

REVIEW ARTICLE

Sexual Dysfunction in Iranian Men with Diabetes; a Systematic Review and Meta-Analysis

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Abstract: **Introduction:** The typical sexual function involves the integrity and harmonious interaction of psychological, endocrine, vascular, and nervous systems. We aimed to determine the prevalence of sexual dysfunction (SD), more specifically erectile dysfunction in Iranian men with diabetes. **Method:** Using keywords including: "sexual function," "erectile dysfunction," "diabetes," and "Iran", an electronic search was done on national and international databases. All cross-sectional or baseline data in cohort studies were included. The prevalence of SD and its related risk factors were extracted and summarized. The random effect model was used for estimating the pooled prevalence. **Result:** Ultimately, 16 studies were included in the qualitative synthesis, amongst which 6 were included for quantitative synthesis. The pooled prevalence of SD across included studies was 50.7% with a total sample size of 1513. Two main correlated factors with SD were advanced age and depression. **Conclusion:** Our analysis showed that more than half of the Iranian men with diabetes suffer from SD. Apart from advanced age, the most important attributes for comorbidity of diabetes and SD in these patients were found to be chronic uncontrolled high blood sugar and depression. More advanced epidemiological studies are needed to assess the temporality of the relationship between SD and its related comorbidities and to develop proper preventive programs.

Keywords: Diabetes; Erectile dysfunction; Iran; Male; Sexual dysfunction

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1. Introduction

The typical sexual function involves the integrity and harmonious interaction of psychological, endocrine, vascular, and nervous systems [1]. These systems are susceptible to disruption from health-related lifestyle choices [2, 3]. Healthy sexuality is an integral part of human life and can undoubtedly lead to social and rational aspects and create relationships and love [4]. Therefore, any disorder leading to inconsistency and lack of sexual satisfaction can cause sexual dysfunction (SD)[5]. SD is seen as a universal health problem for both men and women and can adversely affect the qual-

ity of life of millions of partners. Most of them prefer to suffer in silence [6]. However, SD refers to the common and persistent problems associated with divorce and a lower quality of life, and causes physical, social, and mental health problems such as mental illness, anxiety, and self-esteem in sufferers and their partners [7]. SD is primarily assessed on the basis of several SDs such as: erectile dysfunction (ED), ejaculatory disorder, and decreased sexual desire in men, each leading to increased psychological and social effects of the disease [8]. The most common sexual complaint in male sexual medicine is erectile ED [9], which is defined as a constant or recurrent inability (more than six months) to achieve or maintain an erection sufficient to be followed by satisfactory sexual activity [10]. ED primarily affects men older than 40 years (with prevalence rates increasing across the adult lifespan)[1]. In addition, the global prevalence of ED is expected to rise to 322 million cases by 2025 [11]. The pathophysio-

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logical source of the disorder can be modifiable risk factors such as obesity, smoking, stress, depression, and chronic diseases (diabetes, cardiovascular disease, hepatitis, kidney failure) that have been included as risk factors that affect various aspects of SD, and are especially influential in the development of ED [12-14].

Diabetes is considered to be one of the most critical, systemic, and silent epidemic diseases affecting older adults worldwide, especially in developing countries such as Asia [15, 16]. Diabetes is known as a group of endocrine and metabolic disorders characterized by high blood sugar and increasing trends around the world. Overall, hyperglycemia in diabetics can lead to both short- and long-term complications. One of the long-term complications is SD. It is usually a disorder that occurs in both male and female patients [17, 18]. Although, SD, especially ED, which is occasionally a chief complaint in men with diabetes compared with those free from it, especially in men affected with diabetic vasculopathy and neuropathy [19, 20]. The pathogenesis of diabetic ED is widespread and various factors known to increase the risk of ED in men with diabetes include duration, type, diabetes status, blood sugar control, metabolic control, and mental disorders such as depression and anxiety [21-24]. In terms of the impact on quality of life, early diagnosis and treatment of ED in these men is essential and could help better manage and prevent or delay its progression. The high overall SD rate in diabetics has a dramatic effect on quality of life and is increasing in all countries. Numerous studies in different countries around the world have reported that the prevalence of ED is very high, ranging between 35-90% in men with diabetes [25, 26]. In addition, the prevalence of ED in Iranian people with diabetes has been performed in several studies, and the severity of this problem is not the same in different reports [8, 23, 24, 27].

