

Diabetes and Male Sexual Health: An Unmet Challenge

Running Title: Male Sexual Health and Diabetes

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Diabetes and Male Sexual Health Survey: An Unmet Challenge

Abstract: (250/250 words)

Objective: to explore the self-reported medical and psychological factors associated with sexual health for men with diabetes.

Research Design and Methods: An online survey was distributed via social media platforms including Twitter, Facebook and LinkedIn and remained open for four weeks. The survey contained 45 items including free text response questions so that participants could provide further detail to their responses if desired, including the 20-item validated diabetes-related sexual complications items [xx] (see supplementary material for full survey). Descriptive and inferential statistical analyses were conducted using SPSS.24 with content and thematic analyses conducted on free text responses.

Results: 100 participants completed the survey, aged 20-73 years (mean 45.4 years) with a diabetes duration of 1-62 years (mean 23.07 years), 90% had type 1 diabetes. 49% reported diabetes had led to a loss of self-esteem, 62% said it had a negative effect on relationships with a partner, 41% felt less attractive and 46% reported it had led to loneliness. Free text responses reflect depth of feeling and considerable negative psychosocial impact of diabetes and associated sexual health issues. Erectile dysfunction was common (66%) however over a third of those participants had not sought help (42%). Oral medications removed spontaneity for half of participants ($n=58$) who had taken it ($n=29$).

Conclusions: Sexual health issues continue to pose challenges for men with diabetes both medically and psychologically. The psychosocial aspects of diabetes and sexuality, including feeling unattractive both physically and emotionally are widely reported by participants, demonstrating the damaging and distressing personal consequences.

Key Points:

- 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.
- Sexual health problems affect over three-quarters of people with diabetes.
- The psychosocial impact of sexual health problems results in loss of self-esteem, loss of feelings of attractiveness, loneliness and negative effects on relationships.
- It is clear that there is still a need for support/resources to be readily available as well as heightened HCP awareness to help individuals.

Background

Diabetes is a leading cause of sexual health issues in men with over half of men who've had diabetes for ten years experiencing some form of erectile dysfunction (ED) [1]. The prevalence of ED varies widely from 32% to 90% depending on the selected population, age, type and duration of diabetes [2]. Prevalence of ED in type 1 diabetes is 32% and in type 2 diabetes it is 46%, however the prevalence increases over age. Men aged 20-29 years have an estimated prevalence of 9%, those aged 30-34 prevalence increases to 15% and those aged 60-70 years have a prevalence of 95% [4]. Men who have sub-optimal diabetes control are more likely to experience sexual health problems [2].

Whilst ED is common, it is not the only sexual dysfunction associated with diabetes. Reduced sexual drive, ejaculatory function, sexual satisfaction and broader sexual problems are all associated with diabetes [5]. There is a strong relationship between ED and reduced libido in men with diabetes [OR=4.38, 95% CI=1.39-13.82] and even stronger relationship between ED and premature ejaculation (OR=4.41, 95% CI 2.08-9.39) [5]. Despite the high prevalence of such problems in men with diabetes, almost half (45.3%) do not seek medical assistance [5].

Much attention has been paid to the physiology and physical aspects of ED. This is perhaps unsurprising as the prevalence of ED in men with diabetes is higher than in men without diabetes, the pathogenesis of diabetes-related ED is specific and more complex compared to men without diabetes and ED is more severe with treatment effectiveness lower compared to men without diabetes. The psychological burden of sexual health problems has received less attention despite the profound negative impact on quality of life of men with diabetes. The psychological dimensions on the sexual impact of diabetes is multi-faceted, associated with higher levels of diabetes-specific health distress, poorer overall quality of life and worse psychological adaptation to diabetes, leading to worse metabolic control [6-8]. Furthermore, men with diabetes are more likely to consider their sexual dysfunction to be severe and permanent than men without diabetes [9].

