

RELATIONSHIP BETWEEN SEXUAL DYSFUNCTION AND SEXUAL SELF-CONCEPT IN PATIENTS WITH DIABETES MELLITUS: A SCOPING REVIEW

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RELATIONSHIP BETWEEN SEXUAL DYSFUNCTION AND SEXUAL SELF-CONCEPT IN PATIENTS WITH DIABETES MELLITUS: A SCOPING REVIEW

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Abstract

Background: An often-occurring complication of diabetes mellitus is sexual dysfunction, often linked to poor blood sugar control. Despite its significant impact on patients' lives, issues related to sexual desire, education, and timely detection and management of sexual problems have historically been overlooked in diabetes interventions. This neglect may affect individuals' sexual self-concept and overall well-being. The purpose of this study is to investigate the relationship between sexual dysfunction and sexual self-concept in diabetics.

Design: This research employs a scoping review design.

Data Sources: A comprehensive literature search was conducted using databases such as Web of Science, Open Alex, Crossref, Google Scholar, PubMed, Scopus, and Semantic Scholar. Articles published between January 2018 and October 2023 were included.

Review Methods: The analysis followed the Arksey and O'Malley model and PRISMA guidelines. 26 quantitative articles were reviewed, including 24 cross-sectional studies and 2 observational studies, all using quantitative methodologies.

Results: Sexual dysfunction is prevalent among diabetes type 1 and type 2 in both men and women, influenced by physiological factors and glycemic control. Men may experience issues like diminished libido, premature ejaculation, and difficulty achieving orgasm, while women may face reduced sexual desire, arousal difficulties, and dyspareunia. Factors contributing to sexual dysfunction include age, duration of diabetes, glycemic control, comorbidities, medication use, psychological factors, and lifestyle elements like physical activity and stress levels. Sexual dysfunction in people with diabetes has a significant impact on sexual self-concept, which includes feelings, views, and beliefs about sexual relationships.

Conclusion: There hasn't been any specific research conducted on diabetic patients concerning the correlation between sexual dysfunction and sexual self-concept, highlighting the need for dedicated studies to address this association and raise awareness.

Keyword: *Diabetes Mellitus, Sexual Dysfunction, Sexual Self-Concept*

INTRODUCTION

A variety of metabolic conditions collectively referred to as diabetes are defined by elevated blood sugar levels caused by insufficiencies in insulin action, secretion, or both (IDF, 2021). The World Health Organization (WHO) reported in 2022 that 422 million people worldwide suffer from ¹⁹Diabetes Mellitus, putting it among the world's main causes of death. As the world's population ages, diabetes is expected to become more prevalent, potentially affecting 700 million people by 2045 and 578 million by 2030. Southeast Asia is third in terms of regional prevalence, with a rate of 11.3% (IDF, 2021).

Indonesia ranks seventh globally in terms of the number of diabetes patients, with approximately 10.7 million individuals aged 20-79 years affected (IDF, 2021). Data from the Indonesian Ministry of Health in 2020 similarly confirm Indonesia's position, reporting 10.7 million cases of diabetes mellitus, contributing to 1.5 million deaths attributed to the condition.

As per the 2018 Riset Kesehatan Dasar (Riskesdas) survey, 2% of Indonesians aged 15 and above were diagnosed with diabetes, which represents an increase from previous years. However, the prevalence of diabetes based on blood sugar examinations rose from 6.9% in 2013 to 8.5% in 2018. This suggests that only about 25% of diabetes patients are aware of their condition.

In West Kalimantan, based on the 2018 Riskesdas data, the prevalence of diabetes diagnosed by doctors was 1.6%, ranking the province 20th nationwide. In Pontianak City, the Health Office reported 44,003 diabetic patients, accounting for 6.61% of the total population. However, only 7.57% of these patients sought treatment at healthcare facilities.

Diabetes is often known as the silent killer, meaning it slowly kills those affected. Often, diabetes patients are unaware of their condition, and complications only arise when they realize they have diabetes (Eva, 2019). Diabetes plays a major role in kidney failure, cardiovascular diseases, loss of vision,

amputations resulting from injuries, and mortality rates (IDF, 2021).

Based on the findings of Price & Wilson (2017) and Wahyuni (2020), complications associated with diabetes mellitus are typically categorized into acute and chronic. Acute complications may include hypoglycemia, hyperglycemia, non-ketotic hyperglycemic hyperosmolar syndrome, and diabetic ketoacidosis. On the other hand, chronic complications of diabetes mellitus encompass macrovascular and microvascular diseases. Additionally, diabetes mellitus can lead to various medical issues, psychological challenges, and sexual dysfunction.

The pathophysiology of diabetes mellitus-related sexual dysfunction can be explained by a number of pathological mechanisms. These mechanisms encompass vascular microangiopathy, endothelial dysfunction, hormonal imbalances, and neurological impairment ¹³triggered by hyperglycemia, leading to the generation of advanced glycation end products and reactive oxygen species. These factors instigate oxidative stress (Mohan, 2023).

In men, the primary factors responsible for sexual dysfunction are neuropathy, macroangiopathy, and microangiopathy. Conversely, in women, the primary factors responsible for sexual dysfunction include hypogonadism, hypoactive desire, dyspareunia, infections, vascular, neurological, and psychological diseases (Mohan, 2023).

Sexual dysfunction presents significant reproductive health challenges as it directly affects reproductive physiological functions (Lamuhammad, 2017, as cited in Sulastri, 2023).

