

# Erectile Dysfunction and Quality of Life among Diabetic Men: A Systematic Review of Quantitative Studies

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## Abstract

**Purpose:** To synthesize quantitative studies associated with quality of life (QoL) among diabetic men with erectile dysfunction (ED).

**Design:** A quantitative systematic review was conducted. Searches of PubMed, CINAHL, and EBSCO were performed between January 2000 and September 2016. The main terms were “quality of life” and “erectile dysfunction.” Two authors independently assessed methodological quality using QualSyst tool.

**Main findings:** Six quantitative studies concerned mostly with quality of life among diabetic men with ED were included in this review. All high-quality studies reported that diabetic erectile dysfunction (DED) had a negative impact on QoL, with increased severity of ED correlating with a lower QoL. The QoL for diabetic men with ED was worse than that of nondiabetic men with ED.

**Conclusion and recommendations:** The existing high-quality scientific evidence reports that DED has negative effects on QoL, mainly in the dimensions of psychology and social relationships. Health care providers should actively assess erectile dysfunction in diabetic men in order to help alleviate the negative impact of DED on QoL. Future research should focus on a causal relationship between DED and QoL.

**Keywords:** diabetes mellitus, erectile dysfunction, quality of life, systematic review

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# ภาวะเสื่อมสมรรถภาพทางเพศและคุณภาพชีวิตของผู้ป่วยเบาหวานชาย: การทบทวนวิจัยเชิงปริมาณอย่างเป็นระบบ

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## บทคัดย่อ

**วัตถุประสงค์:** เพื่อศึกษางานวิจัยเชิงปริมาณที่เกี่ยวกับคุณภาพชีวิตของผู้ป่วยเบาหวานชายที่มีภาวะเสื่อมสมรรถภาพทางเพศ

**รูปแบบการศึกษา:** เป็นการทบทวนวรรณกรรมอย่างเป็นระบบ โดยศึกษางานวิจัยเชิงปริมาณ มีการสืบค้นจากฐานข้อมูล PubMed, CINAHL และ EBSCO ที่ตีพิมพ์ตั้งแต่เดือนมกราคม ปี ค.ศ. 2000 ถึงเดือนกันยายน ปี ค.ศ. 2016 คำสำคัญหลักที่ใช้ในการค้นหาคือ “คุณภาพชีวิต” และ “ภาวะเสื่อมสมรรถภาพทางเพศ” ผู้เขียนทั้งสองคนประเมินคุณภาพระเบียบการวิจัยด้วยตนเองโดยใช้เครื่องมือ QualSyst

**ผลการศึกษา:** งานวิจัยเชิงปริมาณจำนวน 6 เรื่อง ถูกนำมาวิเคราะห์ในการทบทวนนี้ งานวิจัยทั้งหมดมีคุณภาพสูงและให้ข้อมูลว่า ภาวะเสื่อมสมรรถภาพทางเพศจากโรคเบาหวานมีผลกระทบต่อทางลบกับคุณภาพชีวิต โดยความรุนแรงของภาวะเสื่อมสมรรถภาพทางเพศที่เพิ่มขึ้นส่งผลให้คุณภาพชีวิตต่ำลง คุณภาพชีวิตของผู้ป่วยเบาหวานชายที่มีภาวะเสื่อมสมรรถภาพทางเพศต่ำกว่าผู้ป่วยชายที่ไม่ได้เป็นโรคเบาหวานแต่มีภาวะเสื่อมสมรรถภาพทางเพศ

**สรุปและข้อเสนอแนะ:** หลักฐานเชิงประจักษ์ที่มีคุณภาพสูงรายงานว่าภาวะเสื่อมสมรรถภาพทางเพศมีผลกระทบต่อคุณภาพชีวิต โดยเฉพาะด้านจิตใจและความสัมพันธ์ทางสังคม บุคลากรด้านสุขภาพควรมีการประเมินภาวะเสื่อมสมรรถภาพทางเพศในผู้ป่วยเบาหวานชาย เพื่อสามารถช่วยลดผลกระทบทางลบของภาวะเสื่อมสมรรถภาพทางเพศต่อคุณภาพชีวิตของผู้ป่วยเบาหวานชาย การวิจัยในอนาคตควรมุ่งเน้นเกี่ยวกับความสัมพันธ์เชิงเหตุผลระหว่างภาวะเสื่อมสมรรถภาพทางเพศและคุณภาพชีวิต