Although numerous safe and efficacious medications and treatments exist, often sexual dysfunction is not adequately diagnosed nor treated. In most cases this is due

to a communication problem in that healthcare professionals do not ask and men with diabetes do not spontaneously ask. This lack of appropriate action leads to further deterioration and aggravation of psychological and couples' distress.

The aim of the current study was to explore the self-reported medical and psychological factors associated with sexual health for men with diabetes with a view to developing resources to improve understanding and signposting appropriate support.

Methods

An online survey was distributed via social media platforms including Twitter, Facebook and LinkedIn and remained open for four weeks. Posts were added to each platform every two days and reshared by the research team, charities, advocacy groups and prolific twitter and facebook users. This method was chosen to enable participants to take part remotely, as compared to face-to-face, due to the potentially sensitive nature of the topic, and to reach as broad an audience as possible. Institutional ethical approval was obtained from Bournemouth University and informed consent received prior to survey completion. The survey contained 45 items including free text response questions so that participants could provide further detail to their responses if desired, including the 20-item validated diabetes-related sexual complications items (see supplementary material for full survey). Questions were generated from a review of the literature and previous research, interviews with potential participants and expert healthcare professionals. The survey was piloted with five men with diabetes prior to use for acceptability with minor revisions made to the final version. Descriptive and inferential statistical analyses were conducted using SPSS.24 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 100 completed survey responses from men aged 20-73 years (mean 45.4 years) with a diabetes duration of 1-62 years (mean 23.07 years). Almost three

quarters were currently sexually active (71%) and two thirds were not using contraception (66.3%). Demographic data is presented in Table 1.

Table One: Demographic Data

	<i>N (%)</i>
Age	
Under 25	5 (5.6)
25-34	12 (13.3)
35-44	25 (27.8)
45-54	23 (25.6)
55-64	24 (26.7)
65 and over	1 (1.1)
Marital Status	
Married/partnered	65 (65)
Single	27 (27)
Divorced	7 (7)
Widowed	1 (1)
Number of children	
0	34 (35.1)
1	16 (16.5)
2	34 (35.1)
3	10 (10.3)
4	1 (1)
5	2 (2.1)
Duration of Diabetes	
0-5 yrs	12 (12)
6-10yrs	17 (17)
11+ yrs	71 (71)
Diabetes Therapy/Treatment	
Insulin (always)	90 (90.9)
Tablets	7 (7.1)
Insulin (used to take tablets only)	2 (2)

*Missing data

Psychosocial Impact

Table Two(a): Impact of Diabetes - Psychosocial

	Not at all (%)	Mildly (%)	Moderately (%)	Greatly (%)
Diabetes has led to a loss of self esteem	51 (51)	25 (25)	10 (10)	14 (14)
Diabetes makes me feel less attractive	59 (59)	20 (20)	11 (11)	10 (10)
Diabetes has led to loneliness or isolation	54 (54)	15 (15)	21 (21)	10 (10)
Diabetes had a negative effect on my relationships with a partner/potential partner	38 (38)	30 (30)	23 (23)	9 (9)
Diabetes has had a positive effect on my relationships*	75 (76.5)	7 (7.1)	8 (8.2)	8 (8.2)

*Missing data

Table Two(b): Impact of Diabetes for those with ED - Psychosocial

	Not at all (%)	Mildly (%)	Moderately (%)	Greatly (%)
Diabetes has led to a loss of self esteem	18 (39.1)	9 (19.6)	8 (17.4)	11 (23.9)
Diabetes makes me feel less attractive	23 (50)	12 (26.1)	4 (8.7)	7 (15.2)
Diabetes has led to loneliness or isolation	22 (47.8)	6 (13)	12 (26.1)	6 (13)
Diabetes had a negative effect on my relationships with a partner/potential partner	13 (28.3)	10 (21.7)	15 (32.6)	8 (17.4)
Diabetes has had a positive effect on my relationships*	36 (80)	4 (8.9)	4 (8.9)	1 (2.2)