Sexual dysfunction is also linked to psychosocial factors in individuals with diabetes mellitus, a condition that is sometimes disregarded (Susanti, 2019). Moreover, the misconception that sexual dysfunction is solely a consequence of aging contributes to its frequent oversight (Hasbullah et al., 2019). Additionally, societal norms and cultural influences often render discussions about sexuality taboo.

Nevertheless, sexual dysfunction among diabetes mellitus patients serves as an indication of inadequate blood sugar control (Sugiharso & Saraswati, 2016, as cited in Byomantara, 2023).

To date, sexual desire, sex education, early detection, and treatment of sexual problems have not been considered in interventions for diabetes patients (Hamani et al., 2015 in Byomantara, 2023). One influencing factor is the cultural factor where there is a sense of shame for patients to admit it (Harnani et al., 2015 in Byomantara, 2023).

According to De Silva (2022), 85.6% of individuals experiencing sexual dysfunction did not disclose their issues to healthcare providers. Among them, 60.5% reported experiencing psychological effects, while 50% showed signs of arterial insufficiency based on penile Doppler ultrasound results. Nevertheless, it is important to emphasize that this matter significantly affects the physical and psychological health of individuals living with diabetes mellitus, including their perception of their own sexuality.

Sexual self-concept involves a variety of aspects, including individuals' feelings, attitudes, and beliefs regarding their sexual relationships (Deutsch AR, 2014, as referenced in Riazi H, 2020).

Sexual dysfunction can affect a person's sexual self-concept in those with diabetes mellitus. This scoping review's objectives are to outline the prevalence of diabetes mellitus and investigate the connection between sexual dysfunction and the way individuals with the condition view themselves.

METHODS

Design

The methodological framework presented by Arksey and O'Malley (2005) was applied in this scoping review to examine the prevalence of sexual dysfunction, disturbances in sexual self-concept, and potential correlations between these factors in people with diabetes mellitus, which consists of five key steps:

1. Clearly and objectively identifying search questions.

2. Identifying relevant articles through systematic search strategies.
3. Selecting pertinent literature from identified articles and extracting relevant data.
4. Organizing, summarizing, and analyzing the extracted data.
5. Reporting the findings of the review.

Search Methods

A scoping review involves a comprehensive search for high-quality literature, both nationally and internationally, across various online databases.

In this article, the author utilized the Publish or Perish 8 application to gather literature from online databases such as Web of Science, Open Alex, Crossref, Google Scholar, PubMed, Scopus, and Semantic Scholar.

The author employed the PICO search strategy to identify key concepts and main questions. Through PICO, search strategies that detail questions and adjustments through inclusion and exclusion criteria can be informed. The author used boolean logic connectors, namely AND, OR, and NOT, to link and focus the search results of articles.

The following are the inclusion criteria for this article:

1. Journal articles in English and Indonesian languages
2. Full-text articles
3. Quantitative studies
4. Articles published between 2018-2023

Meanwhile, the exclusion criteria for this article are:

1. Articles not in English or Indonesian languages
2. Not full-text articles
3. Qualitative studies
4. Articles published before 2017
5. Literature review articles

The research questions for this study are as follows:

1. Is sexual dysfunction prevalent among individuals with ²⁷ diabetes mellitus?
2. Do individuals with diabetes mellitus experience disturbances in their sexual self-concept?
3. Is there a connection between sexual dysfunction and the way people with DM perceive themselves sexually?

Search Outcome

The researcher plans to explore ² sexual dysfunction in men and women with type 1 and type 2 diabetes mellitus in further detail after gathering 4,998 articles. The outcome of the article selection process is then visualized in a PRISMA MOHER 2009 diagram, as depicted in Figure 1.

Upon obtaining articles that adhere to the predetermined inclusion criteria, a systematic elimination process is implemented. This process involves removing duplicate articles, followed by the exclusion of articles that do not meet specific criteria, such as those not written in English or Indonesian languages, incomplete articles, qualitative studies, and articles published prior to 2017. Consequently, 26 articles meeting the inclusion criteria are identified.

Among the selected articles, 25 are written in English, while one is in Indonesian. Refer to Figure 1 for a detailed depiction of this selection process.

Data Abstraction

In the identification stage, a total of 4998 articles were identified through online journal databases. Subsequently, screening was conducted to check for indications of duplication or similarity in titles, resulting in the exclusion of approximately 213 articles, leaving 4785 articles selected. Further screening based on irrelevant titles and abstracts led to the exclusion of 4559 articles, resulting in 226 remaining articles. Out of these, 136 articles were found to be incomplete, leaving 90 articles. Among them, 23 were ³ review articles, 18 had incongruent

findings, and 23 had inappropriate populations, resulting in a total of 26 articles selected to be included in this study.

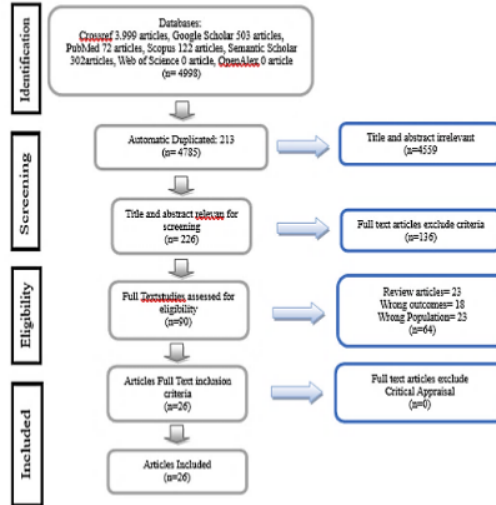


Figure 1. Diagram of PRISMA Flow (Moher, 2009)

Data Analysis/ Synthesis

Data extraction from the chosen body of literature. The researcher then uses Microsoft Word to ¹ extract data from the articles and create a matrix. The researcher's name, the year, and the findings are among the domains that are used in data extraction.