Also, because of the increasing prevalence of diabetes, especially at younger ages, it is important to pay more attention to SD and its risk factors when creating health records and considering routine care for these patients. We aimed to calculate the combined prevalence of erectile dysfunction in Iranian men with diabetes.

2. Methods

This study aimed to assess the prevalence of sexual dysfunction, more specifically erectile dysfunction in men with diabetes in Iran. For this aim, all cross-sectional or baseline data in cohort studies were included. Keywords such as "sexual function," "erectile dysfunction," "diabetes," and "Iran" were searched in international databases including Scopus, MedLine, Web of Science, ProQuest, and on the national scientific information database (SID) from inception until October 2020. No language restriction was defined as the studies were

presumed to be published in either English or Farsi. We excluded studies with non-Iranian participants, experimental designs, and studies with female participants. Two independent researchers completed the process of article selection. Quality assessment of the studies was performed using the Newcastle-Ottawa Scale (NOS) checklist [28].

Extracted data included the author's information, publication year, sample size, type of measurement tool, and the estimated prevalence of ED. A separate table has been prepared for the reported related factors for SD. The study outcome was determined as the proportion of men with diabetes with SD. To calculate standard error for prevalence estimates, the exact method and binary distribution were used. Heterogeneous Cochrane test (Q) was used to assess the heterogeneity between studies. The results of this test suggested that the random-effect model was a perfect strategy for estimating the pooled prevalence of SD ($P < 0.001$). Forest plot was prepared for prevalence estimation as well as 95% confidence intervals (CIs) so that the size of the squares indicates the specified weight based on the sample size and vertical lines indicate 95% CI in the estimated prevalence in each study and the estimated pooled prevalence. Data were analyzed using Stata software, version 14 (Stata Corp., College Station, TX, USA).

3. Results

The search retrieved 546 studies at the initial phase. 334 articles remained after removing duplicates. After title and abstract screening 318 studies were excluded. Ultimately, 11 studies were included in the qualitative synthesis, amongst which 6 were included for the quantitative synthesis (i.e. calculation of the pooled prevalence) (Figure 1).

The results of the heterogeneity test of the estimated prevalence showed a high variation among studies, necessitating calculation of the pooled prevalence by the random-effects model ($I^2 = 579.91$, $P < 0.001$). Accordingly, the pooled prevalence of SD across included studies with a total sample size of 1513 was calculated to be 50.7% (95%CI: 48.0, 52.7%). (Table 2)

Risk factors of SD with significant correlation or effect in patients with diabetes, as shown in table 2 include the duration of diabetes in 3 (27%) studies, age in 4 (36%) studies, smoking in 2 (18%) studies, obesity and higher body mass index (BMI) in 2 (18%) studies, lower HDL in 1 (9%) study, hypercholesterolemia in 1 (9%) study, high HbA1c in 2 (18%) studies, and poor metabolic control in 1 (9%) study. The existence of other comorbidities such as depression in 4 (36%) studies, anxiety in 1 (9%) study, stress in 1 (9%) study, hypertension in 2 (18%) studies, cardiovascular diseases in 2 (18%) studies was statistically significantly associated with prevalence of SD. In one study a positive correlation was seen between

self-efficacy and erectile function. Several studies especially emphasized the duration of diabetes, and a study calculated the effect of each year living with diabetes on increasing the risk of ED by 10% (95% CI 2–18%). Type II diabetes was reported by two studies to have a higher correlation with SD compared with type I (table 3).

The most common questionnaires used by the included studies were 15-item International Index for Erectile Function (IIEF) in 4 (36%) studies, and 5-items IIEF in 3 (27%) studies, followed by Male Sexual Function Index (MSFI) in 2 (18%) studies, Androgen Deficiency in the Aging Male (ADAM) in 1 (9%) study, and Sexual Quality of Life-Male (SQOL-M) in 1 (9%) study.