Comments regarding feelings of self-esteem (n=33) included:

- 'I don't feel comfortable injecting in front of people or being vulnerable while hypo'
- 'self-conscious about weight, wearing a pump and CGM, contributes to feeling unattractive'
- 'worry of future problems, feelings of helplessness to stop future problems causes lack of motivation to care for diabetes'
- 'lost the ability to gain an erection'
- 'sometimes embarrassed about diet (explaining to others)'

Comments regarding feelings of loss of attractiveness (n=32) include:

- 'it's a disability and I'm restricted to what I can do, don't feel as worthy or attractive'
- 'I think it's all the gadgets, cannula, cgm, taking your pump off isn't the sexiest thing'
- 'Having a pump attached is the opposite of sexy'
- 'Put on weight due to insulin, and cannot shift it'
- 'Feel like for the people that are aware of the complications it can bring it would make people more wary of entering into a romantic relationship with a diabetic'

Comments regarding feelings of loneliness (n=30) included:

- 'Having to constantly worry about blood sugar is an isolating experience'
- 'feeling of helplessness to stop future problems, mood swings, annoyance at not being able to control properly puts you in a bad mood and wouldn't be a good person to be around'
- 'Who would love a broken person, body and soul totally ruined'
- 'a feeling of elimination from certain social activities'

- 'sometimes I feel lonely with diabetes as nobody around me on a daily basis lives with what I have to live with. Meeting others on social media has helped but then social media can be a lonely place at times'
- 'not being able to talk about these issues with partners or having them not understand is hard'
- 'Non-diabetics never fully understand what I'm going through. I don't know any other diabetics that I can speak to about how they feel, which can feel lonely'.

Comments regarding negative impact on relationship with partner/potential partner (n=50) include:

- 'I'm embarrassed for my wife'
- 'Yeah yeah another hypo, how convenient'
- 'Them seeing what I have to deal with and do shots could turn them off me'
- 'Wife not into sex and think it is because of pump'
- 'Ex-partner found it very hard to accept my diabetes, particularly the injections – ended up splitting up'
- 'General increase in stress and anxiety adds pressure to relationships'
- 'Sometimes I cannot perform'
- 'Twice had bad hypos with partners and both times they were freaked out and from there it was apparent the relationship changed'
- 'Causes problems around food and planning eating into day'

Sexual Activity Impact

Table Three: Negative Impact of Diabetes on Sexual Activity

	Not at all (%)	Mildly (%)	Moderately (%)	Severely (%)
Tiredness	24 (25.8)	25 (26.9)	29 (31.2)	15 (16.1)
Anxiety / worry	29 (30.9)	23 (24.5)	24 (25.5)	18 (19.1)
Anger / irritability	33 (35.5)	22 (23.7)	27 (29)	11 (11.8)
Depression / hopelessness	37 (41.1)	18 (20)	20 (22.2)	15 (16.7)
Lack of time / inconvenience	45 (50)	18 (20)	20 (22.2)	7 (7.8)
Impact on performance	19 (19.6)	26 (26.8)	25 (25.8)	27 (27.8)

Three quarters of participants were not worried that diabetes could affect fertility (74%) and two thirds were not/had not ever worried about having children (67%). Of the 33% who were worried, the most common concerns were passing diabetes on to children (n=17) and infertility or erectile dysfunction (n=19). Specific comments included:

- 'worried about if my children would inherit the disease and that they would then have to go through the same difficulties I have'
- 'don't want them to have issues like mine'
- 'knowing what I experienced in home and work life, I was concerned that my children would develop T1D'
- 'chances of the child developing diabetes, will I be around long enough to see child grow up / in good enough health to be a capable parent?'
- 'I didn't want children when married, once we had them I worried about and still worry about them incessantly'

Participants with a shorter duration of diabetes were more likely to report sexual issues interfering with their relationship with their partner (66.7, n=16 vs 30%, n=21). Those with a shorter duration of diabetes (<10 years) were over 4½ times more likely to report sexual issues interfering with their relationship with their partner (OR = 4.65). The relationship between sexual issues interfering with relationships and duration of diabetes (over or under 10 years of diagnosis) was significant, $\chi^2(1, N = 94) = 10.07, p = 0.002$.