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## Introduction

Diabetic erectile dysfunction (DED) or diabetes induced erectile dysfunction (DIED) refers to erectile dysfunction (ED) that results as a complication of diabetes mellitus<sup>1</sup>. Men of all ages who are living with DM are concerned about DED because it greatly disturbs their sex life<sup>1-3</sup>. Presently DED is highly reported more than 50 % among men with DM in both Western and Asian countries<sup>1</sup>. The pathogenesis of DED can be derived from multiple different physical and psychological causes including diabetic neuropathy, endothelial dysfunction, corporal tissue reformation, psychogenic components, and hormonal changes<sup>4,5</sup>. While common in older men with diabetes, DED is also found in young men. In fact, the majority of men living with DM are affected by the consequences of DED. This leads to not only a higher prevalence but also a more severe degree of ED for men with DM as compared to men without DM.

The impact of DED is related to quality of life (QoL). When a man experiences impotence, it can greatly influence his daily life and sexual health<sup>6</sup>. DED results in a decline of QoL because of difficulty in intimate relationships, causing men to lose their self-esteem and self-efficacy. However, there are few studies that investigate QoL among men living with DED. In ED or impotence and QoL literature review<sup>7-10</sup>, the studies found that penile dysfunction has a great negative influence on QoL of men and their spouses. Each previous study provided varying specific details such as assessment of both general QoL

and specific QoL domains among men living with ED<sup>7-8,10</sup>, as well as factors that influence QoL<sup>9</sup>. However, none of these studies was specific to men who had diabetes mellitus. Current knowledge about QoL of men with DED is not conclusive as to which dimensions of QoL have been affected. Thus, integration of quantitative data can provide a better idea of the consequences of DED on QoL.

To address these knowledge gaps, it is important to collect and synthesize findings from quantitative research on QoL among DED men. Thus, the following research question was addressed: “what are the impacts of DED on men’s QoL according to the men themselves?” Synthesizing knowledge can advance understanding of the impact of DED on QoL and better inform care planning and execution. It will also identify knowledge gaps and shed light on the need for further research.

## Objective

This systematic review was conducted to synthesize quantitative research on QoL among men living with DED.

## Design

The quantitative systematic review followed the general guidelines published by the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA)<sup>11</sup>.

## Eligibility Criteria

Quantitative research papers were included for analysis. The criteria used for selection of the studies are demonstrated in Table 1.

**Table 1:** Inclusion and exclusion criteria

Inclusion criteria	Exclusion criteria
Employed quantitative methods but not limited to designs (such as descriptive research, comparative research, clinical trials research, and RCT);	The primary subjects were not men with diabetic erectile dysfunction;
Paper reporting adult men aged 18 years or older who had DED; there were no restrictions on the type, severity, and complications of diabetes mellitus;	Case studies, reviews, or non-peer reviewed papers or book chapters;
An original peer-reviewed article published between 2000 and 2016 in English;	Conference abstract or poster presentations;
Provided numerical data on general or specific QoL from the standard and widely used instruments;	Reported a perception of others instead of men on QoL and men who were not diagnosed as having DED by IIEF, standard instruments, or a physician;