RESULTS

A thorough search was conducted for this study across a number of online databases, including Web of Science, Open Alex, Crossref, Google Scholar, PubMed, Scopus, and Semantic Scholar, resulting in the retrieval of 90 eligible articles. Subsequently, 26 articles were selected for extraction and further analysis. Some articles were excluded because they were purely discussions or theoretical in nature, and some were unrelated to the topic. Articles were limited to English and Indonesian languages, resulting in 25 English-language articles and 1 Indonesian-language article. After screening, 24 articles were identified as cross-sectional studies and 2 as observational studies. All articles were quantitative research studies.

Of the 26 reviewed articles, the classification is as follows: the studies were from various countries, including 4 journals from Ethiopia, 1 from Poland, 4 from India, 4 from Pakistan, 1 from Sri Lanka, 1 from Benin, 1 from Nigeria, 1 from Bangladesh, 1 from Norway, 1 from the Philippines, 2 from Italy, 4 from Iran, and 1 from Indonesia.

The reviewed articles provide an overview of topics concerning sexual

dysfunction among diabetic patients, as well as themes related to the sexual self-concept of individuals experiencing sexual dysfunction. The instruments used were standardized questionnaires with modifications, and some journals had conducted validity and reliability testing of the instruments.

The following table will show the combined findings from the articles:

Table 1. Synthesis of Review Articles

| No | Author | Year | Findings |
|----|--------------------------|------|---|
| 1. | Eskedar Getie | 2021 | The reported rate of sexual dysfunction in men is 69.5%. This condition is more prevalent among older individuals, those who have had DM for a longer period, those with poor metabolic control, and those experiencing comorbidities and complications related to DM. Nevertheless, aspects such as physical activity levels and partner satisfaction seem to be less impacted by sexual dysfunction. |
| 2. | J.Flotyńska, A | 2019 | Compared to older women without DM, those with type 1 DM experience sexual dysfunction more frequently, with a significant p-value of <0.01. Regardless of age, the length of DM, weight, or the existence of angiopathy, this association is still present. |
| 3. | Ratan Halder et al. | 2021 | Males diagnosed with DM type 2 report erectile dysfunction at a rate of 89.9%. Among these individuals, 58.16% spontaneously reported the condition, with up to 62.4% experiencing severe erectile dysfunction, as indicated by a significant p-value of 0.000. Additionally, hypoactive sexual desire is reported by 25.7% of individuals, while decreased libido is reported by 42.2%. Furthermore, 68.8% of respondents report difficulty achieving orgasm, 56.9% experience premature ejaculation, and 20.2% experience delayed ejaculation. Moreover, a significant proportion of respondents, accounting for 61.47%, report experiencing all three problems of erectile dysfunction, ejaculatory dysfunction, and orgasmic dysfunction. |
| 4. | Gebreegziab hier G, 2020 | 2020 | Erectile dysfunction frequently occurs in men with DM, with approximately 87% affected. Factors such as having an income above the poverty line, the duration of DM, insufficient daily physical activity, and reliance on oral medication for DM management are notably correlated with erectile dysfunction in diabetic men. |
| 5. | Shabeen Naz Masood, 2021 | 2021 | Sexual dysfunction affects around 43.2% of women with DM. Significant factors linked to Female Sexual Dysfunction include age and their partner's occupation. Women who have DM have a higher probability of developing sexual dysfunction and are frequently reluctant to talk about these problems in public. Common problems contributing to sexual dysfunction include dyspareunia, lubrication difficulties, |

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| | | | challenges in achieving orgasm, reduced sexual desire, and impaired sexual arousal. |
| 6. | Asjad Hameed | 2023 | Among men diagnosed with type 2 DM, 65% encounter erectile dysfunction (ED), categorized into various severity levels: 19% endure severe ED, 15% experience moderate ED, and 31% report mild ED, with a notable 20% of cases likely to escalate to severe ED over time. |
| 7. | Adane Asefa, 2019 | 2019 | Sexual dysfunction affects 53.3% of patients with DM. Various factors, including age exceeding 41 years, lower levels of formal education, marital status (such as being divorced or widowed), type 2 DM diagnosis, presence of depression, diabetic complications, and insufficient physical activity, show significant associations with sexual dysfunction among diabetic patients. |
| 8. | Nipun Lakshitha de Silva et al. | 2022 | Out of 168 men diagnosed with DM, a staggering 79.2% encounter sexual dysfunction. Among them, 45 individuals exhibit mild dysfunction, 56 have mild-moderate dysfunction, 26 experience moderate dysfunction, and 41 suffer from severe dysfunction. Premature ejaculation is prevalent in 18.7% of cases, while low libido affects 16% of individuals. A number of variables, including age, the length of DM, and a low GFR, presence of diabetic retinopathy, peripheral neuropathy, and peripheral arterial disease are closely linked with erectile dysfunction. Alarmingly, 85.6% of those affected do not divulge their sexual issues to healthcare providers, despite 60.5% reporting psychological repercussions. Penile color Doppler ultrasonography reveals arterial insufficiency in 50% of participants undergoing the procedure. |
| 9. | Gurinder Mohan | 2023 | Sexual dysfunction affects 64.05% of patients diagnosed with DM. Among them, 65.9% are female, and 61.5% are male. Factors contributing to the heightened prevalence of sexual dysfunction include advanced age, prolonged duration of DM, and deteriorating glycemic control. Moreover, individuals with existing DM complications such as neuropathy, retinopathy, or albuminuria are more susceptible to experiencing sexual dysfunction. |
| 10. | Manisha Gupta | 2022 | Women with DM frequently experience sexual dysfunction, accounting for 18% of cases. Age, central obesity, and elevated BMI are all linked to female sexual dysfunction. Surprisingly, neither the duration of DM nor levels of HbA1c show a significant relationship with increasing the risk of female sexual dysfunction. |
| 11. | Djrolo, F | 2021 | Among women with DM, a significant majority, 84.2% (155 out of 184), experience sexual dysfunction. Various factors contribute to this high prevalence, including age 50 years and older, lower education levels, modest monthly income, parity or gestation of four or more, hypertension, neuropathy, and a DM duration of five years or longer. Interestingly, there appears to be no clear link between sexual dysfunction and either body mass index or central obesity. |
| 12. | Onung Samuel | 2022 | Sexual dysfunction affects 62% of females with type 2 DM, as opposed to only 8% in the group under control. This represents a notable rise in |

