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Title

Sexual health and function in women with diabetes.

Running title

Sexual dysfunction in women with diabetes

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Novelty Statement

- Women with diabetes are more likely to experience sexual dysfunction.
- Sexual dysfunction in women with diabetes is associated with depression, anxiety and difficulties in living with diabetes including body image issues and problems with the management of blood glucose levels.
- Sexual dysfunction and its role in wellbeing should be given parity with male sexual dysfunction and be routinely addressed in diabetes consultations.
- Women with diabetes and sexual dysfunction should be referred to targeted or holistic treatments.
Abstract

Sexual dysfunction for women with diabetes is more common than for women without diabetes. The reasons why women with diabetes are a high-risk group are numerous. For example, lack of vaginal lubrication, pain during sex and inability to orgasm can be a consequence of high or low blood glucose levels. Higher rates of depression in people with diabetes can lead to low sexual drive. Wearing of diabetes devices, such as pumps, glucose monitors or lumps from lipohypertrophy around insulin injection sites may affect body image and self-esteem and the inconvenience of self-managing diabetes may affect the spontaneity of sex. This narrative review provides an overview of the problem of sexual dysfunction in women with diabetes, current methods of assessing sexual dysfunction in women, pharmacological and non-pharmacological interventions to treat it and an example of how psychological support for women with diabetes who experience sexual dysfunction can be integrated into a diabetes service. There are still significant gaps in our knowledge in how best to support women with diabetes and sexual dysfunction. However, raising awareness of the problem may help women with diabetes and healthcare professionals to discuss it as part of diabetes clinical consultations.

Keywords

Women, Type 1 diabetes, Type 2 diabetes, sexual health, sexual dysfunction
Introduction

The problem of sexual dysfunction in women

Sexual activity is a human function and is associated with multiple health benefits, such as improved quality of life, quality of social relationships, mental well-being and is a good form of exercise (1). Female sexual activity involves a combination of emotional, cognitive and physical responses. There is increased blood flow to the genital region, including internal (vagina, clitoral bulbs) and external genitalia (vulva, clitoris, labia), increased vaginal lubrication, heart rate and respiration. There needs to be adequate blood supply to the genital region and normal functioning of the sensory and autonomic nervous system. The clitoris has erectile tissue similar to male erectile tissue and is governed by the nitric oxide (NO) cyclic guanosine monophosphate (cGMP) pathway in the same way as in men. Sexual dysfunction, however, is common and a UK study of female twins aged 18-85 years (N=1489) found it affected 15.5% of women across any stage of the lifespan, and was associated with relationship difficulties or psychological issues such as anxiety and obsessive compulsive disorder (2). Despite the fact that sexual dysfunction can cause significant distress and impact to women and their quality of life (3), we know that there is significant under-reporting of the issue as there is disparity between spontaneous reports of sexual dysfunction compared with screen detected sexual dysfunction in research trials. This suggests that around 80% of cases of sexual dysfunction may go un-reported (4). Diagnosis of sexual dysfunction can be made according to 4 categories in the Diagnostic and statistical Manual of Mental Disorders IV (DSM-IV) and correspond to a linear model of female sexual response (5). These include: hypoactive sexual desire disorder (absence or deficiency of sexual fantasies/desire); sexual arousal disorder (inability to attain or maintain sexual excitement); orgasmic disorder (delay or absence of orgasm); and sexual pain disorder (dyspareunia or vaginismus). However, in DSM-V this has been reduced to 3 categories, moving away from the traditional sexual response cycle and includes ‘female disorder of sexual interest/arousal’, ‘female orgasmic disorder’ and ‘genito-pelvic pain/penetration disorder’. For diagnosis of these specific categories of sexual dysfunction, each should be present for 75-100% of the time, for a minimum period of 6 months and cause women significant distress. The duration question was introduced with DSM-V to discriminate from sexual disorders that may be temporary or stress-induced (6). The 3 categories of sexual dysfunction are largely consistent with International Classification of Diseases-11 and the Fourth International Consultation on Sexual Medicine (ICSM) (6, 7).
The aetiology and epidemiology of sexual dysfunction in women