4. Discussion

The global aging of the world population and increasing incidence of diabetes mellitus may explain the increased prevalence of ED in the world [29]. ED is the third most common complication of diabetes influencing the quality of life [30]. There are a few studies about the prevalence of ED in Iranians with diabetes mellitus. The prevalence of ED in patients with diabetes differs across the world, for instances it has been reported to be 35.8% in Italy [31], 64.6% in Japan [32], 65.4% in Korean [33], 86.1% in Saudi Arabia [34], 38.9% in India [35], and 71.45% in Africa [36]. In this study, the overall prevalence of ED was about 50.7% in Iranian men with diabetes. The large differences in the reported prevalence of ED in men with diabetes might be related to differences in methodology and population characteristics. The prevalence of ED is about 18.8% in the Iranian population [37].

The odds of ED in people with diabetes is about 2.69 higher than the general population in Iran. ED was significantly higher in men with type II diabetes compared with type I diabetes and in older men. These findings are consistent with the Massachusetts Male Aging Study in which men with diabetes showed a threefold chance of having ED compared with men without diabetes [38]. The results of other high-quality studies [39] are consistent with our results that advanced age and Type II diabetes are correlated with an increased risk of ED. In addition, our finding confirmed that depression increased the risk of developing ED in patients with diabetes mellitus. Regarding the psychological impact of ED, there was a positive correlation between ED and depression which contributes to poorer quality of life [40]. ED was associated with classical cardiovascular risk factors including smoking, hypertension, hypercholesterolemia, and obesity in the Iranian population. In a large survey of 7689 men with diabetes and/or hypertension, ED was reported in 67% of those with hypertension alone, in 71% with diabetes alone, and in 77% of men with both diseases [41]. Some studies suggest that ED is a vascular disease [42]. Therefore, ED not only

influences quality of life but is also associated with cardiovascular events in men with diabetes. ED could be considered as a good predictor of cardiovascular events and all-cause mortality in patients with diabetes mellitus (13). Therefore, early detection of ED improves both mental and physical health.

Although this study provides valuable information about SD among men with diabetes in Iran but has some limitations. First, most studies considered the prevalence of ED in men with diabetes mellitus and did not separate those with type I and II diabetes. Second, most studies did not provide complete data. This study showed that there is a link between ED and cardiovascular risk factors and depressive mood in patients with diabetes which has an impact on the quality of life and cardiovascular events. Both psychosocial support and health care support are crucial for men with diabetes mellitus. Future prospective, longitudinal, and separate studies in both populations with type I and type II diabetes, are encouraged to be done.

5. Conclusion

Despite a remarkable heterogeneity among studies on the association of diabetes with SD, our analysis showed that more than half of the Iranian men with diabetes suffer from SD. Apart from advanced age, the most important attributes for comorbidity of diabetes and SD in these patients were found to be chronic uncontrolled high blood sugar and depression. More advanced epidemiological studies such as prospective population-based cohort studies are warranted to assess the temporality of the relationship between SD and its related comorbidities and to develop proper preventive programs.

6. Appendix

6.1. Acknowledgements

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6.2. Conflict of interest

None.

6.3. Funding and support

This study was part of an ongoing project, with no independent financial support.

6.4. Author contribution

The authors declare that they have no competing interests.



