**Diabetes and Female Sexual Health: An Ongoing Challenge**

Short title: Diabetes and Female Sexual Health

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**Diabetes and Female Sexual Health: An Ongoing Challenge**

**Abstract**: (250/250 words)

**Objective**: Female sexual health remains a much-neglected area in diabetes clinical medicine however it is important for psychological and social well-being as well as reproductive function. We aimed to explore the views of women regarding the impact of diabetes on sexual health beyond pregnancy and reproduction.

**Research Design and Methods**: An online survey distributed via social media platforms including Twitter, Facebook and LinkedIn remained open for four weeks. Questions addressed a range of medical and psychological factors including body image, self-esteem and confidence.

**Results**: 258 participants completed the survey, aged 18-73 years. Results show a significant deterioration over past 20 years, with issues including negative impact on self-esteem (68.6%) and relationships (61.6%), feeling less attractive (57.8%), feeling lonely/isolated (66.3%), worries about fertility (52.7%) and pregnancy (69.4%) and worry about diabetes being passed on to children (79.5%). Medical factors included vaginal infections (77.9%), dyspareunia (51.2%), general orgasmic problems (57.4%). Almost half (49.2%) were unaware that these problems were more common in women with diabetes. Shorter duration of diabetes was negatively associated with self-esteem (p=<.002), loneliness (p=<.001), impact on relationships (p=<0.017). Those without children and those aged under 35 years were more worried about fertility (p=.000) and pregnancy (p=.000).

**Conclusions**: Sexual health issues continue to pose challenges for women with diabetes in terms of medical and psychological challenges. The psychosocial aspects of diabetes and sexuality, including feeling unattractive both physically and emotionally are widely reported by participants, demonstrating the very damaging and distressing personal consequences.

**Key Points:**

* Sexuality is a defining aspect of oneself.  It goes beyond conception care and pregnancy.
* Sexual health is an integral part of overall health, well-being and quality of life.
* Diabetes has been shown to have a significant detrimental effect on sexual health and well-being.
* Women report feelings of isolation, low self-esteem, poor body image and loss of enjoyment or engagement in sexual activity.
* It is clear that there is a need for support/resources to be readily available as well as heightened HCP awareness to help individuals.

**Background**

Female sexual health remains a much-neglected area in diabetes clinical medicine however it is important for psychological and social well-being as well as reproductive function. Sexual health issues for women go beyond pre-conception care and pregnancy. Female sexual dysfunction is associated with both type 1 and type 2 diabetes [1] with a meta-analyses of 26 studies comparing 3168 women with diabetes with 2832 control participants reporting the risk for sexual dysfunction was 2.47 times greater for women with diabetes [2] Contributing factors include interpersonal, social, psychological and biological.

Normal sexual function in women occurs through an interaction between emotional and physical wellbeing, however this complex interaction may be modified by disease, anatomic, physiological and/or emotional causes [3]. Given the complex nature of diabetes and its complications in terms of the physical and psychological issues involved, it is unsurprising that female sexual health is markedly affected by this condition. There are no specific guidelines available to support women, however effective treatment requires psychological and pharmacological approaches. Many women are unaware that treatments are available nor where to seek help.

A further complicating factor is that women with diabetes are at increased risk of developing depression [4]which is the most well-established risk factor for female sexual dysfunction in women with diabetes [5-7] and which can impact on all stages of sexual functioning [5]. In addition, psychological challenges in diabetes may negatively impact on sexual function, including low self-image, tiredness and dependency on others [8,9].Diabetes in itself has negative psychological effects on sexual function beyond any medical aspect [8,10], with women viewing themselves as less attractive and less happy. They also report less satisfaction with their sexual partner, sex life in general, lubrication and orgasm.

Twenty years ago, a study by Meeking et al [11] (*n*:161) reports medical issues related to pregnancy (43%), contraception (33%), dyspareunia (painful intercourse) and general orgasmic problems (50%), genito-urinary infection (23%). They further report a number of psychological issues including low mood, anxiety and poor self-image. Furthermore, loss of self-esteem, loss of attractiveness, loneliness and isolation and relationship difficulties attributed to diabetes were common. Additional diabetes-attributed factors affecting sexual health for women included tiredness, anxiety/worry, anger/irritability and depression. It is unclear the extent to which these problems persist and the impact they have on women today.

The aim of the current study was to explore the impact of diabetes on female sexual health in terms of medical and psychological aspects, relationships and help-seeking behaviours with a view to developing appropriate support resources if required.