The group with children had a mean anxiety score of 2.15 (SD = 1.06) whereas the group without children had a mean anxiety score of 2.63 (SD = 1.16). The results of an independent samples t-test showed that this difference was significant, $t(90) = -1.99, p = 0.050$, 2-tailed, equal variances assumed. The group without children reported feeling that their diabetes has caused anxiety which has had a negative effect on their sexual activity more so than those with children.

There was a significant difference in lack of time/convenience ($U = 457.500, p = 0.014$) between those with a duration of diabetes of 10 years or under and those with a duration of diabetes of over 10 years. The median lack of time/convenience score for 10 years or under was 2.0 and the mean was 2.38 (SD=1.12) while the median lack of time/convenience score for over 10 years was 1.0 and the mean was 1.74 (SD=0.96) (higher scores meaning increased feelings of lack of time/convenience), suggesting that those with a shorter duration of diabetes had more concerns with lack of time/convenience.

Table Four: Specific Issues

Issue	N (%)
Inability to maintain an erection	32 (48.5)
An increasing difficulty or inability to achieve orgasm	11 (16.7)
A lack of interest in sex	9 (13.6)
A lack of sensation in the genital area	8 (12.1)
A reduction in pleasure obtained from sex	6 (9.1)

Of participants who reported these issues ($n=66$), almost half ($n=28$, 42.4 %) had not sought help, 48.5% ($n=32$) had sought help from their GP, 16.7% ($n=11$) from their hospital doctor, 9.1% ($n=6$) from a nurse and 3% ($n=2$) from a pharmacist. Most participants ($n=76/100$) were aware that these problems may be more common in men with diabetes, however almost half ($n=45/100$) were not aware of any treatments available for these problems.

41% of participants report having a diabetes-related complication and of these $n=41$, nearly half (46.3%) have multiple diabetes-related complications, or 19% of all participants.

Of the 58 participants who reported having taken medication, eg Viagra for sexual health problems, half ($n=29$) reported that it had removed the spontaneity of sex.

Table Five: Diabetes-Related Sexual Complications

	Yes	No
Experiencing difficulty recently in achieving erections that you and your partner consider adequate for intercourse	46 (46)	54 (54)
Difficulty performing intercourse in more than half of your attempts	35 (35.4)	64 (64.6)
Problem with erection difficulty occurring when with a partner	47 (53.4)	41 (46.6)
Problem with erection difficulty occurring when alone	39 (45.3)	47 (54.7)
It takes longer to achieve an erection than in the past	60 (62.5)	36 (37.5)
Experience hypoglycaemia during sexual intercourse	40 (47.6)	44 (52.4)
Diabetes is a cause of sexual issues	57 (57.6)	42 (42.4)
Sexual issues have interfered with relationship with partner	38 (39.2)	59 (60.8)
Feeling depressed over sexual issues currently	34 (34)	66 (66)

Some participants did, however report diabetes having a positive effect on their relationship ($n=22$). Specific comments included:

- 'My current partner puts a lot of energy into understanding what I'm going through, although she doesn't know exactly, it does help. Although equally it makes me feel more vulnerable'.
- 'Admiration at coping'
- 'It has made us more likely to have a direct and frank conversation about subjects that many people would otherwise find difficult I think'

- 'Makes you very open and creates a connection with your partner'. Your partner takes a real interest and wants to learn and understand. It really makes you feel cared for'.
- 'My current partner always gives my night time injection – this has given us a moment of time together each day where diabetes actually connects us'