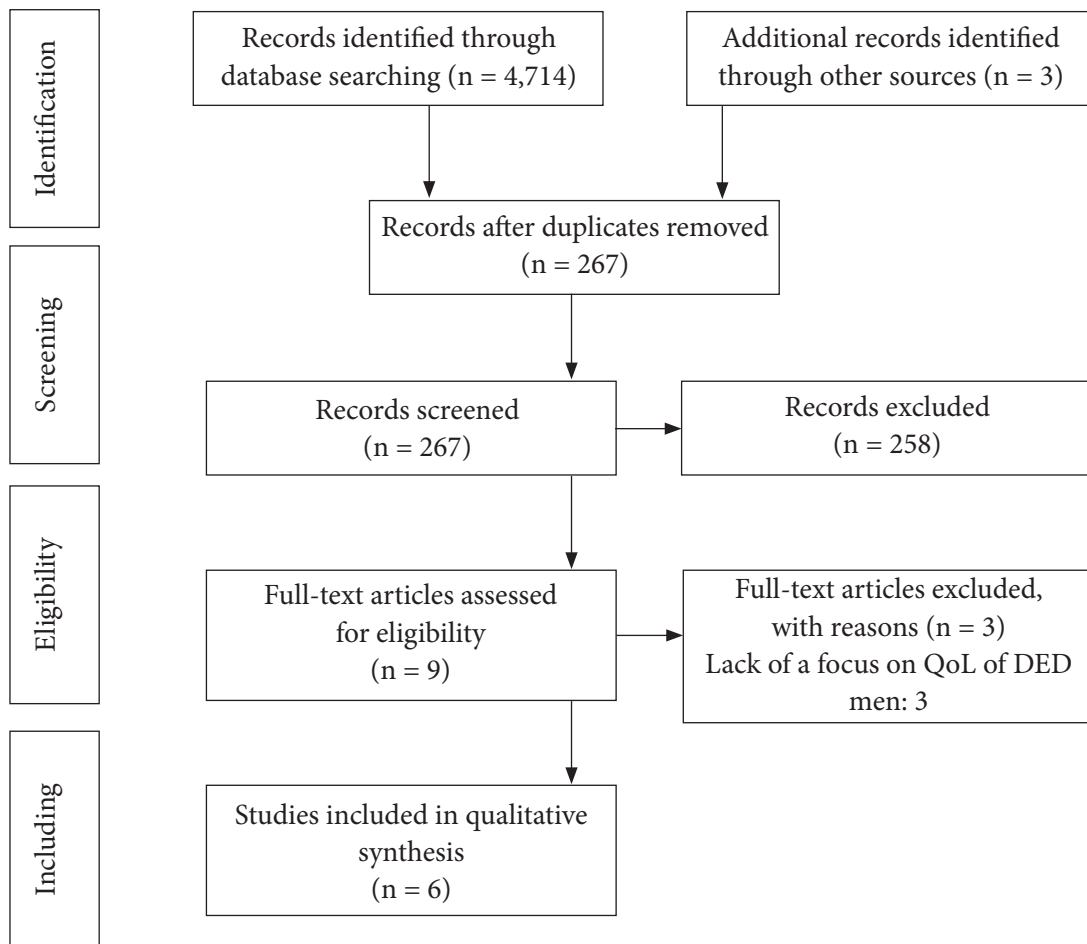
**Note:** IIEF, International Index of Erectile Function

### Search Strategy

PubMed, CINAHL, and Science Direct databases were searched. The terms used in the search strategy were “quality of life,” “erectile dysfunction,” “men with diabetes mellitus,” and “quantitative research”. The search terms used aimed to find studies that included the broader perception of quality of life among men with DED. The ED search terms were “erectile dysfunction,” “impotence,” and “diabetic erectile dysfunction”. The QoL terms searched were “quality of life” and “Health-related quality of life”. The databases were searched separately to enhance the identification of relevant studies and were searched in the period of August 2016 to October 2016. Manual searching were also implemented through the search engines in order to find the additional research articles.

### Search Outcome

A flow diagram describing the selection of studies is shown in Figure 1 based on the PRISMA guidelines<sup>9</sup>. The initial search identified 4,714 studies. After that, 4,447 duplicates were removed. The researchers independently screened titles and abstracts for the remaining 267 studies. Then, 258 studies were excluded due to not meeting the selection criteria as the participants were not men with diabetic erectile dysfunction. Nine studies were reviewed in full and then 3 studies were excluded due to not focusing on QoL of DED among men. Finally, 6 studies, including 3 studies found via searching manually, were included in the review.



**Figure 1:** Flow diagram of included studies through review process

**Study Selection**

After identifying published papers from the databases, the titles and abstracts of each study were independently screened. Three additional related studies were identified through manual searching based on references in previous literature reviews. The researchers independently conducted preliminary screens of each article and determined which studies met the above inclusion criteria. The eligible discussion on reason for exclusions was performed between researchers. Then, the researchers read the full-text of each remaining study in detail.

**Data Extraction and Synthesis**

The first researcher read each study and extracted: a) researchers, year of publication, and country; b) study purpose; c) participants; d) instruments; e) findings; and f) limitations from the selected articles into the common table. The second researcher cross-checked the said extracted information. Table 2 displays a summary of the contents and findings of the studies.