**Methods**

A questionnaire study delivered online via social media platforms was conducted. Participants were women with diabetes of any type or duration. Data was collected via links on Twitter, Facebook and LinkedIn over a four-week recruitment period. Institutional ethical approval was obtained from Bournemouth University and informed consent received prior to survey completion. The survey contained 54 items including free text response questions so that participants could provide further detail to their responses if desired. Most questions replicated those in the Meeking study (1998) (see supplementary material for full survey).

The questionnaire was piloted with four women with diabetes prior to use to ensure the final version was acceptable and relevant. No revisions were suggested or made to the final version. Descriptive and inferential statistical analyses were conducted using SPSS.22 with content and thematic analyses conducted on the free text responses. Two researchers experienced in qualitative research methods analysed the free text responses and conducted thematic and content analyses thereof.

**Results**

We received 258 completed survey responses from women aged 18-73 years of whom 212 (82.2%) were sexually active. Demographic data is presented in Table 1. Results show statistically significant deterioration in psychosocial outcomes in the current study compared with data presented in the Meeking study (all p=<0.001). Shorter duration of diabetes (less than 10 years) was negatively associated with self-esteem (p=<.002), loneliness (p=<.001), impact on relationships (p=<0.017). Data presented in Table 3.

Most (69.4%, *n*=179) had not sought help from a healthcare professional for sexual health related medical problems. 77.9% (*n*=201) of participants were unaware of any treatments available. Almost half (49.2%) were not aware that any of these problems were more common in women with diabetes. Specific detail is presented in Tables 4.

Over half of participants (52.7%, *n*=136) reported having worried that diabetes may affect their fertility with 69% (*n*=179) having worried about diabetes affecting their ability to become pregnant. Participants aged <35 years were over three times more likely to be worried about fertility (OR=3.15) than those aged >35. This relationship was statistically significant (p=0.000). Furthermore, participants aged <35 years were also over five times more likely to be worried about pregnancy (OR=5.08) than those >35. Again, statistically significant (p=0.000). Those without children were twice as likely to be worried about fertility (OR=2.49) and almost twice as likely to be worried about pregnancy (OR=1.82). These differences were both statistically significant (p=<0.001).

Three quarters of participants (76.4%, ­n­=197) reported that their diabetes-related medications had not negative impacted their sexual relations, despite concerns regarding injection sites and visibility of medical devices. Many (42.2%, n=109) participants that a doctor or nurse has not discussed pregnancy planning with them. Two thirds of participants (67.4%) reported that diabetes had not affected their choice of contraception. Participants with children were not more concerned about passing on diabetes than those without children (p=.409).

A selection of the free text responses is presented below. Content analyses is shown in Table Five, with the key themes for each of the individual items showing the number of responses falling under each theme for each item. Results show that ‘loss of self-esteem’ and ‘feeling less attractive’ are mostly associated with difference from others/loneliness/stigma and lack of understanding as well as body-image, feeling judged and the presence of technology. ‘Loneliness/isolation’ and ‘negative affect on relationships’ are associated with difference from others and low mood/burnout/tiredness.

Loss of self-esteem

‘Made me feel worthless and broken’ (181)

‘I’m broken. I broke myself. The rollercoaster that we sometimes ride despite the insulin, exercise, food and everything else makes it seem like we’re failing, even though we’re doing our best’ (251)

‘Embarrassed, misunderstood, criticised’ (253)

‘Diabetes has made me extremely self-conscious in all aspects of my life’ (173)

‘Weight fluctuations. Bruises. Devices attached. Diet is hard I feel broken, like I’m defective in some way’ (138)

Feel less attractive

‘People’s perceptions are that I’m a high-risk partner and, let’s be honest, hypos aren’t attractive’ (017)

‘Wearing devices, having scars from cannulas’ (058)

‘I feel that my diabetes is a judgement making me ugly fat’ (133)

‘When my boyfriend sees me having low hypos …. When I’m sweaty and shakey and feeling really rough I struggle a bit’ (149)

‘I feel as though I’m less desirable’ (170)

‘I feel as though people wouldn’t want to be with me as I am diabetic’ (181)

Diabetes led to loneliness or isolation

‘My husband is not interested so I cannot discuss it with him, friends do not understand the full complexities’ (009)

‘Scared of going out .. would always just stay in my room’ (018)

‘No-one seems to listen and actually hear what you are saying! (093)

‘At times, it’s like living with a death sentence. Not easy to share that’ (102)

‘I avoid spending time going out because of the temptations or sadness at watching others indulge (133)

‘felt like no one understood it’ (224)