References

1. Shamloul, R. and H. Ghanem, Erectile dysfunction. *The Lancet*, 2013. 381(9861): p. 153-165.
2. Biswas, A., et al., Sedentary time and its association with risk for disease incidence, mortality, and hospitalization in adults: a systematic review and meta-analysis. *Annals of internal medicine*, 2015. 162(2): p. 123-132.
3. Lee, I.-M., et al., Effect of physical inactivity on major non-communicable diseases worldwide: an analysis of burden of disease and life expectancy. *The lancet*, 2012. 380(9838): p. 219-229.
4. Organization, W.H., Measuring sexual health: Conceptual and practical considerations and related indicators. 2010, World Health Organization.
5. Rush Jr, A.J., M.B. First, and D. Blacker, *Handbook of psychiatric measures*. 2009: American Psychiatric Pub.
6. Atlantis, E. and T. Sullivan, Bidirectional association between depression and sexual dysfunction: a systematic review and meta-analysis. *The journal of sexual medicine*, 2012. 9(6): p. 1497-1507.
7. Nappi, R.E., et al., Female sexual dysfunction (FSD): Prevalence and impact on quality of life (QoL). *Maturitas*, 2016. 94: p. 87-91.
8. Fallahi, M., et al., Evaluation of sexual function in men with diabetes mellitus type 2-Yazd Diabetes Research Center. *Iranian Journal of Diabetes and Obesity*, 2014. 6(3): p. 136-141.
9. Hatzimouratidis, K., et al., Guidelines on male sexual dysfunction: erectile dysfunction and premature ejaculation. *European urology*, 2010. 57(5): p. 804-814.
10. Lewis, R.W., et al., Definitions/epidemiology/risk factors for sexual dysfunction. *The journal of sexual medicine*, 2010. 7(4): p. 1598-1607.
11. Aytac, I., J. McKinlay, and R. Krane, The likely worldwide increase in erectile dysfunction between 1995 and 2025 and some possible policy consequences. *BJU international*, 1999. 84: p. 50-56.
12. Beutel, M., W. Weidner, and E. Brähler, Epidemiology of sexual dysfunction in the male population. *Andrologia*, 2006. 38(4): p. 115-121.
13. Gupta, B.P., et al., The effect of lifestyle modification and cardiovascular risk factor reduction on erectile dysfunction: a systematic review and meta-analysis. *Archives of Internal Medicine*, 2011. 171(20): p. 1797-1803.
14. McAninch, J.W. and T.F. Lue, *Smith & Tanagho's general urology*. 2013: McGraw-Hill Medical New York.
15. Meneilly, G.S. and D. Tessier, Diabetes in elderly adults. *The Journals of Gerontology Series A: Biological Sciences and Medical Sciences*, 2001. 56(1): p. M5-M13.
16. Tong, P.C., et al., Association of testosterone, insulin-like growth factor-I, and C-reactive protein with metabolic syndrome in Chinese middle-aged men with a family history of type 2 diabetes. *The Journal of Clinical Endocrinology & Metabolism*, 2005. 90(12): p. 6418-6423.
17. Hidalgo-Tamola, J. and K. Chitale, Type 2 diabetes mellitus and erectile dysfunction. *The Journal of Sexual Medicine*, 2009. 6(4): p. 916-926.
18. Isidro, M.L., Sexual dysfunction in men with type 2 diabetes. *Postgraduate medical journal*, 2012. 88(1037): p. 152-159.
19. Kamenov, Z., A comprehensive review of erectile dysfunction in men with diabetes. *Experimental and Clinical Endocrinology & Diabetes*, 2015. 123(03): p. 141-158.
20. Parazzini, F., et al., Diabetes, cardiovascular diseases and risk of erectile dysfunction: a brief narrative review of the literature. *Archivio Italiano di Urologia e Andrologia*, 2009. 81(1): p. 24-31.
21. Awad, H., et al., Erectile function in men with diabetes type 2: correlation with glycemic control. *International journal of impotence research*, 2010. 22(1): p. 36-39.
22. Furukawa, S., et al., Depressive symptoms and prevalence of erectile dysfunction in Japanese patients with type 2 diabetes mellitus: the Dogo Study. *International Journal of Impotence Research*, 2017. 29(2): p. 57-60.
23. Mofid, A., et al., Prevalence and risk factors of erectile dysfunction in Iranian diabetic men. *Acta Medica Iranica*, 2009: p. 309-314.
24. Ghodrati Mirkouhi, M. and S. Hadadi, Correlation between Self-Efficacy with Sleep Quality and Sexual Function Index in Patients with Type 2 Diabetes. *Qom University of Medical Sciences Journal*, 2018. 12(4): p. 31-41.
25. Malavige, L.S. and J.C. Levy, Erectile dysfunction in diabetes mellitus. *The journal of sexual medicine*, 2009. 6(5): p. 1232-1247.
26. Penson, D.F., et al., Do impotent men with diabetes have more severe erectile dysfunction and worse quality of life than the general population of impotent patients?: Results from the Exploratory Comprehensive Evaluation of Erectile Dysfunction (EXCEED) database. *Diabetes care*, 2003. 26(4): p. 1093-1099.
27. Habibi, A., et al., Evaluation of erectile dysfunction and associated factors in type-II diabetic patients in Birjand, Iran in 2008-2009. 2011.
28. Lo, C.K.-L., D. Mertz, and M. Loeb, Newcastle-Ottawa Scale: comparing reviewers' to authors' assessments. *BMC medical research methodology*, 2014. 14(1): p. 1-5.
29. Ayta, I.A., J.B. McKinlay, and R.J. Krane, The likely worldwide increase in erectile dysfunction between 1995 and 2025 and some possible policy consequences. *BJU Int* 1999. 84: p. 50-56.
30. Shlomei, G., et al., Type 2 diabetes mellitus and cancer: the role of pharmacotherapy *J Clin Oncol*, 2016. 34: p. 4261-4269.