**Table 2:** Overview of studies

Author, County	Study design	Purpose	Participants	Assessment of DED and QoL	Findings
De Berardis, et al. <sup>12</sup> USA	Cross-sectional	To assess the prevalence of self-reported erectile dysfunction and evaluate its impact on quality of life	2,962 T2DM Italian patients	DED: 2 questions on a five scale - How often he had experienced problems in attaining and maintaining an erection during the past 6 months QoL: SF-36, diabetes-related stress, diabetes health distress, sexual life questionnaire	Patients with ED had lower scores in all QoL dimensions; greater differences were seen in physical, emotional, and social functioning dimensions.
Penson, et al. <sup>13</sup> USA and Canada	Longitudinal study	To compare disease-specific health-related quality of life (HRQOL) and severity of ED in impotent men with and without diabetes	110 men	DED: IIEF-5 QoL: SF-36, PIED, sexual self-efficacy scale	Diabetic men with ED appeared to have worse disease-specific HRQOL than nondiabetic men with ED. ED had a greater impact on emotional life of diabetic men. No differences were noted in the Sexual Desire domain of the IIEF among diabetic and non-diabetic.

**Table 2:** (continued)

Author, County	Study design	Purpose	Participants	Assessment of DED and QoL	Findings
De Berardis, et al. <sup>14</sup> USA	Longitudinal study	To evaluate the longitudinal changes over 3 years in quality of life (QoL) in patients with type 2 diabetes according to the presence or the development of erectile dysfunction (ED)	1,456 patients	DED: 2 questions on a five scale - How often he had experienced problems in attaining and maintaining an erection during the past 6 months QoL: SF-36, quality of sexual life	- Patients who developed ED were older, had longer duration of diabetes, worse metabolic control, and were more often treated with insulin and affected by hypertension, neuropathy, CVD. - Patients with ED showed a worsening in all SF-36 scales. The onset of ED was associated with a further marked worsening in physical functioning, general health perception, and social functioning. The development of ED was also associated with a highly significant increase in depressive symptoms and a marked decrease in quality of sexual life.

**Table 2:** (continued)

Author, County	Study design	Purpose	Participants	Assessment of DED and QoL	Findings
Avasthi, et al. <sup>15</sup>  India	Cross-sectional	To study the QoL of men with type 2 diabetes mellitus (T2DM) and ED and compare to the QoL for men with DM without ED	63 patients of DM with ED and 30 patients of DM without ED	DED: IIEF-5 QoL: WHO-QoL-BREF, HAM-D, HAM-A	DED men had poorer QoL in all domains than diabetic men (except the physical domain); however, the differences between the two groups were significant only for the environmental domain.
Brooke, et al. <sup>16</sup>  UK	Cross-sectional	To investigate the impact of testosterone and ED on quality of life (QoL) in diabetic men	126 ED patients	DED: IIEF-5 QoL: SF-36	Patients who reported having ED had an average SF-36 score of 9.1% less than those without ED ( $p < .001$ ). Lower testosterone and greater severity of ED independently correlated with poorer physical function, physical health, social function, vitality, pain, and decline in general health domains of the SF-36.

**Table 2:** (continued)

Author, County	Study design	Purpose	Participants	Assessment of DED and QoL	Findings
Malavige, et al. <sup>17</sup> Sri Lanka	Cross-sectional	To identify predictors of poor quality of life among men with diabetes	253 Sri Lanka men with T2DM	For DED: IIEF-5 For QoL: SF-36, PIED	DED is a significant predictor of poor generic and disease-specific quality of life on the physical summary scale of the 36-item short form ( $\beta = 7.93$ , 95%CI = 3.70, 12.17, $p < .001$ ), the mental health summary scale of the 36-item short form ( $\beta = 5.82$ , 95%CI = 2.26, 9.37, $p < .01$ ) and the sexual experience scale of the Psychological Impact of Erectile Dysfunction ( $\beta = 6.57$ , 95%CI = 4.63, 8.51, $p < .001$ ).