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| | | | the condition's prevalence. In these women, sexual dysfunction is linked to factors like age, length of DM, and HbA1c levels. |
| 13. | Shabeen Naz Masood | 2021 | 43.2% of women with DM have been reported to have sexual dysfunction. There are significant ($P < 0.001$) correlations between DM and very modified Female Sexual Function Index parameter, which include orgasm, lubrication, sexual desire, arousal, and dyspareunia. Additionally, age and the occupation of the partner emerge as significant factors linked to Female Sexual Dysfunction. Dyspareunia ranks as the most prevalent sexual dysfunction, followed by lubrication issues, orgasm difficulties, decreased sexual desire, and impaired sexual arousal. |
| 14. | Kamrul-Hasan | 2023 | In contrast to females who do not have type 2 DM, who had a prevalence of 42%, DM type 2 in females had a significantly higher prevalence of sexual dysfunction (79%). Additionally, there is a statistically significant difference between women with type 2 DM and those in the control group in terms of their overall Female Sexual Function Index scores (p -value < 0.001). In particular, type 2 diabetics performed significantly worse in domains like lubrication, orgasm, satisfaction, and desire, while the arousal domain showed no discernible variation. Notably, long-standing DM emerges as the primary cause of orgasmic difficulties and pain during sexual intercourse. |
| 15. | Anne Haugstvedt | 2022 | Compared to females not suffering from type 1 DM, those with DM are almost twice as likely (1.89 times) to suffer from dysfunctional sexuality. When type 1 DM affects women, sexual dysfunction is linked to increased levels of DM-related distress and depression. |
| 16. | Firomsa Bekele | 2018 | Among men diagnosed with DM, a significant majority, 82.1%, experience erectile dysfunction, with severity levels distributed as follows: 30% report mild ED, 38% moderate ED, and 14.1% severe ED. Interestingly, erectile dysfunction is 5.8 times more prevalent greater in type 2 DM patients than in type 1 DM patients. Elements like age, type of DM, and comorbidities are closely associated with erectile dysfunction, while no significant correlation has been found with the area of residence. |
| 17. | James Paningbatan | 2018 | 72% of women with type 2 DM experience sexual dysfunction. Microvascular complications like diabetic retinopathy and nephropathy, as well as age and an excessive body mass index and poorly regulated levels of fasting blood sugar, are contributing factors. |
| 18. | Ali Sebtain | 2022 | In females suffering from type 2 DM, 66.9% experience sexual dysfunction. Within this population, specific issues are common: 76.7% have lubrication difficulties, 68.6% report reduced libido, 78% face arousal problems, 47.3% suffer from dyspareunia, 60.6% experience abnormal orgasms, and 61.6% report decreased satisfaction. Notably, no specific patient characteristics have been found to be significantly linked to sexual dysfunction in this group. |
| 19. | Giuseppe De rosa | 2023 | Among females diagnosed with type 2 DM, a significant majority experience sexual dysfunction. There is an inverse correlation between how long they have had DM and their insulin resistance levels in those |

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| | | | who do not suffer from sexual dysfunction. Anxiety is more common in women who experience sexual dysfunction, and heart disease and depression are associated with lower sexual function scores. These women also have elevated levels of certain markers, such as homocysteine and E-selectin. Sexual dysfunction is closely associated with factors like blood sugar regulation, heart disease, autonomic neuropathy, endothelial dysfunction, and mental health issues like depression and anxiety. |
| 20. | Maryam Alikamali | 2019 | Among people with DM, 17.08% report experiencing sexual dysfunction, with men making up 70.73% of these cases compared to women. About 5% of diabetic individuals report reduced sexual desire, with 66.6% of these being men. Nonetheless, there is no discernible difference in sexual desire between people with DM and those in good health. Compared to people with DM, healthy people exhibit noticeably increased libido, lubrication, orgasm, satisfaction, and lack of dyspareunia in relation to sexual desire. Furthermore, compared to their healthy counterparts, Prolonged sexual dissatisfaction and erectile dysfunction are more common in patients with DM. |
| 21. | Morteza Mirdehghan | 2023 | A noteworthy percentage (73.7%) of males diagnosed with type 2 DM report experiencing sexual dysfunction. Age, addiction, the kind of treatment they are receiving, retinopathy, nephropathy, and neuropathy are all significantly linked to overall sexual dysfunction. Nevertheless, no statistically significant associations have been found between the overall sexual dysfunction score and variables such as smoking, hypertension, HbA1c levels, hyperlipidemia, or DM duration. |
| 22. | Alireza Shafiee K | 2018 | Every woman having type 2 DM and receiving below-average ratings in each category of their sexual function, indicating that she has sexual dysfunction. |
| 23. | Lintang Dian Saraswati | 2019 | Sexual dysfunction affects 74.8% of women with DM, which is a significant proportion. Three factors stand out as significant contributors to sexual dysfunction in this demographic: age, menopausal status, and antihypertensive medication use. |
| 24. | M. Gupta et al. | 2022 | Erectile dysfunction and other sexual disorders are more common in male patients with type 2 DM, accounting for roughly 32% and 43.3% of cases, respectively. These events correlate with the length of time a person has type 2 DM. Erectile dysfunction is significantly linked with macrovascular issues, creatinine levels, and the use of beta blockers. Conversely, a robust association has been observed between orgasmic dysfunction and the following conditions: hypertension, hypoglycemia, microvascular and macrovascular issues, levels of creatinine and HbA1c, and the use of beta blockers and statins. |
| 25. | Virginia Zamponi | 2020 | In comparison to the control group, women with type 1 DM showed a markedly increased incidence of sexual dysfunction, with a statistically significant p-value of 0.01. However, no appreciable differences were discovered in female sexual dysfunction in relation to the existence of complications, insulin delivery method, or history of prior pregnancy. |