Sexual dysfunction in women is considered to have multi-factorial aetiology and there are specific biopsychosocial risk factors and contributors. DSM-V refer to a list of associated factors and ICD-11 to aetiological qualifiers (7). These include: relationship or partner factors, for example poor communication or discrepancies in desire for sexual activity, partner health status or sexual function; individual psychological or behavioural factors, including poor body image, history of sexual or emotional abuse, poor sleep hygiene (optimal sleep habits to improve sleep quality); psychological comorbidity, including depression and anxiety; socio-cultural stress, such as job loss, bereavement; cultural factors, such as cultural inhibition or attitude to sexual activity or pleasure; and medical factors, which include diabetes and other medically relevant factors relevant to prognosis, course and treatment. According to a recent systematic review and meta-analysis of 95 observational studies (N=215,740) the global prevalence of self-reported sexual dysfunction in women has been estimated as 41% (95% CI 37.1 to 44.7, I² statistic = 99.0%) amongst pre-menopausal women, however, prevalence is lower, 37% (95% CI 33.3 to 41.3) when validated measures of determining sexual dysfunction are used (62 studies included) (8).

Assessment of sexual dysfunction in women

Although sexual dysfunction in women is a common problem, assessment can be a sensitive issue for women to raise and discuss in a clinic consultation. Self-report questionnaires or clinician checklists may therefore assist women and healthcare professionals (HCP) to identify the specific problem. Longer questionnaires will typically map onto the 3 or 4 domains of sexual dysfunction referred to in DSM-IV and DSM-V. For example, the gold standard 19-item Female Sexual Function Index (FSFI) determines sexual function according to 6 domains including: sexual desire, arousal, lubrication, orgasm, satisfaction, and dyspareunia (pain) (9). It is scored on a 5 point scale with higher scores indicating less sexual dysfunction. However, there are shorter measures, such as the Brief Sexual Symptom Checklist for women (BSSC-W) and these may form the basis of more detailed discussion within the clinical setting (10). For a summary of assessment questionnaires, please see Table 1.

Once the specific problem has been identified any medical or physical causes should be investigated. This will involve detailed history taking and women should be asked about prior sexual abuse, genital mutilation, or trauma caused by childbirth. Physical examination may be indicated, and would need to be conducted by a gynaecologist. Factors such as medications that can influence sexual function and blood tests to identify underlying hormonal problems are also important, although there is a lack of association.
between hormone levels and sexual function (6). Medications such as anti-depressants and specifically Selective Serotonin Re-uptake Inhibitors (SSRI) can inhibit sexual function (11); chronic disease is known to affect normal sexual function including diabetes, hypertension, hypothyroidism, hypopituitarism and cancer; and finally depletion of oestrogens and androgens (5). Psychological assessment such as screening for anxiety and depressive disorders is also necessary as is measurement of daily stress and relationship factors.

The problem of sexual dysfunction in women with diabetes

Women with diabetes are thought to be at increased risk of sexual dysfunction and this is commonly cited in the sexual dysfunction literature. Prevalence rates among pre- and post-menopausal women with type 1 diabetes is thought to range between 27-71% (12) (13) (14) (15) (16) (17) and for women with type 2 diabetes between 42-53% (10, 15-19). A recent meta-analysis of 26 observational studies showed a higher prevalence of sexual dysfunction in women with any type of diabetes (n=3,168) and any duration (O.R. 2.02 [95% C.I. 1.49 to 2.72]) compared with controls (n=2,823) and higher BMI was significantly associated lower scores on FSFI (SMD -0.90, 95% CI -1.00 to -0.81).(18) Prevalence rates of depression were also higher in the women with diabetes (18). Depression and obesity are known to be associated with sexual dysfunction in women with diabetes, suggesting that improvement in either may also improve sexual function (18)(15). Enzlin et al, reported that women with type 1 diabetes who reached the cut-off for depressive symptoms on the Beck Depression Inventory were 4 times more likely to have sexual dysfunction (37.7% versus 8.3%, p<0.001) (14).