**Note:** HRQoL, Health related quality of life; T2DM, Type 2 diabetes mellitus; QoL, Quality of life; PIED, Psychological Impact of Erectile Dysfunction Scale; SF-36, Short-Form-36 Health Survey; WHOQoL-BREF, World Health Organization Quality-of-Life Questionnaire-BREF; IIEF-5, International Index of Erectile Dysfunction; HAM-D, Hamilton Depression Rating Scale; HAM-A, Hamilton Anxiety Rating Scale

**Quality Appraisal**

The researchers used the QualSyst tool<sup>18</sup> to assess the quality of quantitative studies. This tool is a checklist of 14 questions. These 14 items were scored from 0 to 2 depending

on the degree to which the specific criteria were met. Items not applicable to a particular study design were excluded from the calculation of the summary score. All studies meeting the .75 score threshold were included in the review<sup>19</sup> (Table 3).

**Table 3:** Quality assessment for quantitative studies

Studies	Quality Assessment Criteria for Qualitative Studies														Total Score	Summary score
	1	2	3	4	5	6	7	8	9	10	11	12	13	14		
De Berardis, et al. <sup>12</sup>	2	1	2	2	N/A	N/A	N/A	2	2	2	1	1	2	2	19	19/22 = 0.86
Penson, et al. <sup>13</sup>	2	2	2	2	N/A	N/A	N/A	2	2	2	1	2	2	2	21	21/22 = 0.95
De Berardis, et al. <sup>14</sup>	2	2	2	2	N/A	N/A	N/A	1	2	2	1	1	2	2	19	19/22 = 0.86
Avasthi, et al. <sup>15</sup>	2	1	2	2	N/A	N/A	N/A	1	1	2	1	2	2	2	18	18/22 = 0.82
Brooke, et al. <sup>16</sup>	2	1	2	2	N/A	N/A	N/A	2	2	2	1	1	2	2	19	19/22 = 0.86
Malavige, et al. <sup>17</sup>	2	2	2	2	N/A	N/A	N/A	2	2	2	1	1	2	2	20	20/22 = 0.90

**Note:** The QualSyst tool for quantitative studies: 1. Question / objective sufficiently described?; 2. Study design evident and appropriate?; 3. Method of subject/comparison group selection or source of information/input variables described and appropriate?; 4. Subject (and comparison group, if applicable) characteristics sufficiently described?; 5. If interventional and random allocation was possible, was it described?; 6. If interventional and blinding of investigators was possible, was it reported?; 7. If interventional and blinding of subjects was possible, was it reported?; 8. Outcome and (if applicable) exposure measure(s) well defined and robust to measurement / misclassification bias? Means of assessment reported?; 9. Sample size appropriate?; 10. Analytic methods described/justified and appropriate?; 11. Some estimate of variance is reported for the main results?; 12. Controlled for confounding?; 13. Results reported in sufficient detail?; and 14. Conclusions supported by the results? (2 = Yes, 1 = Partial, No = 0, Not applicable = N/A)

## Findings

### General Results

#### Quality of studies

An assessment of study quality is available in Table 3. Overall scores ranged from 0.86/1 to 0.95/1. The quality of a paper was defined as strong (summary score of > 0.80), good (summary score of 0.71-0.79), adequate (summary score of 0.50-0.70), or limited (summary score of < 0.50)<sup>19</sup>. This review is grounded on findings with an overall 'strong' methodological quality. Common strengths included: clear reporting of study objectives, clear reporting of patient characteristics and method of selection, clear reporting of results and conclusion, and the use of appropriate statistical tests to assess the main outcomes. Weaknesses within the 6 included studies were mainly related to a lack of clearly reporting an

estimate of variance for the main results or the study not being controlled for confounding.

#### Description of studies

All studies were quantitative in nature, using cross-sectional design (n = 4) and longitudinal descriptive study design (n = 2). Most of the previous studies about evaluation of QoL among men living with DED were conducted in western countries while only two studies were conducted in an Asian context. Two studies were of American participants and the other studies individually investigated participants in Canada and America, United Kingdom, India, and Sri Lanka. The number of participants in the 6 studies varied from 63 to 2,962.

#### Measuring methods

##### Measuring quality of life

The 6 studies used generic health-related

QoL tools to measure QoL including the Short-Form-36 health survey (SF-36) and the World Health Organization Quality-of-Life Questionnaire-BREF (WHOQoL-BREF). In addition to general QoL, specific QoL domains (such as sexual quality of life) and related impacts of DED (e.g. anxiety, stress, and self-esteem) were also assessed. The measurement of specific QoL and related psychological impacts was done through quality of sexual life, diabetes-related stress, sexual self-efficacy scale, Psychological Impact of Erectile Dysfunction (PIED), Hamilton Rating Scale for Depression (HAM-D), and Hamilton Rating Scale for Anxiety (HAM-A).