31. Fedele, D., et al., Erectile dysfunction in diabetic subjects in Italy. Gruppo Italiano Studio Deficit Eretille nei Diabetici. *Diabetes Care.*, 1998. 21(11): p. 1973-7.
32. Minami, H., et al., Physical activity and prevalence of erectile dysfunction in Japanese patients with type 2 diabetes mellitus: The Dogo Study. *Diabetes Investig.*, 2018. 9(1): p. 193-198.
33. Cho, N.H., et al., Prevalence of erectile dysfunction in Korean men with Type 2 diabetes mellitus. *Diabet Med.*, 2006. 23(2): p. 198-203.
34. El-Sakka, A.I. and K.A. Tayeb, Erectile Dysfunction Risk Factors in Noninsulin Dependent Diabetic Saudi Patients. *J Urol.*, 2003. 169(3): p. 1043-7.
35. Dan, A., et al., Erectile dysfunction in patients with diabetes mellitus: Its magnitude, predictors and their bio-psycho-social interaction: A study from a developing country. *J Psychiatr.*, 2014. 7(1): p. 58-65.
36. Shiferaw, W.S., T.Y. Akalu, and Y.A. Aynalem, Prevalence of Erectile Dysfunction in Patients with Diabetes Mellitus and Its Association with Body Mass Index and Glycated Hemoglobin in Africa: A Systematic Review and Meta-Analysis. *Int J Endocrinol.*, 2020. 18: p. 5148370.
37. Safarinejad, M., Prevalence and risk factors for erectile dysfunction in a population-based study in Iran. *International journal of impotence research*, 2003. 15(4): p. 246-252.
38. Johannes, C.B., et al., Incidence of erectile dysfunction in men 40 to 69 years old: longitudinal results from the Massachusetts male aging study. *J Urol.*, 2000. 163: p. 460-463.
39. Kamenov, Z.A., A comprehensive review of erectile dysfunction in men with diabetes. *Exp Clin Endocrinol Diabetes* 2015; 123: 141-158. 23 Lewis RW. Epidemiology of erectile dysfunction. *Urol Clin North Am*, 2001. 28: p. 209-216.
40. Mekhtiev, T.V., Stress, anxiety, depression and erectile dysfunction in patients with diabetes mellitus *Georgian Med News.*, 2013. 220-221: p. 77-81.
41. Giuliano, F.A., et al., Prevalence of erectile dysfunction among 7689 patients with diabetes or hypertension, or both. *Urology* 2004. 63: p. 1196-1201.
42. Ibrahim, A., et al., Erectile Dysfunction and Ischaemic Heart Disease *Eur Cardiol.*, 2018. 13(2): p. 98-103.
43. Mirzaei, M.R., M. Amini, and A. Aminorroaya, The prevalence of hypogonadism in diabetic men in Isfahan Endocrine and Metabolism Research Center, Isfahan, Iran. *Journal of research in medical sciences: the official journal of Isfahan University of Medical Sciences*, 2012. 17(7): p. 602.
44. Ziaei-Rad, M., M. Vahdaninia, and A. Montazeri, Sexual dysfunctions in patients with diabetes: a study from Iran. *Reproductive Biology and Endocrinology*, 2010. 8(1): p. 1-8.
45. Shiri, R., M. Ansari, and K.F. Hassani, Association between comorbidity and erectile dysfunction in patients with diabetes. *International journal of impotence research*, 2006. 18(4): p. 348-353.
46. Sharifi, F., et al., Independent predictors of erectile dysfunction in type 2 Diabetes mellitus: Is it true what they say about risk factors? *ISRN endocrinology*, 2012. 2012.
47. Rahimi, M., et al., Factors Associated with Sexual Function and Sexual Satisfaction in Male Patients with Diabetes Type 2. *Journal of Mazandaran University of Medical Sciences*, 2018. 28(164): p. 164-169.
48. Torkamani, Z.J., et al., Relationship between sexual function and type 2 diabetes in infertile men referred to Royan institute.
49. Bahar, A., et al., Sexual dysfunction in men with type II diabetes. *Caspian Journal of Internal Medicine*, 2020. 11(3): p. 295.