There are 3 diabetes-related issues that affect sexual function in women (19)(20)(21). First, physical problems related to sexual intercourse such as a lack of vaginal lubrication, pain during sex, and a lack of ability to orgasm, can all be a consequence of either high or low blood glucose levels (22). Second, that people with diabetes are twice as likely to experience depression and this is associated with reduced sexual drive (23). Third, specific problems related to diabetes can affect body image such as wearing of medical devices, scarring, lumps (lipo-hypertrophy) from injection sites (24). And finally, the daily demands of diabetes that relate to tiredness or inconvenience of diabetes management such as the need to test prior to sexual intercourse to avoid hypoglycaemia, or the fear of hypoglycaemia (25), may all affect the spontaneity of sex.
Awareness, identification and assessment of sexual dysfunction in women with diabetes

Identification of sexual dysfunction in women with diabetes appears to be the main problem preventing treatment. This is related to numerous factors. Women may not be willing to discuss the problems they experience with a HCP, we know from a cross-sectional questionnaire study (N=179) that ~70% of women with diabetes had not sought help from a HCP for their sexual dysfunction (21). Second, women may be unaware that sexual dysfunction might be diabetes-related, the same study identified that approximately 50% of women did not know this (21). Third that some structured education programmes, such as X-PERT Diabetes, Diabetes Education and Self Management for Ongoing and Newly Diagnosed (DESMOND) and Dose Adjustment For Normal Eating (DAFNE), in the UK do not discuss it, perhaps because this is not recognised as a problem in UK diabetes guidelines (26). Fourth, that diabetes specialists might be more concerned with preventing un-planned pregnancy in women with diabetes, a significant issue for women with both types of diabetes (27) (28) rather than the problems experienced by women with sexual dysfunction or feel awkward initiating a conversation (28). And finally, that although sexual dysfunction is seen as important to wellbeing in men with diabetes HCPs may be unaware of the impact of sexual dysfunction for women (29).

Given that diabetes specialists are more likely to routinely discuss issues of sexual dysfunction with men with diabetes, a recent survey indicated that around 60% of men in a hospital diabetes outpatient clinic were screened, albeit after some awareness-raising (30), failure to give equal weight to the concerns of women could potentially be viewed as discriminatory. Sexual dysfunction is known to be an indication of cardiovascular complications in men (31), and there is evidence women with diabetes and sexual dysfunction may experience cardiovascular and neurological complications also (22) (32) (33). For example, in the Diabetes Control and Complications Trial/Epidemiology of Diabetes Interventions and Complications (DCCT/EDIC) women with type 1 diabetes and sexual dysfunction (n=153) had increased odds of developing cardiovascular autonomic neuropathy (OR 1.52, 95% CI 0.89-2.61) (22). Furthermore, in a study comparing 30 women with diabetes and 20 normal sexually active women, the diabetes group had reduced sensation around genital sites although this was not associated with sexual dysfunction score on the FSFI (34). Therefore, the presence of sexual dysfunction in women could be a sign of advanced diabetes complications and warrants further investigation of other known diabetes complications.

Treatment of sexual dysfunction in women with diabetes may involve improving diabetes self-management, and so diabetes specialists are already required to be part of the treatment process. However, awareness of the issue amongst diabetes specialists has not been widely considered nor is there currently an awareness or scoping of the resources available to support women and HCPs, although
diabetes charities, such as Diabetes UK and the Diabetes, Research and Wellness Foundation, have recently published advice for women on their websites and in the form of leaflets (21). Similarly, there are pockets of treatment excellence for women with sexual dysfunction and diabetes to access, such as a fully integrated diabetes and psychotherapy service for Sussex Community NHS Trust. – Diabetes Care for You (DCFY) which is described in more detail below.

Current evidence for intervention and treatment for sexual dysfunction in women with diabetes

Pharmacological interventions

1. Phosphodiesterase 5 (PDE 5) inhibitors

Phosphodiesterase type 5 (PDE5) inhibitors, such as Sildenafil (Viagra), Tadalafil (Cialis), Verdenafil (Levitra) and Avanafil (Stendra), are licensed for the treatment of erectile dysfunction in men with diabetes. It is thought that they may also improve blood flow to the clitoris and restore some sexual function for women. However, they are not licensed for the treatment of women with sexual dysfunction as the evidence for their use is inconclusive. It is thought that for women sexual dysfunction is not solely a physical issue and these treatments will not improve the psychological sexual response (29).

There have been a few small pilot trials in women with type 1 diabetes. For example, in a randomised double blind crossover trial using Sildenafil (Viagra), 36 premenopausal women with sexual arousal disorder and type 1 diabetes were assigned to 2, 8 week periods of Sildenafil 100mg, washout and placebo in 2 possible sequences (35). Results demonstrated statistically significant improvements in arousal (d = 1.21), desire (d = 0.36), orgasm (d = 0.99), enjoyment of sexual activity (d = 0.18), measured using the Personal Experiences Questionnaire and objective measurements of blood flow to the clitoris were improved. Although some improvements in sexual function could be established from these results, it has been argued that there are significant issues related to the methodology of this study (36). For example, a non-validated questionnaire was used to assess the experience of the participants, along with a small sample size (36).