#### *Measuring erectile dysfunction*

Four studies<sup>13,15-17</sup> used the International Index of Erectile Dysfunction (IIEF-5) to assess erectile dysfunction among diabetic men. Only two studies<sup>12,14</sup> used self-reported questionnaires that included two questions: "How often have you experienced problems in attaining an erection during the past 6 months?" and "How often have you experienced problems in maintaining an erection during the past 6 months?"

#### **Impact of DED on QoL**

All studies looking at the impact of DED on QoL found evidence to suggest that DED can have a negative impact on QoL among male patients<sup>12-17</sup>. QoL in diabetic patients with erectile difficulty decreased in at least one aspect<sup>12-17</sup>, and three studies stated that DED patients have poor QoL compared with the general male population<sup>13-15</sup>. Two studies revealed that DED has an impact on all of the SF-36 domains<sup>12,14</sup>. In addition, one study revealed that DED has a significant association with psychological, social relationships, and environmental domains of WHO-QoL-BREF<sup>15</sup>.

#### *Physical health*

Two studies found that DED is

significantly associated with physical health<sup>16-17</sup>. Using the SF-36 to measure, these studies showed that men with T2DM who experienced DED encountered a declining QoL in the overall physical domain. The only domain on the questionnaire that was not affected was role-physical limitation (regarding the amount of time spent on work, difficulty in performing work, and the level of accomplishment associated with work or other usual activities). However, another study<sup>15</sup> reported that QoL in the physical domain among men having T2DM with ED and men having DM without ED was not significantly different; both groups reported low scores for the physical domain. The researchers suggested that this was because the participants from both groups were elderly. Decreasing physical health was associated with severity of DED, severe clinical conditions of DED, higher prevalence of micro- and macrovascular complications, and older age<sup>12,14,16</sup>.

#### *Psychological health*

Three studies confirmed the association between DED and mental health such as self-esteem, self-efficacy, anxiety, and depression<sup>13,15,17</sup>. DED men scored lower in the emotional life domain on the PIED scales than those with common ED ( $p < .067$ ). DED men also scored lower in the psychological impact domain ( $p < .002$ )<sup>13</sup>. DED is a predictor for the emotional life and sexual life scales of PIED ( $\beta = 2.96$ , 95%CI = 1.37, 4.58,  $p < .001$ )<sup>17</sup>. One study<sup>15</sup> found that while the patients with DED had poor QoL in the psychological domain, they had low depression and anxiety scores (indicating lower incidence of depression and anxiety). The explanation provided in the paper was that age of participants was about 50-60 years, thus, sex was no longer considered as an important aspect in their lives.

*Social and relational*

Three of the 6 studies revealed that DED impacted social and relational function<sup>15-17</sup>. Men who experience DED have lower QoL score in the social and relational domains than men without DED<sup>15</sup>. However, the difference between the two groups is not statistically different. The authors claimed that the lack of difference in the social domain of QoL can be understood from socio-cultural background. The age of participants in the two groups was similar. Usually the elderly people are involved in the care of their grandchildren, which also keeps them busy, leading to a lack of difference in social domain of QoL. Among men living with DED, DED may lead to relationship difficulties, decreased confidence, and a degree of embarrassment, perhaps explaining why it is associated with reduced QoL<sup>17</sup>.

*Environmental*

The investigation of environmental domain of QoL is focused on the perception of one's environment and its influence on daily life, such as perceived safety and security, health care service, financial resources, and perceived opportunity for new information and skills.

One study<sup>15</sup> reported that DED is associated with the environmental domain of QoL. Diabetic men with ED had significantly poorer QoL in the environmental domain than those without ED<sup>15</sup>. DED leads to feelings of physical insecurity, lack of freedom, dissatisfaction with the health system, and discomfort in the home environment as well as to lack of participation in other leisure and recreational activities.

**Discussion**

To the best of the authors' knowledge, this was the first systematic review of QoL among DED men. This systematic review, including a full analysis of six quantitative studies, found

that DED has a negative impact on men's QoL.