Diabetes had a negative effect on relationships with a partner/potential partner

‘Lack of sexual interest is significantly impacting on my marriage’ (249)

‘I resent him for never taking an interest after the initial diagnosis’ (250)

‘Having to explain it all, having hypos and feeling humiliated, hospitalisation, complications, endless blood tests and meds, feeling disgusting is not conducive to a healthy relationship’ (159)

‘… my partner is often very worried about my diabetes and is more anxious about my blood sugars than I am when all I need is for him to be calm’ (129)

‘I take anger out on him’ (84)

‘Don’t love my husband any more’ (51)

**Conclusions**

Two hundred and fifty-eight women participated in the survey. Sexual health issues continue to pose challenges for women with diabetes both in terms of medical issues and psychological challenges. The psychosocial aspects of diabetes and sexuality, including feeling unattractive both physically and emotionally are widely reported by participants with the free text data demonstrating the very damaging and distressing personal consequences.

The psychological challenges posed by sexual health issues for women with diabetes remain particularly concerning, with considerable deterioration in several areas. Loss of self-esteem, feelings of unattractiveness and loneliness/isolation were highly prevalent both in the Meeking study and considerably worse in the current study. These debilitating psychological consequences are severely limiting for women. It is perhaps unsurprising that almost two-thirds of current study participants reported that diabetes had a negative effect on their relationships with a partner or potential partner. Furthermore, such self-loathing and despair negatively impacts on women’s life choices as their expectations are reduced, including academic attainment, employment opportunities and social relationships [12]

There are some similarities and notable differences between the data reported by Meeking twenty years ago with medical issues data reported here, for example dyspareunia increased from 43% to 51.2%, general orgasmic problems increased from 50% to 57.4% and vaginal infections increased from 23% to 78.7%. Whilst more women in the current survey had sought medical advice for difficulties with sexual function (30.6% compared to 17%), this did not seem to have impacted the number of women who were aware that treatment was available (22.1% current study compared with 20%). Despite treatments being available, it is unknown what treatment recommendations were made to the 30% of women who sought medical advice.

There remains a lack of education around diabetes risks in terms of pregnancy worries and anxiety associated with hereditary risk of diabetes on potential children. Concerns regarding the passing on of diabetes to children remained static at 79.5% (compared to 75%). Worries about fertility increased considerably from 31% to 52.7% and worries about becoming pregnant also increased from 43% to 69.4%. As can be seen from the data, there are clear sub-group differences in the current study. It appears women’s willingness to discuss these concerns with healthcare professionals has barely changed over the decades with 57.4% in the current study compared to 66% in the Meeking study.

Pre-conception care and pregnancy support have received much focus over recent years. Developments in diabetes technologies, such as continuous glucose monitoring systems and clinical trials in automated insulin delivery during pregnancy have resulted in improved glycaemic control and quality of life for women with diabetes. Broader sexual health issues, however, have received scant attention yet remain a widespread problem.

The strengths of the current study include the large participant numbers and replication of previous research, enabling comparisons to be drawn across a twenty-year period. The inclusion of quantitative and free-text data provides both overall numbers but also the meaning behind those numbers, which demonstrates the depth of the negative impact that sexual health issues has on the everyday lives of women. The study is not without limitation however with self-selecting participants potentially not being representative of the broader population of women with diabetes. Data was collected via social media internet recruitment and so may not have included those without regular access to the internet. Office for National Statistic data shows that over 90% of households have internet access, however this still excludes 10% of the population and diabetes affects all sectors of society. Furthermore, this data is predominantly explorative in nature and, despite the free text response options, may have limited participants’ ability to report broader issues that may affect their sexual health.

Further research is required, and we are currently conducting in-depth qualitative research to better understand the needs and desires of women to develop resources, as well as developing tools to assist healthcare professionals to initiate conversations regarding sexual health issues with their patients. Cultural factors will surely play a role and these should be considered in future research.

**Author Contributions**

KB, ST and DM developed the research project, KB led on data analyses with DN, CR. All authors interpreted the data and contributed to article writing.