Table 1: Description of the included studies for qualitative synthesis

First author [reference number]	Study setting (location, participants, measurement tool)	Sample size	Study type	ED & Risk factors
Mofid (2009) [23]	Sina Hospital (Tehran city), men with diabetic aged 20-69 years, IIEF	700	Cross-sectional	A positive association between ED and duration of diabetes, advanced ages, smoking status, and poor metabolic control regimen, Type I DM<Type II DM
Habibi (2011)[27]	Birjand city, men with diabetes aged 29–76 years, IIEF-5,	171	Cross-sectional	ED is associated with higher HbA1C, severer depression, and lower HDL. No significant relationship between ED and smoking and HTN
Mirzaei (2012) [43]	Isfahan, men with diabetes aged over 30 years, ADAM questionnaire	243	Cross-sectional	No correlation between obesity, age, BMI, HTN, duration of diabetes, smoking & HbA1c & prevalence of hypogonadism
Ziaei rad (2010) [44]	Isfahan, patients with diabetes aged over 30 years, IIEF 200 Cross-sectional No association between ED and the duration of diabetes, diabetes status and HTN. Type I DM<Type II DM Shiri (2006) [45] Hamedan, men with diabetes (types I and II) aged 20–83 years, IIEF-5	312	Cross-sectional	ED was associated with Age, duration of diabetes, CVD, depression. A non-significant higher risk of ED was found in current smokers and in patients with diabetes type 1
Sharifi (2012) [46]	Zanjan, Type-II men with diabetes aged over 30 years, IIEF-5 and SQOL-M	200	Cross-sectional	A negative significant correlation was found between potency score & age, HbA1c and the level of fasting blood sugar. History of smoking did not have predictive value for ED
Rahimi (2018) [47]	Kermanshah, men with type II diabetic aged 25- 70 years, Larson sexual satisfaction, MSFI	330	Cross-sectional	A negative relationship between sexual function with depression, anxiety & stress & Age
Jafari-torkamani (2020) [48]	Tehran, infertile men, IIEF	270	Cross-sectional	Positive association of Age and BMI with sexual function
Safarinejad (2003) [37]	Nationwide, general population of men aged 20-70 years, Self-reported sexual dysfunction	2674	Baseline data of a prospective cohort	Positive association of ED with HTN and diabetes type II, and taking antidepressants, compared with non-smokers, the OR of ED was 2.41 (95% CI, 1.52–3.30)
Ghodrati (2018) [24]	Karaj, men with diabetes with a disease duration of >5 years, MSFI	99	Cross-sectional	Positive association of duration of DM with decreased sexual function
Bahar (2020) [49]	Sari, men with type II diabetes aged over 20 years, IIEF	350	Cross-sectional	Lower scores of IIEF was associated with HTN and Age>50y

IIEF: International index erectile function questionnaire, ADAM: Androgen Deficiency in the Aging Male,

ED: erectile dysfunction, DM: Diabetes Mellitus,

IIEF-5: Short form of International Index of Erectile Function, HTN: hypertension, CVD: Cardiovascular Disease,

MSFI: Male sexual function index, SQOL-M: Sexual Quality of Life-Male, HbA1C: Hemoglobin A1C

Table 2: General description of the studies included into the quantitative synthesis.

Author (year of publication)	Study Location (city)	Sample size	Estimated prevalence (%)	95%CI (%)	Weight
Mofid (2009)[23]	Tehran	700	35.0	32.0, 37.0	46.27
Habibi (2011)[27]	Birjand	171	65.5	58.0, 72.0	11.30
Mirzaei (2012)[43]	Isfahan	243	86.8	82.0, 90.0	16.06
Ziaei-Raad (2010)[44]	Isfahan	100	14.0	7.0, 20.0	6.61
Sharifi (2012)[46]	Zanjan	200	59.0	52.0, 65.0	13.22
Ghodrati (2018)[24]	Karaj	99	67.0	57.0, 76.0	6.54
Pooled prevalence		1513	50.7	48.7, 52.7	100.00
		Heterogeneity statistic	Degrees of freedom	p-value	I ²
Test of heterogeneity		579.91	5	<0.001	99.1%

Table 3: Estimated association between selected factors/exposures with prevalence of sexual dysfunction among Iranian men.