Interaction Between Demographics and Results

If participants had children, they were more likely to seek help for sexual health problems (68.3% vs 37.5%). Those with children were over 3 ½ times more likely to seek help than those without children (OR = 3.56). The relationship between child status and help-seeking for sexual health problems was significant, $\chi^2(1, N = 65) = 5.85, p=0.016$. If participants had children, they were more likely to know these problems were common for people with diabetes (82.5% vs 64.7%). Those with children were over 2 ½ times more likely to know these problems were more common for people with diabetes (OR = 2.58). The relationship between child status and knowing these problems are common was significant, $\chi^2(1, N = 97) = 3.88, p=0.049$.

If participants did not have children, they were more likely to report having hypos during sex (65.5% vs 37%). Those without children were over 3 times more likely to report ever having a hypo during sex (OR = 3.22). The relationship between reported ever having had a hypo during sex and having a child was significant, $\chi^2(1, N = 83) = 6.14, p=0.013$.

If participants were married, they were more likely to seek help for sexual health problems (66.7% vs 41.7%). Those who were married were nearly 3 times more likely to seek help than those who were not married (OR = 2.82). The relationship between marriage status and help-seeking for sexual health problems was significant, $\chi^2(1, N = 66) = 3.90, p=0.048$. If participants were married, they were more likely to report taking longer to achieve an erection (69.8% vs 48.5%). Those who were married were nearly 2½ times more likely to report taking longer to achieve an erection than those who were not married (OR = 2.47). The relationship between marriage status and taking longer to achieve an erection was significant, $\chi^2(1, N = 96) = 4.21, p=0.040$.

If participants were over 35 they were more likely to know these problems were common (83.3% n=60 vs 38.9% n=7) although responses were low for under 35s (n=18). Those over the age of 35 were nearly 8 times more likely to know these problems were more common for people with diabetes (OR = 7.81). The relationship between age and knowing these problems are common was significant, $\chi^2(1, N = 90) = 14.95, p = 0.000$. If participants were over the age of 35 they were significantly more likely to be aware of treatments available (61.1% vs 27.8%). Those over the age of 35 were over 4 times more likely to know these problems were more common for people with diabetes (OR = 4.13). The relationship between age and being aware of treatments available was significant, $\chi^2(1, N = 90) = 6.45, p = 0.011$.

A Mann-Whitney U test showed that there was a significant difference in self-esteem ($U = 625.500, p = 0.018$) between those with a duration of diabetes of 10 years or under and those with a duration of diabetes of over 10 years. The median self-esteem score for 10 years or under was 2.0 and the mean was 2.20 (SD=1.0) while the median self-esteem score for over 10 years was 1.0 and the mean was 1.76 (SD=1.08) (higher scores meaning feelings of lower self-esteem), suggesting that those with a shorter duration of diabetes had more concerns with self-esteem.

If participants had diabetes for a longer duration they were more likely to report seeking help for sexual health problems (68.9%, n=31, vs 38.9%, n=7). Those with a longer duration of diabetes (>10 years) were also nearly 3½ times more likely to report seeking help for sexual health problems (OR = 3.45). The relationship between reported help seeking for sexual health problems and duration of diabetes (over or under 10 years of diagnosis) was significant, $\chi^2(1, N = 63) = 4.83, p = 0.028$. If participants had diabetes for a longer duration they were more likely to report having a diabetes-related complication (47.9%, n=34 vs 24%, n=6). Those with a longer duration of diabetes (>10 years) were nearly 3 times more likely to report having a diabetes related complication (OR = 2.88). The relationship between diabetes related complications and duration of diabetes (over or under 10 years of diagnosis) was significant, $\chi^2(1, N = 96) = 4.34, p = 0.037$.