In terms of research design, most of the studies<sup>12,15-17</sup> (66.67%) employed a cross-sectional design. Longitudinal studies examining the impact of DED on QoL in men were fewer. A cross-sectional study, however, is relatively inadequate to determine causal relationships. This design cannot reveal a real causal relationship between DED and QoL or determine whether such a relationship changes over time. Moreover, some of the studies<sup>12,17</sup> did not use control groups, which can lead to an increased risk of bias due to an inability to detect differences between groups in the real world<sup>20</sup>. Therefore, the possible applications of this review's findings are relatively conservative due to incomplete methodological descriptions in the included studies.

The studies selected in this review were of good quality. The most frequently used tool for measuring QoL was the SF-36 (five studies). Another systematic review also found the SF-36 to be a commonly used measurement tool<sup>21</sup> as it is easy to use, applicable to various diseases, and less prone to the ceiling effect. However, most of the instruments used to measure QoL were not designed specifically for DED patients; rather, these questionnaires are commonly used for several different chronic diseases. It is important that clinicians and researchers carefully appraise the location, purpose, study objects, and possible applications of results when deciding on the appropriate measure to use<sup>22</sup>.

Most studies we reviewed support the notion that worsening ED is related to deteriorating QoL, and that QoL for men with greater severity ED is worse than that of men with only mild or moderate ED. Possible explanations include the following: (1) low self-esteem: inability to please their partner challenges the men's sense of masculinity and

decreases their QoL; and (2) relationship problems: men are ashamed to talk about ED with their partners or find help and instead pull away from their partners, resulting in a low QoL<sup>23-25</sup>. Based on these possible explanations, future studies should examine whether buffering effects exist that can alleviate the negative effects of DED on QoL. Also, it is recommended that future research involve qualitative methods to further achieve a more comprehensive analysis on how DED affects QoL. In addition, when assessing the impact of DED on QoL, it is also important to consider subjects with varying severities of ED.

The studies assessed in this review were predominantly from the USA, and studies from other parts of the world (Canada, Asia, and Europe) were fewer. Due to cultural differences between countries such as sexual culture and traditional masculine norms, results may be different when comparing studies from different parts of the world. Therefore, the studies from the USA should inspire researchers in other parts of the world to perform new studies in order to contribute to the knowledge of how DED affects men's quality of life.

#### **Limitations**

The present review only examined studies that were published in English between 2000 and 2016. The omission of studies in other languages poses considerable limitations to the generalizability of the review's conclusions. The number of databases used to search for the literature leaves the possibility that some studies were not identified. A comprehensive meta-analysis is not possible because the studies used varying measurement to assess ED and QoL. All participants in this review came from diabetic clinics. This may limit the ability to generalize the findings for a broader clinical context.

#### **Conclusion and Recommendations**

Previous evidence shows that DED is significantly associated with QoL among men living with DED. QoL in men with DED is lower than in those without DED and lower with increased severity of DED. DED thus has a negative impact on QoL, especially in the psychological social relationships domains. This review can be used to enhance health care providers' understanding of DED in diabetic men and to enable health care providers to actively assess diabetic men's sexual functions in order to help alleviate the negative impact of DED on QoL in diabetic men.

#### **Implications for practice and policy**

Health care providers should provide psycho-educational interventions such as counseling to promote better QoL among DED patients, particularly those who ignore the complications resulting from ED such as stress or anxiety, unsatisfactory sex life, and relationship problems. Moreover, health care settings should have health care providers such as psychiatric nurses who can provide counseling that can help diabetic men to deal with the impact of erectile dysfunction on their QoL. Health care providers must provide longer-term follow-up when treating ED in diabetic patients and must be prepared to try alternative therapies for their patients who want additional treatment.

#### **Implications for further study**

Longitudinal studies to establish a causal relationship between DED and QoL should be conducted. The future research should investigate specific QoL domains, especially psychological and social relationships domains among DED men. For the general QoL investigation, factors influencing each QoL domain as well as management of QoL should be examined. Further investigation on QoL among men living with DED should consider long term changes. Different QoL levels may

be found for different stages of diabetes such as during periods of uncontrolled versus controlled blood sugar. Moreover, a comparison of QoL for varying severity of DED is recommended.

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