Furthermore, results from a placebo controlled crossover study using 5mg Tadalafil in premenopausal women with type 1 diabetes and sexual genital arousal disorder (SGAD) (37), a disorder mostly common in women, characterised by spontaneous genital arousal which is triggered by sexual or non-sexual stimuli that is unresolved by orgasm, suggest it is effective in improving arousal. A statistically significant improvement of sexual genital arousal (d = 1.85), sexual enjoyment (d = 0.74), orgasm (d = 1.08),
satisfaction with frequency of sexual encounters \((d = 1.08)\) and sexual thoughts or fantasies \((d = 1.86)\) \((p<0.005)\) was demonstrated between baseline measures and at 12-week follow-up (37). The women on Tadalafil moreover reported an enhanced quality of their sex life compared with the control group (37).

There were significant limitations associated with this study. For instance, no control group existed for the group of women with type 1 diabetes and no SGAD.

Other clinical trials using Sildenafil in postmenopausal women have, nevertheless, been conducted with unsatisfactory results. For example, a clinical trial assessed the effect of Sildenafil on sexual functioning in oestrogenised and non-oestrogenised women (38). Of the oestrogenised women, \(n = 143\) received 50mg of Sildenafil, while \(n = 103\) non-oestrogenised women received between 25mg and 100mg of Sildenafil. The results showed a non-significant improvement in physical response during sexual activity, as measured by the Global Efficacy Questionnaire, a patient-reported outcome measure typically used in studies of male erectile dysfunction which is answered ‘yes’ or ‘no’ according to perception of improvement (38).

For women with type 2 diabetes PDE5 inhibitors have been tested to improve heart failure rather than to treat sexual dysfunction. Hyperglycaemia, dyslipidaemia, and reduced nitrous oxide (NO) production can lead to endothelial dysfunction, adipose tissue dysfunction and heart failure in type 2 diabetes. Whereas treatment with PDE5 inhibitors can reduce tissue inflammation, oxidative stress and increase NO production ameliorating cardiovascular complications (39). The jury is still out as to whether women with type 2 diabetes benefit as much as men and more research is needed (39).

2. Hormone replacement therapy

Over time steroids produced by the ovaries, oestrogen, testosterone and progesterone, decrease as women approach the menopause. Reduction in sexual desire occurs at the same time as it is known that oestrogen and testosterone are involved in its regulation (40). Hormone Replacement Therapy (HRT) usually includes oestrogen with or without progesterone and can reduce symptoms of the menopause, osteoporosis and improve sexual function and would therefore seem to be a useful treatment. This is now more uncertain as results from the Women’s Health Initiative trial indicated that HRT increased risk of breast cancer as well as cardiovascular disease which means that it is now considered to be a short-term treatment for menopausal symptoms, and is less widely prescribed than previously (41).
In men reduced testosterone is associated with onset of type 2 diabetes (42), and is often prescribed to improve sexual function. Whereas, for women higher plasma levels of oestrogen and testosterone are associated with insulin resistance and incidence of type 2 diabetes (43). Testosterone treatment is thought to boost sexual function in postmenopausal women when it is added to conventional hormonal therapy (44), but trials have not specifically included women with diabetes. For example, in a 6-month, placebo-controlled, double-blind trial, 272 naturally menopausal women with hypoactive sexual desire disorder (HSDD) were randomly assigned to receive a transdermal testosterone patch (300 mcg/day) twice per week, or an identical placebo (45). The outcome variables assessed were the sexual desire domain using the Profile of Female Sexual Function, psychological distress using the Personal Distress Scale and the 4-week frequency of satisfying sexual episodes (SSE) using the Sexual Activity Log (45). The intervention group showed significant improvements in sexual desire (d = 0.01, p = 0.0007) and SSE (d = 0.21, p = 0.0089), and a significant decrease in distress (d = 0.15, p = 0.0024) at 6-months follow-up compared to the control group (45).