Participants with a shorter duration of diabetes were more likely to report sexual issues interfering with their relationship with their partner (66.7%, n=16 vs 30%, n=21). Those with a shorter duration of diabetes (<10 years) were over 4 ½ times more likely to report sexual issues interfering with their relationship with their partner (OR = 4.65). The relationship between sexual issues interfering with relationships and duration of diabetes (over or under 10 years of diagnosis) was significant, $\chi^2(1, N = 94) = 10.07, p = 0.002$.

Discussion

Sexual dysfunction and psychological burden were commonly reported by participants. Despite most participants being aware that these problems may be more common in men with diabetes, almost half of participants had not sought help, which is consistent with data in previously published literature. The prevalence of ED within the current study was also consistent with previously reported data in Kamenov's 2015 systematic review. Furthermore, it is evident that support for sexual health problems has not improved over recent years, despite improved diabetes treatments and oral ED therapies becoming available over-the-counter from pharmacies.

In comparison to previous research by Cummings et al (10), the current study had a slightly younger age (45.43 vs 53.7 years) but a much higher proportion of participants with Type 1 diabetes in the current study (90% vs 31%) and a much longer duration of diabetes (22.71 vs 9 years). A similar proportion of participants in both studies experienced difficulty achieving erections (46% vs 50%). In the Cummings et al. study 30% were unaware that ED was a complication of diabetes yet and in the current study 24% (n=24) of participants stated that they did not know ED and other sexual problems were common amongst people with diabetes. In addition, 45% (n=45) of participants in the current study were aware of treatments available, very similar to the Cummings et al. study (46%, n=87).

In the Cummings study 38% (n=36) of those suffering from ED felt their relationship had suffered moderately and 19% (n=18) severely, as a consequence of the problem. Our data shows similar results where 32.6% (n=15) had declared that

diabetes had a negative effect on their relationships with a partner/potential partner moderately and 17.4% (n=8) greatly. In addition, 68.9% (n=31) said that sexual issues, if experienced, had interfered with their relationship with their partner.

In the groups where the problem had interfered with the relationship with their partner, 38.6% of patients were unaware that treatment was available in the current study and 33% in the Cummings et al. study. Despite the high incidence of participants in the Cummings study with ED, only 30% (43/143) had discussed the problem with a healthcare professional, while 66.7% (30/45) of those who have experienced difficulty achieving erections adequate for intercourse recently in the current study had sought help (this reduced to 57.6% 38/66 of the whole study population in the current study).

It is clear from our data that ED remains a troubling subject for participants and this may explain to some extent the misconceptions about ED. The current study also highlights the limited awareness and knowledge about ED possessed by men with diabetes. It is noteworthy that recruitment to the study was challenging, as compared to recruitment for similar research with women with diabetes that recruited over 250 participants in half the time. This may be a reflection of the taboo nature of the subject and reduced willingness of men to engage or seek help.

The strength of the current study lies in its investigation of the current state of attitudes and understanding of men regarding sexual health, and its comparison to previous research in 1997 (10). The study is limited, however, in the self-report nature of the data, as well as the online recruitment methodology. Furthermore, the fewer participants and challenges with recruitment limit the generalisability of the results.

Conclusion

Sexual health issues pose challenges for men with diabetes who participated in the current study both medically and psychologically. The psychosocial aspects of diabetes and sexuality, including feeling unattractive both physically and emotionally are widely reported by participants, demonstrating the damaging and distressing

personal consequences. It is clear that there is still a need for support/resources to be readily available as well as heightened HCP awareness to help individuals. Such resources could include patient literature/direct patient access to support groups. It is also clear that awareness and impact for men with ED hasn't improved over the past twenty years.

Author roles:

KBK wrote the first draft of the article, led the research and psychosocial aspects with DN who wrote the psych results and interpretation. CR assisted with psych aspects and writing. DM and MC led medical aspects and wrote these sections of the manuscript. RS and CA provided lay expert input and contributed to writing to ensure readability and relevance.

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