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| 26. | Hedyeh Riazi | 2020 | Researchers compared women with and without sexual dysfunction who ¹² this study were experiencing issues with infertility. They found significant differences between these two groups at a significance level of $p < 0.05$ in a number of domains, including depression, motivation, satisfaction, and sexual anxiety. There were notable associations discovered between sexual dysfunction and factors like the age of the women and their partners as well as the cause of infertility. More specifically, a noteworthy association was discovered between sexual dysfunction and both sexual motivation and satisfaction as well as female and male factor infertility and their combination. |
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DISCUSSION

A thorough search was conducted for this study across a number of online databases, including Web of Science, Open Alex, Crossref, Google Scholar, PubMed, Scopus, and Semantic Scholar, resulting in the retrieval of 90 eligible articles. Subsequently, 26 articles were selected for extraction and further analysis. Some articles were excluded because they were purely discussions or theoretical in nature, and some were unrelated to the topic. Articles were limited to English and Indonesian languages, resulting in 25 English-language articles and 1 Indonesian-language article. After screening, 24 articles were identified as cross-sectional studies and 2 as observational studies. All articles were quantitative research studies.

Of the 26 reviewed articles, the classification is as follows: the studies were from various countries, including 4 journals from Ethiopia, 1 from Poland, 4 from India, 4 from Pakistan, 1 from Sri Lanka, 1 from Benin, 1 from Nigeria, 1 from Bangladesh, 1 from Norway, 1 from the Philippines, 2 from Italy, 4 from Iran, and 1 from Indonesia.

The reviewed articles provide an overview of topics concerning sexual dysfunction among diabetic patients, as well as themes related to the sexual self-concept of individuals experiencing sexual dysfunction. The instruments used were standardized questionnaires with modifications, and some journals had conducted validity and reliability testing of the instruments. Overall, the 26 articles covered the following themes:

Theme 1: Males with Sexual Dysfunction and Type 1 DM

Males with type 1 DM who are more likely to experience sexual dysfunction, shown in the following data, as gathered from various research studies:

Asefa (2019) reported that 53.3% of male DM patients encounter sexual dysfunction. This figure is slightly higher, as reported by Getie (2021), who found that 69.5% of male DM patients experienced sexual dysfunction. Similarly, Mohan (2023) revealed that 64.05% of DM patients experienced sexual dysfunction, with 61.5% of them being male.

Sexual dysfunction was discovered by Silva et al. (2022) was most common in men with DM, accounting for 79.2% of cases, with 26.79% experiencing mild dysfunction, 33.33% experiencing mild-to-moderate dysfunction, 15.48% experiencing moderate dysfunction, and 24.4% experiencing severe dysfunction. Among them, premature ejaculation occurred in 18.7% of patients, and low libido was reported in 16%.

Theme 2: Sexual dysfunction has been identified in females suffering from type 1 DM.

Mohan (2023) has reported on it. 64.05% of people with DM experience sexual dysfunction. According to Flotynska, A (2019), Older women without DM are less likely to experience sexual dysfunction than in those with type 1 DM. This discovery aligns with Zamponi's (2020) findings, whose research revealed that, on average, compared to women in a control group,

Higher levels of sexual dysfunction were observed in women with type 1 DM.

According to research by Haugstvedt (2022), Compared to women without the condition, The likelihood of sexual dysfunction in women with type 1 DM is 1.89 times higher., which is almost twice as likely. Masood (2021) findings indicate that 43.2% of females suffering from type 1 DM have sexual dysfunction.

Asefa (2019) noted that 53.3% of diabetic patients experienced sexual dysfunction, while Mohan (2023) observed that 65.9% of individuals with DM reporting sexual dysfunction were women. In another study by Saraswati (2019), 74.8% of women with DM were found to have experienced sexual dysfunction. The highest prevalence was documented by Djrolo F (2021), revealing that 84.2% of diabetic women reported having sexual dysfunction.

Moreover, Mohan (2023) found strong connections exist between DM and each item on the most recent Female Sexual Function Index, such as lubrication, orgasm, dyspareunia, arousal, and sexual desire. These research findings predominantly focused on respondents with a type 1 DM diagnosis.