Factor	Frequency (%) of the reported association	
	Significant association	Non-significant association
Advanced age	4 (80%)	1 (20%)
Duration of diabetes	3(60%)	2 (40%)
Tobacco smoking	2(33%)	4 (67%)
Diabetes type II	2(66%)	1 (33%)
Hypertension	2 (50%)	2 (50%)
Higher values of HbA1C	2(66%)	1 (33%)
Low HDL	1(50%)	1(50%)
Depression	4 (100%)	0 (0%)
Cardiovascular diseases	2 (100%)	0 (0%)
High BMI (BMI>30)	1(50%)	1(50%)
Hypercholesterolemia	1 (100%)	0 (0%)
Poor self-efficacy	1 (100%)	0 (0%)
Poor glyceic control	1 (100%)	0 (0%)
Higher triglyceride	0 (0%)	1 (100%)



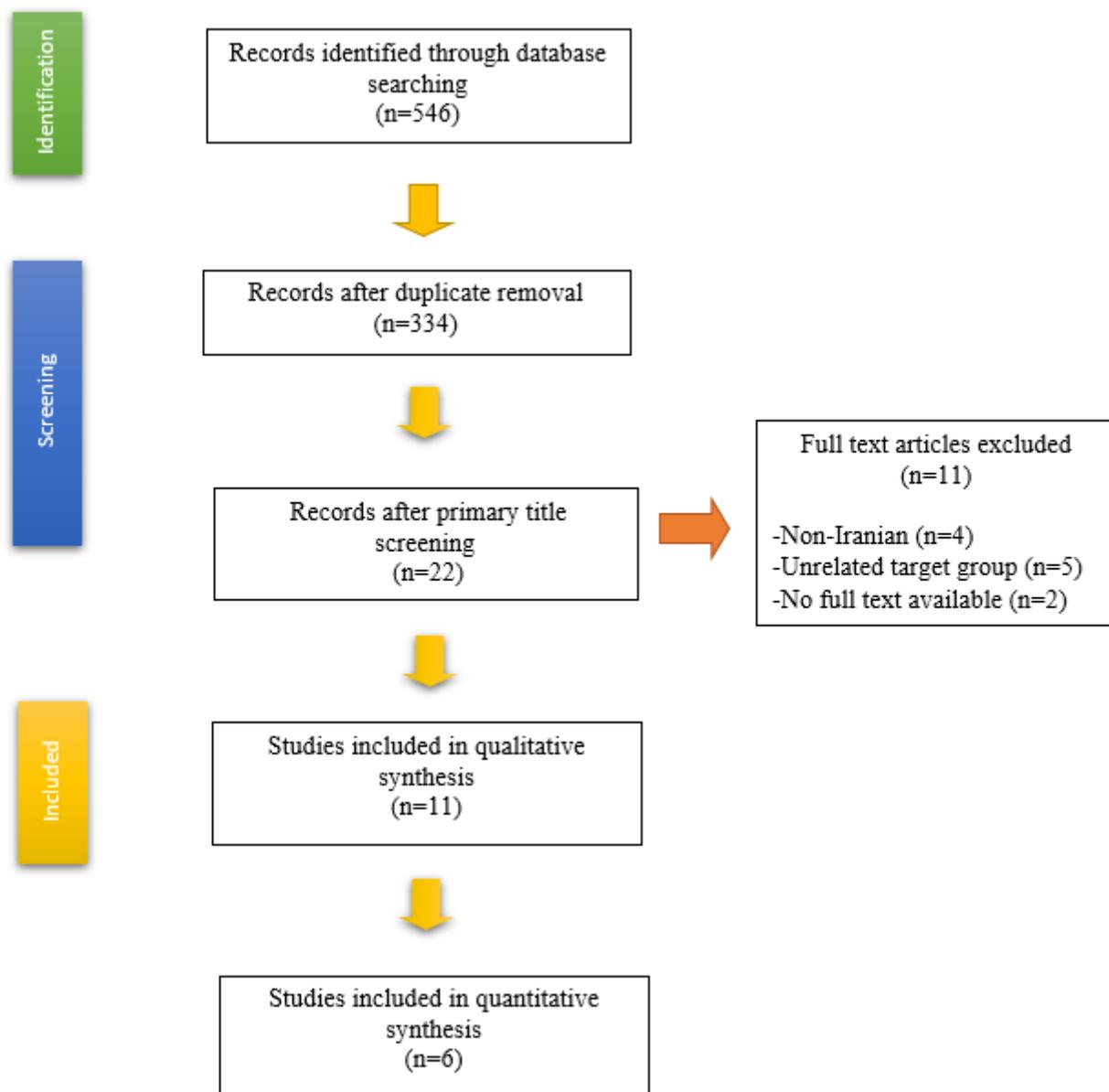


Figure 1: PRISMA Flow diagram of studies on sexual dysfunction in diabetic Iranian men.