Some evidence has failed to demonstrate the effectiveness of Sildenafil on sexual function in women who receive hormonal therapy. For example, evidence from randomised, double-blind crossover study conducted using Sildenafil for postmenopausal women with sexual dysfunction receiving hormonal therapy, found that Sildenafil did not have an overall effect on orgasm latency (P > 0.05) (refers to the amount of time it takes from start of stimulation to orgasm, improvement is associated with a decrease in orgasm latency, i.e. less time to achieve orgasm) (46). It was however established that women with minimal changes in vaginal vasocongestion (tissue swelling due to increased blood flow) at baseline, had significant improvements in vaginal vasocongestion in the follow-up session compared to the control group (P = 0.044). This suggests that a single oral dose of 50mg Sildenafil may help improve vaginal vasocongestion among women who experience minimal changes in vaginal vasocongestion when exposed to erotic stimuli (47).

3. Anti-depressant therapy

There is some evidence to suggest that treating depression in diabetes can lead to improved sexual function. Most anti-depressants such as Selective Serotonin Re-uptake Inhibitors (SSRI) are associated with reduction in sexual functioning (48). However, bupropion (BU) is an atypical anti-depressant (a norepinephrine-dopamine reuptake inhibitor (NDRI), commonly used in smoking cessation and to treat major depressive disorder (MDD), is thought to improve sexual dysfunction in women with type 2 diabetes (49).
diabetes and MDD (49). In a secondary analysis assessing sexual functioning, mood and glycaemic control in 90 women with type 2 diabetes, of which 63.3% were women treated with BU for MDD, results revealed that 71.1% of patients had insufficient sexual functioning at baseline. However, mean sexual energy scores improved significantly during treatment with BU (49). Furthermore, it was established that mean sexual energy scores were improved among participants with hyperglycaemia and persistent depression (25.9% and 18.2% respectively) (49). It was therefore concluded that BU treatment for MDD in women with diabetes may significantly improve sexual function, mood and glycaemic control. Improvements in sexual functioning was however also demonstrated in approximately 20% of women with persistent MDD and hyperglycaemia, suggesting that BU treatment may enhance sexual functioning, regardless of improvements in mood and glycaemic control.

Non-pharmacological interventions

1. Weight-loss

Treating sexual dysfunction by reducing weight and perhaps thereby improving perceived body image may be a useful strategy for treatment. Wing et al, (2013) (50), in the Look AHEAD study demonstrated that obese women with type 2 diabetes who participated in a RCT of intensive lifestyle intervention that there was a statistically significant improvement in sexual function based on the FSFI compared with controls at 1 year follow-up (50). Improvements in sexual function, using FSFI scores, have also been demonstrated for women, some of whom had diabetes, who have undergone bariatric surgery (51).

2. Psychological interventions

Attempts to implement psychological interventions to improve sexual dysfunction have been made. Among such interventions are the Permission, Limited Information, Specific Suggestions and Intensive Therapy (PLISSIT) framework which has been developed to assist treatment of sexual problems. This framework encompasses four stages: Permission which relates to giving the patients permission to raise sexual issues, Limited Information which relates to giving the patients limited information about sexual side effects of treatment, Specific Suggestions which entails suggestions based on comprehensive evaluation of presenting problems, and Intensive Therapy which refers to includes psychological intervention, biomedical and/or sex therapy (52) (53). Limited evidence currently exists on the effectiveness of the PLISSIT framework for women with diabetes.
However, the PLISSIT framework has been successfully implemented in controlled trials for women with gynaecologic cancer (54) breast cancer (55) and sexual dysfunction. For example, 61 women with gynaecologic cancer were randomly assigned to an integrative 6-hour programme, developed with the PLISSIT framework and focused on psychosocial aspects of women’s sexuality (54). The FSFI was used to assess sexual function. Results showed a statistically significant group difference in the sub-domains of the FSFI, including satisfaction, orgasm, lubrication, arousal and sexual desire. No significant group differences were however established for the sub-domain of pain on the FSFI (54).