Theme 3: After Type 2 DM Diagnosis and Men Sexual Dysfunction

Research studies have shown Men with type 2 DM are more likely than women to experience sexual dysfunction. Sex dysfunction affects 17.08% of people with DM, and men make up a sizable majority (70.73%) of those affected. Alikamali (2019) pointed out that diabetic patients have a greater prevalence of severe erectile dysfunction and dissatisfaction with sexual encounters compared to those without DM. According to Gupta et al. (2022), the duration of a patient's type 2 DM is connected to how frequently sexual dysfunctions occur, including erectile dysfunction; in male patients, these disorders impact about 32% and 43.3% of cases, respectively.

Furthermore, Asefa (2019) identified a

heightened prevalence of sexual dysfunction, with 53.3% of diabetic patients experiencing such issues. According to Hameed (2023), Erectile dysfunction was reported by 65% of men with type 2 DM, with severe cases making up 19% of the total.

Theme 4: Female Patients with Sexual Dysfunction and DM Type 2

Approximately, in female with DM type 2, sexual dysfunction affects 17.08% of them, with 29.27% of them representing the female population, which is comparatively lower than men (Alikamali, 2019). Asefa (2019) noted that over half, specifically 53.3%, of individuals with DM experienced sexual dysfunction. Sixty-two percent of ladies suffering from type 2 DM and eight percent of women in the control group reported having sexual dysfunction, according to Samuel (2022). According to Hasan's (2023) findings, a significant portion of women with type 2 DM said they had problems with their erection (79% vs 42% in the control group).

Djrolo F (2021) reports that among women with DM, a significant 84.2% prevalence rate of sexual dysfunction was noted., while Derosa (2023) reported a slightly higher prevalence of 87%. Shafiee (2018) revealed that all women with type 2 DM, totaling 100%, experienced sexual dysfunction, with all sexual function indicators falling below normal measurement averages. Additionally, Mohan (2023) established significant associations between DM and all parameters of the women's adjusted Female Sexual Function Index.

Theme 5: Factors Linked to Sexual Dysfunction in People with Type 2 DM

Individuals with type 2 DM may experience sexual dysfunction due to the following factors such as:

1. Age (Asefa, 2019; Gupta, 2022; Mirdegan, 2023; Paningbatan, 2018; Samuel, 2022 and Silva et al., 2022)
2. Duration of Diabetes Mellitus (Flotynska, A., 2019; Gebreegiabhier,

- 2020; Getie, 2021; Mohan, 2023; Samuel, 2022 and Silva et al., 2022)
3. Poor Glycemic Control (Getie, 2021; Mohan, 2023)
4. HbA1c Levels (Samuel, 2022)
5. Creatinine Levels (Derosa, 2023; Gupta et al., 2022)
6. GFR (Glomerular Filtration Rate) (Silva et al., 2022)
7. Income (Djrolo, F., 2021)
8. Education (Asefa, 2019; Djrolo F, 2021)
9. Partner's Occupation (Masood, 2021)
10. Divorce or Widowhood (Asefa, 2019)
11. Lack of Physical Activity (Asefa, 2019; Gebreegziabhier, 2020)
12. Stress (Asefa, 2019; Derosa, 2023 and Haugstvedt, 2022)
13. BMI (Body Mass Index) (Flotynska, A., 2019; Gupta, 2022 and Paningbatan, 2018)
14. Parity (Number of Pregnancies) (Djrolo F, 2021)
15. Angiopathy (Flotynska, A, 2019)
16. Medication Use (Derosa, 2023; Gebreegziabhier, 2020; and Mirdehghan, 2023)
17. Retinopathy (Mirdehghan, 2023; Mohan, 2023; and Silva et al., 2022)
18. Neuropathy (Derosa, 2023; Mohan, 2023; Paningbatan 2018 and Silva et al., 2022)
19. Nephropathy (Mirdehghan, 2023)
20. Hypertension (Djrolo F, 2021)
21. Albuminuria (Djrolo F, 2021; Mohan, 2023)
22. Peripheral Arterial Disease (Silva et al., 2022)

Theme 6: Sexual self-concept in patients with sexual dysfunction

Riazi (2020) conducted a study comparing women experiencing infertility, differentiating between those experiencing sexual dysfunction and those who were not. Their findings showed significant differences between the two groups on a number of different measures,

including depression, motivation, satisfaction, and sexual anxiety. Sexual dysfunction was substantially correlated with variables like sexual drive, contentment, underlying causes of infertility, and the age of the woman and her partner.

17 DM, characterized by hyperglycemia due to insulin secretion abnormalities or insulin resistance, leads to acute and chronic complications (Price & Wilson, 2017; Wahyuni, 2020). Acute complications encompass hypoglycemia, hyperglycemia, hyperosmolar non-ketotic hyperglycemic syndrome, and diabetic ketoacidosis, while chronic complications involve macrovascular and microvascular diseases. DM also predisposes individuals to various medical and psychological issues, including sexual dysfunction.

The pathogenic mechanisms that contribute to sexual dysfunction in DM involve vascular microangiopathy, endothelial dysfunction, hormonal imbalances, and neurological damage brought on by advanced glycation end products and oxidative stress brought on by hyperglycemia (Mohan, 2023).

In male patients, the prevalence of sexual dysfunction varies from 53.3% to 79.2% among people who have type 1 DM and from 12.08% to 89.9% among people who have type 2 DM. (Asefa, 2019; Silva et al., 2022; Aliakmali, 2019; Halder, R et al., 2021). Common issues include decreased libido, hypoactive sexual desire, failure to achieve orgasm, premature ejaculation, and delayed ejaculation, potentially attributable to neuropathy, macroangiopathy, and microangiopathy (M26n, 2023).