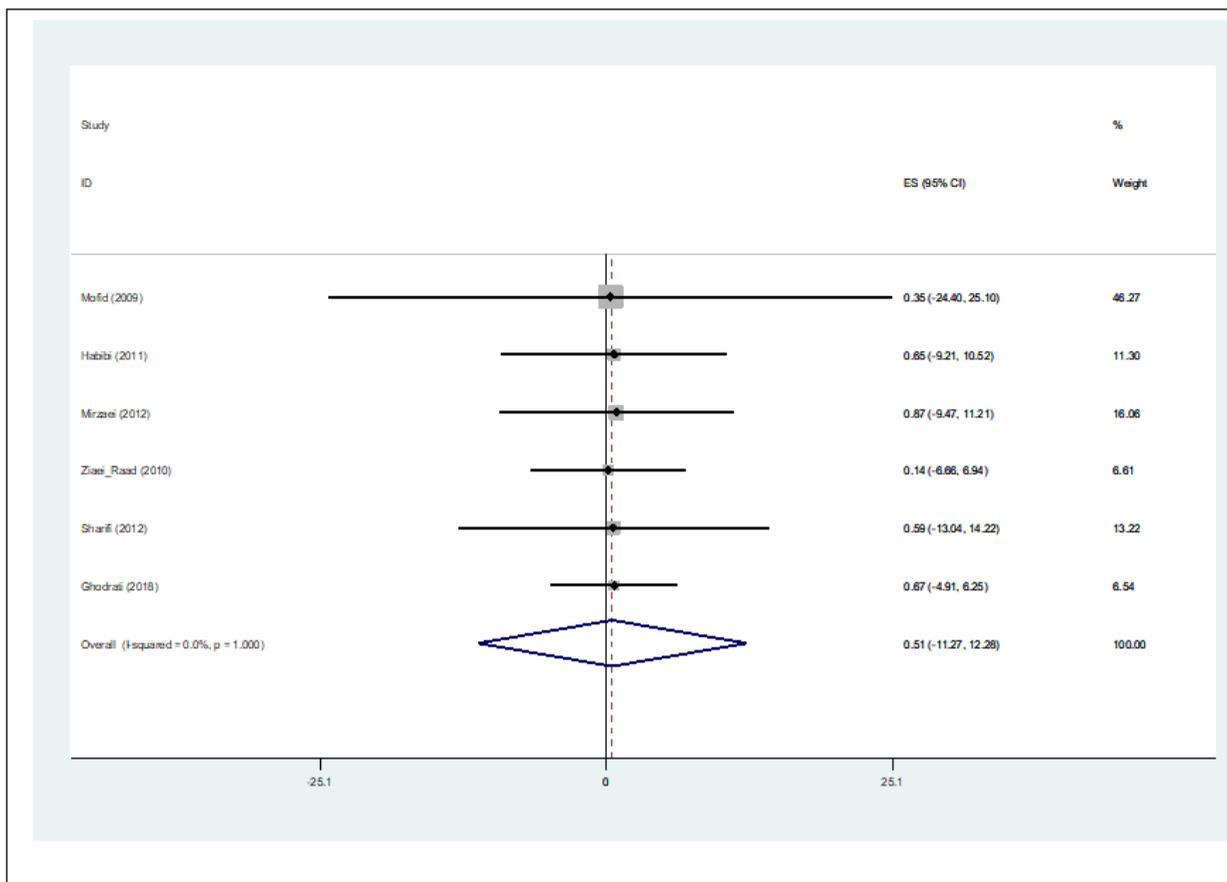


Figure 2: Forest plot for the meta-analysis of the prevalence of sexual dysfunction among patients with diabetic in Iran.