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**Conflicts of Interest**

None reported

Table One: Demographic Data

|  |  |  |
| --- | --- | --- |
|  | *N* | % |
| Age |  |  |
|  Under 25 | 41 | 15.9 |
|  25-34 | 82 | 31.8 |
|  35-44 | 69 | 26.7 |
|  45-54 | 42 | 16.3 |
|  55-64 | 21 | 8.1 |
|  65 and over | 3 | 1.2 |
| Marital Status |  |  |
|  Divorced | 8 | 3.1 |
|  Married/partnered | 190 | 73.6 |
|  Single | 60 | 23.3 |
| Number of children |  |  |
|  0 | 149 | 57.8 |
|  1 | 34 | 13.2 |
|  2 | 48 | 18.6 |
|  3 | 14 | 5.4 |
|  4 | 9 | 3.5 |
|  5 | 2 | 0.8 |
|  6 | 2 | 0.8 |
| Duration of Diabetes |  |  |
|  1-3 yrs | 14 | 5.4 |
|  3-5yrs | 13 | 5.0 |
|  5-10yrs | 43 | 16.7 |
|  11+ yrs | 188 | 72.9 |
| Diabetes Therapy/Treatment |  |  |
|  Insulin (always) | 233 | 90.3 |
|  Diet only | 1 | 0.4 |
|  Tablets | 13 | 5.0 |
|  Insulin (used to take tablets only) | 11 | 4.3 |

Table Two: Comaprison of Results – Meeking vs Current Study

|  |  |  |
| --- | --- | --- |
|  | Meeking% | Current Study% |
| **Psychological** |  |  |
| Diabetes has led to a loss of self esteem | 36.0 | 68.6 |
| Diabetes makes me feel less attractive | 34.0 | 57.8 |
| Diabetes has led to loneliness or isolation | 40.0 | 66.3 |
| Diabetes had led to worry about fertility | 31.0 | 52.7 |
| Diabetes has led to worry about pregnancy | 43.0 | 69.4 |
| Diabetes has led to worry about passing it on to children | 75.0 | 79.5 |
| I have discussed my concerns with a healthcare professional | 66.0 | 57.4 |
| **Medical** |  |  |
| Vaginal infections | 23.0 | 77.9 |
| Dyspareunia | 43.0 | 51.2 |
| General orgasmic problems | 47.0 | 57.4 |

Table Three: Impact of Diabetes - Psychosocial

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Not at all(%) | Mildly(%) | Moderately(%) | Greatly(%) |
| Diabetes has led to a loss of self esteem | 81 (31.4) | 74 (28.7) | 58 (22.5) | 45 (17.4) |
| Diabetes makes me feel less attractive | 109(42.2) | 69 (26.7) | 50 (19.4) | 30 (11.6) |
| Diabetes has led to loneliness or isolation | 87 (33.7) | 71 (27.5) | 51 (19.8) | 49 (19.0) |
| Diabetes had a negative effect on my relationships with a partner/potential partner | 99 (38.4) | 86 (33.3) | 41 (15.9) | 32 (12.4) |
| Diabetes has had a positive effect on my relationships | 159(61.6) | 49 (19.0) | 30 (11.6) | 18 (7.0) |

Table Four: Negative Impact of Diabetes on Sexual Activity

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Not at all(%) | Mildly(%) | Moderately(%) | Severely(%) |
| Tiredness | 21 (8.1) | 72 (27.9) | 98 (38.0) | 60 (23.3) |
| Anxiety / worry | 49 (19.0) | 63 (24.4) | 86 (33.3) | 45 (17.4) |
| Anger / irritability | 52 (20.2) | 67 (26.0) | 93 (36.0) | 35 (13.6) |
| Depression / hopelessness | 61 (23.6) | 60 (23.3) | 70 (27.1) | 48 (18.6) |
| Lack of time / inconvenience | 60 (23.3) | 79 (30.6) | 71 (27.5) | 35 (13.6) |
| A reduction in pleasure from sex | 101 (39.1) | 57 (15.9) | 49 (19.0%) | 41 (15.9) |
| Increasing difficulty / inability achieve orgasm | 93 (36.0) | 59 (22.8) | 43 (16.7) | 51 (19.8) |
| Lack of desire / interest | 80 (31.0) | 66 (25.6) | 43 (16.7) | 60 (23.3) |

Vaginal/urinary infections, cystitis or thrush were reported to have interfered with sexual relationships by 203 participants (78.7%).

Table Five: Content Analyses – Questions with Summary of Free Text Key Themes

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Question | Difference from others / Isolation / Stigma / lack of understanding | Body-image / Judged / presence of tech | Low mood / burnout / tiredness | Sexual function / infection / loss of enjoyment | Other |
| Loss of self-esteem | 70 | 81 | 25 | 3 | 26 |
| Feel Less Attractive | 28 | 140 | 9 | 8 | 17 |
| Loneliness / isolation | 128 | 5 | 29 | 0 | 17 |
| Negative affect on relationships | 75 | 14 | 32 | 22 | 8 |

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