non-diabetic group. Researches were therefore needed to further explore the mechanisms physiologically and psychologically.

Sexual dysfunction could bring women stress and undermine their social activity and cooperation with other people[1,4], which could predictably harm the overall control of life quality of diabetes patients. Although many diabetic patients suffered from FSD, quite a few of them were undiagnosed or neglected. It is the duty of medical professionals to arouse more attention of diabetic women to their sexual functions and give them more guidance and instructions. Also, FSD should be considered as one of the most common and important complications of diabetes.

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