Interventions already available within clinical practice, an example of an NHS pathway

The Diabetes Care for You (DCFU) service is a fully integrated diabetes and psychotherapy service which was developed in accordance with NHS care guidelines. During the diabetes review, both men and women are asked about their sexual health and should they wish to discuss any concerns, this can be done during the consultation. A clinic handout addressing sexual health is also provided. This handout addresses high blood glucose levels and how these may affect sexual difficulties in women, including thrush, painful intercourse and reduced desire due to menopause or depression and/or anxiety. This handout also explains treatment options for any of the sexual health difficulties. Additionally, enquiring about emotional problems that may affect sexual feelings are equally important, and to screen for depression and diabetes distress the patient health questionnaire 2 (PHQ2) (56) and diabetes distress scale 2 (DDS2) (57) are completed by the individual during their clinic conversation and any concerns regarding their psychological wellbeing are discussed with the diabetes psychotherapy team within the service. People identified as being distressed or depressed are referred with their permission to the psychotherapy team within the service for triage into the pathway. Improvements in overall wellbeing including diabetes distress and HbA1c levels are measured at the end of therapy. The recognition of sexual dysfunction in women with diabetes within this service was particularly commended when DCFY won the 2019 UK Quality in Care (QiC Diabetes) award under the Mind and Body Healthy Together category. An overview of the issues related to sexual dysfunction in women in diabetes can be seen in figure 1.

Discussion
Sexual activity is a normal human function and has associated health benefits. However, sexual dysfunction is common in women and is associated with distress and poor quality of life. Diagnoses of sexual dysfunction can include, lack of sexual interest, problems with orgasm and pain and or penetration difficulties. Whilst there are multiple biopsychosocial risk factors for sexual dysfunction, diabetes is consistently identified to be a cause.

The global prevalence of sexual dysfunction in women is high but for women with diabetes rates are typically twice as high and there are specific diabetes-related issues affecting sexual function in women including, lack of vaginal lubrication, painful sex, a lack of ability to orgasm owing to either high or low blood glucose levels, body image because of scarring or wearing of medical devices and the daily demands of diabetes (21). Despite the increased prevalence of sexual dysfunction in women with diabetes it is rarely identified and therefore often goes undetected (21). This can be due to a combination of factors including unwillingness on the part of the woman to discuss their issues and the fact they may not be aware that some are related to diabetes and the fact that many HCPs are also not aware that this is a potential problem or feel embarrassed to ask women about their sex life.

Treatments for sexual dysfunction for women with diabetes using pharmacotherapy, such as PDE5 inhibitors, e.g. Sildenafil and Tadafil, have demonstrated improvements in sexual arousal for example but most studies have limitations such as using non-validated questionnaires to measure outcome, small sample sizes and a lack of an appropriate control group (38) (37). Also, none have been conducted in women with type 2 diabetes and sexual dysfunction and currently the evidence is inconsistent meaning these treatments are not licensed. Bupropion, a norepinephrine re-uptake inhibitor anti-depressant, has demonstrated some improvements in sexual function in people with type 2 diabetes and major depression but this was a secondary analysis (49). There is currently a dearth of psychological interventions although there is one trial planned and a meta-analysis of 20 studies in women without diabetes psychological interventions are associated with improvements in orgasmic disorder (d=0.46, 95% CI 0.07 to 0.86) (58). Few clinical diabetes services screen or treat women with sexual dysfunction and unlike erectile dysfunction in men, sexual dysfunction in women is not recognised as a problem in diabetes clinical guidelines (26). It is possible that women who may experience a lack of vaginal lubrication may find topical oestrogens or lubricants effective. Additionally, if the issue is arousal stimulation of the clitoris with a vibrator could help. Couples therapy and relationship counselling may assist with relationship difficulties and may be accessed via a general practitioner (GP). Optimisation of blood glucose control may rectify some of the issues for women with diabetes and that is why discussion within the diabetes consultation is important. Therefore, although there are potentially some treatments
or strategies available via the diabetes team or GP there remains both a research and treatment gap for women with diabetes and sexual dysfunction. To date there have been no qualitative studies specifically documenting the experiences of women with diabetes and sexual dysfunction which may inform future intervention studies and the provision of health services.

In summary, levels of sexual dysfunction among women with diabetes are high and can correlate with depression, anxiety and difficulties in living with diabetes including body image issues, cardiovascular risk and hyper or hypoglycaemia. Untreated sexual dysfunction can lead to relationship difficulties and breakdown. Sexual dysfunction and its role in wellbeing should be given parity with male sexual dysfunction in diabetes consultations and targeted or holistic treatments need to be made available in diabetes services.