Frequency of sexual dysfunction in women type 1 DM patients varies from 43.2% to 84.2%, while in type 2 DM, it spans from 4.99% to 100% (Masood, 2021; Djrolo F, 2021; Alikamali, 2019; Shafiee, 2018; Hasan, 2023). Dyspareunia disorders, orgasm, lubrication, satisfaction, and sexual desire are among the commonly mentioned issues (Masood, 2021; Alikamali, 2019; Hasan, 2023).

In women, the main factors responsible for sexual dysfunction include hypogonadism, hypoactive desire, dyspareunia, infections, vascular, neurological, and psychological diseases (Mohan, 2023).

Many factors can influence and be related to sexual dysfunction experienced by both male and female DM patients. According to Asefa (2019), Gupta (2022), Samuel (2022), Mirdegan (2023), Paningbatan (2018), and Silva et al. (2022), DM patients' sexual dysfunction is correlated with their age. According to Getie's observations (2021), It seems that older people are far more likely to experience sexual dysfunction.

In women, Age and the prevalence of female sexual dysfunction are strongly correlated, as emphasized by Masood (2021). This finding supports the claim made by Mohan (2023) that type 2 DM in women increases the risk of develop age-related complications. Specifically, Masood (2021) suggests that women over the age of 41 are more susceptible to experiencing sexual dysfunction. Djorlo also mentioned that people who are 50 years of age or older have a higher chance of developing sexual dysfunction. Furthermore, Saraswati (2019) pointed out that menopause and aging have a significant impact on sexual dysfunction in diabetics.

In addition to age, the length of time since DM diagnosis is also a correlated factor with sexual dysfunction. Research by Getie (2021), Flotynska, A (2019), Gebreegiabhier (2020), Silva et al. (2022), Samuel (2022), and Long-term DM is connected to an increased risk of sexual dysfunction, as Mohan (2023) repeatedly points out. According to Djorlo F (2021), female with type 2 DM more likely to experience sexual dysfunction, if they have had the disease for five years or longer, leading to issues such as orgasmic difficulties and pain during sexual intercourse (Hasan, 2023). However, it's worth noting that studies by Mirdehghan (2023) and Gupta (2022) have reported contradictory findings, suggesting that the duration of DM may not necessarily increase the risk of Female Sexual Dysfunction.

Moreover, deteriorating glycemic control has been identified as a significant factor contributing to the increased prevalence of sexual dysfunction (Mohan, 2023; Getie, 2021). Uncontrolled fasting blood glucose levels have been associated with sexual dysfunction, as noted by Paningbatan (2018). Additionally, defects in orgasmic function have been significantly linked to hypoglycemia (Gupta et al., 2022). Sexual dysfunction has also been linked to Type 2 diabetic women's HbA1c levels (Samuel, 2022). However, contradictory findings exist, with some research suggesting that the possibility of greater sexual dysfunction in women is not significantly correlated with HbA1c levels (Gupta, 2022; Mirdehghan, 2023).

Creatinine levels are also significantly associated with orgasmic function defects and sexual dysfunction (Derosa, 2023 and Gupta et al., 2022). Additionally, low GFR values also have an influence on the occurrence of sexual dysfunction (Silva et al., 2022).

According to Djorlo, F (2021), individuals with low monthly income are greater likelihood of sexual dysfunction. Additionally, Asefa (2019) highlighted that a lack of formal education can contribute to more people experiencing sexual dysfunction, a finding consistent with Djorlo F (2021), who also suggested that Limited educational attainment is linked to sexual dysfunction.

In the case of women, Masood (2021) found that the partner's occupation significantly influences the occurrence of Female Sexual Dysfunction. Moreover, Asefa (2019) observed that individuals suffering from type 2 DM who have experienced divorce or the loss of a spouse through widowhood also experience sexual dysfunction.

Another factor is not engaging in daily physical exercise, which is related to sexual dysfunction (Gebreegiabhier, 2020). This is consistent with Asefa (2019) stating that not engaging in physical activity is significantly associated with sexual dysfunction in DM patients. However, being physically active is

unlikely to affect sexual dysfunction (Getie, 2021).

Høgstvedt (2022) observed association between Depression and sexual dysfunction in females diagnosed with type 1 DM as well as DM-related distress. Similarly, Derosa (2023) and Asefa (2019) highlighted depression's significant impact on the occurrence of sexual dysfunction, with Derosa (2023) specifically noting that psychological conditions like anxiety and depression are closely linked to Female Sexual Dysfunction.

Stress is not the sole psychological factor affecting sexual dysfunction; body weight also plays a role. Flotynska, A (2019) indicated that sexual dysfunction is influenced by body weight, with higher body mass index (BMI) correlating with a greater likelihood of sexual dysfunction, a notion supported by Gupta (2022). Gupta (2022) went on to say that in women who have type 2 DM and central obesity sexual dysfunction is more prevalent. Conversely, Mirdehghan (2023) found no evidence of a significant relationship between hyperlipidemia and the total score for sexual dysfunction, with Djrolo F (2021) also stating no correlation between sexual dysfunction and BMI or central obesity.

In terms of reproductive history, Djrolo F (2021) identified parity or gestation equal to or greater than four as a risk factor for sexual dysfunction. However, Zamponi (2020) found no statistically significant differences in female sexual dysfunction based on previous pregnancy history in women who have been identified as having type 1 DM.

Angiopathy is linked to sexual dysfunction (Flotynska, A, 2019). Additionally, sexual dysfunction is also related to the type of treatment performed (Mirdehghan, 2023).