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Table 1. Female sexual dysfunction screening measures

<table>
<thead>
<tr>
<th>Measure</th>
<th>population</th>
<th>items</th>
<th>domains</th>
<th>reference</th>
<th>comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>19-item Female Sexual Function Index (FSFI)</td>
<td>female</td>
<td>19 items</td>
<td>6: sexual desire, arousal, lubrication, orgasm, satisfaction, and dyspareunia (pain).</td>
<td>(9)</td>
<td>Considered to be gold standard</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Each item score ranging from 0 to 5.</td>
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<td></td>
<td></td>
<td></td>
<td>Higher score = less sexual dysfunction</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td><strong>6-item Female Sexual Function Index (FSFI)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>6 items</td>
<td>6 domains: desire, arousal, lubrication, orgasm, satisfaction, pain</td>
<td>(59)</td>
<td>Screening tool indicates need for further investigation. More suitable for clinical practice.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>lower scores indicate worse sexual functioning</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Massachusetts General Hospital Sexual Function Questionnaire (SFQ)</td>
<td>Males and Females</td>
<td>5-items: graded on a 6-point scale, ranging from greater than normal (a score of 1 indicating superior functioning), to normal (a score of 2), to totally absent (a score of 6 indicating impairment in that domain).</td>
<td>(60)</td>
<td>Can discriminate between: hypoactive sexual desire disorder, female sexual arousal disorder, female orgasmic disorder, and dyspareunia</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>5: (1) interest in sex, (2) ability to become aroused, (3) ability to achieve orgasm, (4) ability to achieve and maintain an erection (men only), (5) overall sexual satisfaction</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Test Name</td>
<td>Version</td>
<td>Number of Items</td>
<td>Description</td>
<td>Number</td>
<td>Notes</td>
</tr>
<tr>
<td>-----------------------------------------------</td>
<td>---------</td>
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<td>-----------------------------------------------------------------------------</td>
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<td>------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Brief Sexual Symptom Checklist for women (BSSC-W)</td>
<td>Female</td>
<td>10 items</td>
<td>5: Sexual interest, problems with decreased sensation, lubrication, orgasm, pain</td>
<td>(7)</td>
<td>There is also a male version. Used as a pre-consultation screener.</td>
</tr>
<tr>
<td>Female Sexual Distress Scale Revised (FSDS-R)</td>
<td>women</td>
<td>A 13-item self-report</td>
<td>Not specified</td>
<td>(61)</td>
<td></td>
</tr>
<tr>
<td>Changes in Sexual Functioning Questionnaire (CSFQ)</td>
<td>Female version</td>
<td>35 items</td>
<td>5 domains: Sexual desire/frequency, sexual desire/interest, arousal/excitement, orgasm/completion</td>
<td>(7)</td>
<td>Initially designed to assess sexual function associated with psychiatric illness and medication effects. More often used in clinical trials.</td>
</tr>
<tr>
<td>Changes in Sexual Functioning Questionnaire 14 (CSFQ-14)</td>
<td>Female version</td>
<td>14 items</td>
<td>5 domains: Sexual desire/frequency, sexual desire/interest, arousal/excitement, orgasm/completion</td>
<td>(62)</td>
<td>Useful for clinical practice</td>
</tr>
<tr>
<td>Decreased Sexual Desire Screener (DSDS)</td>
<td>Males and female</td>
<td>5-item</td>
<td>1: sexual desire and interest Plus potential</td>
<td>(63)</td>
<td>Diagnosis of generalized acquired Hypoactive</td>
</tr>
<tr>
<td>Sexual Interest and Desire Inventory-Female (SIDI-F)</td>
<td>women</td>
<td>17-item</td>
<td>Sexual Desire Disorder (HSDD), clinician administered</td>
<td></td>
<td></td>
</tr>
<tr>
<td>--------------------------------------------------</td>
<td>-------</td>
<td>---------</td>
<td>---------------------------------------------------</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reason for decreased sexual desire/interest</td>
<td></td>
<td>1: sexual desire&lt;br&gt;Plus comorbid factors</td>
<td>(64) clinician-administered instrument, evaluates severity of HSDD</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Figure 1 - Sexual dysfunction in women with diabetes

- Sexual arousal disorder
- Orgasmic disorder
- Pain/penetration disorder
- Depression
- Body image
- Hypoglycaemia
- Hyperglycaemia/vaginal lubrication

Assessment
- Use questionnaires or checklists, e.g. FSFI, BSSC-W

Psychological support
- Diabetes self-management support
- Onward referral

Diabetes related factors and sexual function
Identification
Treatment