The utilization of oral medications for DM is significantly linked to DM-related erectile dysfunction in men (Gebreegziabhier, 2020). Utilizing beta-blockers has a strong correlation with the development of orgasmic function defects (Gupta et al., 2022). In contrast, female patients with DM who take antihypertensive

medications are more likely to experience sexual dysfunction (Saraswati, 2019). Derosa (2023) also noted the correlations between creatinine levels, beta-blocker usage, and statin intake with the incidence of sexual dysfunction.

Co-existing conditions and complications of DM are frequently linked with sexual dysfunction (Getie, 2021; Paningbatan, 2018; Asefa, 2021). Endothelial dysfunction is closely linked to Female Sexual Dysfunction (Derosa, 2023), with orgasmic function defects significantly associated with hypertension (Gupta et al., 2022). Microvascular and macrovascular complications further exacerbate this relationship (Gupta et al., 2022). However, Mirdehghan (2023) reported there is no notable correlation between the overall score of sexual dysfunction and hypertension, and Zamponi (2020) discovered that regardless of the existence of complications, there were no statistically significant differences in female sexual dysfunction among women with type 1 DM.

Sexual dysfunction is also associated with diabetic retinopathy (Silva et al., 2022; Paningbatan, 2018). Male who suffers from type 2 DM have a notable correlation between retinopathy and overall sexual dysfunction (Mirdehghan, 2023). Similarly, Mohan (2023) found that in diabetics with type 1 and type 2, retinopathy was correlated with sexual dysfunction.

Peripheral neuropathy is another significant factor contributing to sexual dysfunction (Silva et al., 2022; Mohan, 2023; Derosa, 2023; Paningbatan, 2018), with Mirdehghan (2023) establishing a connection between neuropathy and general sexual dysfunction in men with type 2 DM. Additionally, there is a connection between nephropathy and sexual dysfunction in men with type 2 DM.

Furthermore, patients with DM who have hypertension also have sexual dysfunction (Djrolo F, 2021), with significant correlations found between orgasmic function impairments and hypertension (Gupta et al., 2022). However, Mirdehghan (2023) found no notable association

between the overall score of sexual dysfunction and hypertension.

In addition to hypertension, albuminuria is also a factor related to sexual dysfunction (Mohan, 2023) (Djrolo F, 2021). Likewise, lower extremity artery disease is also associated with its presence with erectile dysfunction (Silva et al., 2022).

Sexual dysfunction is a critical reproductive health issue directly impacting reproductive physiological function (Rafika, 2023). Among men with sexual dysfunction, penile color Doppler ultrasonography revealed arterial insufficiency in 50% of participants (Silva et al., 2022). On the contrary, female patients with DM face an increased risk of encountering sexual dysfunction, frequently reluctant to openly discuss such issues voluntarily (Masood, 2021). Despite this, up to 85.6% of cases of sexual dysfunction go undisclosed to healthcare providers, despite 60.5% of affected individuals experiencing psychological ramifications (Silva et al., 2022).

Sexual dysfunction in DM patients is a complication that is occasionally overlooked, with psychosocial factors also contributing significantly to its manifestation (Susanti, 2019). Additionally, the concept that sexual dysfunction is a result of the aging process also contributes to this being often overlooked (Hasbullah et al., 2019). Furthermore, the influence of social and cultural factors in society makes sexuality a taboo topic for discussion. However, sexual dysfunction in DM patients is a marker of poor blood sugar control (Byomantara, 2023).

To date, sexual desire, sex education, early detection, and treatment of sexual problems have not been considered in the intervention of DM patients (Byomantara, 2023). One of the influencing factors is also cultural factors where there is a sense of shame for patients to admit it (Byomantara 2023). Indeed, sexual dysfunction profoundly impacts individuals with DM both physically and psychologically, including their sexual self-concept.

The complex component of sexual self-concept comprises people's attitudes, feelings, and beliefs regarding their sexual relationships (Deutsch AR, 2014 in Riazi H, 2020). Riazi (2020) conducted research comparing patients with and without sexual dysfunction among women with infertility issues, identifying notable variations in depression between the two groups, motivation, satisfaction, and sexual anxiety, among other things. Several factors influencing sexual self-concept in individuals with sexual dysfunction were identified, including the age of both women and their partners, causes of infertility, sexual motivation, and sexual satisfaction, all of which are significantly associated with sexual dysfunction (Riazi, 2020).

CONCLUSION

Diabetes Mellitus patients frequently experience sexual dysfunction in both genders. Men may experience decreased libido, orgasm difficulties, and premature or delayed ejaculation due to physiological conditions like neuropathy and vascular issues. Women with DM may encounter problems such as dyspareunia, lack of arousal, and satisfaction issues, often linked to hypogonadism and neurological disorders. Despite its significance in indicating blood sugar management, sexual dysfunction among diabetic patients is frequently overlooked. Interventions often neglect sexual desire, education, and early detection and treatment of sexual issues, impacting physical and psychological well-being.

SUGGESTIONS

Despite the significance of sexual self-concept, there has been limited research conducted on its correlation with sexual dysfunction. Regrettably, there has not been much research specifically to scrutinize the connection between individuals with DM' sexual self-concept and sexual dysfunction, highlighting the need for dedicated studies to address this association and raise awareness.

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DECLARATION OF CONFLICTING INTEREST

Considering various aspects, this research has been validated to be free from any conflicts of interest.

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AUTHOR CONTRIBUTION

Tiara Amalia Mentari: As the sole author, responsibilities encompass generating research ideas, conducting literature searches, selecting pertinent articles, drafting the research manuscript, preparing it for publication, and evaluating and revising the manuscript based on feedback.

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