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Review Article

Prevalence and Odds of Developing Sexual Dysfunction in Women With Polycystic Ovary Syndrome: A Systematic Review and Meta-Analysis

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Abstract

Objective: Women with polycystic ovary syndrome (PCO) suffer from a wide range of psychological difficulties such as sexual dysfunction (SD). In different countries, sexual dysfunction has been evaluated in women with PCO, but the results differ between studies. So, we designed this systematic review and meta-analysis to estimate the pooled prevalence of sexual dysfunction and to assess the odds of SD among women with PCO compared with controls.

Materials and methods: PubMed, Scopus, EMBASE, Web of Science, Google Scholar were systematically searched by two independent researchers on December 1st, 2023. Data analysis was done using STATA.

Results: A literature search revealed 1636 records, 84 full-texts were evaluated, and finally, 37 studies remained for systematic review. Most studies were published in 2023, followed by 2022.Most studies were from Iran, followed by Turkey. The prevalence of SD in women with PCO ranged between 4% and 99%, and the pooled prevalence was estimated as 73% (95%CI: 72%-74%, fixed-effect model) (I^2=0). The odds of SD in women with PCO ranged between 0.42 and 7.29, and pooled OR was estimated as 2.45(95%CI: 1.55-3.86, random-effect model) (I^2=79.9%, P<0.001). The SMD of total FSFI (case-control) ranged between -2.83, and 0.46, and the pooled SMD was estimated as -0.48(95% -0.72, -0.25) (I2=94.6%, P<0.001, random-effect model).

Conclusion: This meta-analysis demonstrates a significantly higher prevalence of sexual dysfunction in women with PCO, emphasizing the need for routine sexual health assessment and holistic management, including psychological support, hormonal regulation, and lifestyle interventions.

Keywords: Polycystic Ovary Syndrome; Women; Sexual Dysfunction

Introduction

Polycystic ovary syndrome (PCO) is an endocrine disorder affecting up to 10% of women of reproductive age (1-3). Physical manifestations such as hirsutism, acne, and menstrual irregularities can lead to psychological complications, including depression, anxiety, low self-esteem, marital and

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social maladjustments, sexual dysfunction, and an overall impaired quality of life (4-6). The high prevalence of infertility and obesity among women with PCOS may predispose them to sexual dysfunction and negatively impact their overall well-being (7). Conversely, both psychological factors and androgen excess may play a role in the development of sexual dysfunction (SD), with evidence indicating that multiple dimensions of sexual life are adversely affected in women with PCOS(8). Given the inconsistent findings across previous meta-analyses and the recent surge of new data, this study aims to provide an updated pooled estimate of SD prevalence and its domains among women with PCO.

Materials and methods

We followed the referred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) 2020 (9).

The inclusion criteria were: We included cross-sectional studies, cohorts, and case-control studies that reported the prevalence of sexual disorders in women with PCO. We only included studies that used the female sexual function index (FSFI) questionnaire.

The exclusion criteria were: Letters to the editor, and case reports were excluded. We also excluded studies that had no clear data regarding the prevalence of sexual disorders. We did not have language restriction.

Information sources: A systematic search of PubMed, Scopus, EMBASE, Web of Science, and Google Scholar was conducted by two independent researchers on December 1, 2023. Conference abstracts and the reference lists of included studies were additionally reviewed to identify any further relevant publications.

Search strategy: ((((((((((((((((((Polycystic Ovary Syndrome[MeSH Terms]) OR (Polycystic Ovary Syndrome[Text Word])) OR (polycystic ovar*[Text Word])) OR (Sclerocystic Ovar*[Text Word])) OR (PCO[Text Word])) OR (PCO[Text Word])) OR (Ovary Syndrome, Polycystic[Text Word])) OR (Syndrome, Polycystic Ovary[Text Word])) OR (Stein-Leventhal Syndrome[Text Word])) OR (Stein Leventhal Syndrome[Text Word])) OR (Syndrome, Stein-Leventhal[Text Word])) OR (Sclerocystic Ovarian Degeneration[Text Word])) OR (Ovarian Degeneration, Sclerocystic[Text Word])) OR (Sclerocystic Ovary Syndrome[Text Word])) OR (Polycystic Ovarian Syndrome[Text Word])) OR (Ovarian Syndrome, Polycystic[Text Word])) OR (Polycystic Ovary Syndrome 1[Text Word])) OR (Ovary, Sclerocystic[Text Word]))) AND ((((((((((((((((((((Sexual Dysfunction*[Text Word]) OR (Dysfunction, Sexual[Text Word])) OR (Dysfunctions, Sexual[Text Word])) OR (Disorders, Sexual[Text Word])) OR (Disorder, Sexual[Text Word])) OR (Sexual Disorder*[Text Word])) OR (Dysfunction, Psychosexual[Text Word])) OR (Dysfunctions, Psychosexual[Text Word])) OR (Psychosexual Dysfunction*[Text Word])) OR (Disorder, Psychosexual[Text Word])) OR (Disorders, Psychosexual[Text Word])) OR (Psychosexual Disorder*[Text Word])) OR (Hypoactive Sexual Desire Disorder*[Text Word])) OR (Aversion Disorders, Sexual[Text Word])) OR (Disorders, Sexual Aversion[Text Word])) OR (Sexual Aversion Disorder*[Text Word])) OR (Disorders, Orgasmic[Text Word])) OR (Orgasmic Disorder*[Text Word])) OR (Arousal Disorders, Sexual[Text Word])) OR (Disorders, Sexual Arousal[Text Word])) OR (Sexual Arousal Disorder*[Text Word])) OR (Frigidity[Text Word]))

Selection process, and data collection: After all relevant studies were retrieved by two independent researchers, the results were imported into EndNote, and duplicate records were removed. The titles and abstracts were then screened independently by both researchers, followed by full-text evaluation of the eligible studies. In cases of disagreement regarding study inclusion, a third reviewer resolved the discrepancies. Data extracted by each researcher were entered into an Excel sheet and cross-checked by a third reviewer for accuracy.

Data items: From each included study, the following data were extracted: first author's name, year of publication, country of origin, total sample size, prevalence of sexual dysfunction among women with PCOS, and the reported odds of sexual dysfunction in this population.

Study risk of bias assessment: We assessed the risk of potential bias using the NEWCASTLE - OTTAWA QUALITY ASSESSMENT SCALE (10, 11).

Effect measures: Standardized mean difference (SMD) was calculated as the effect size

Synthesis methods: All statistical analyses were performed using STATA (Version 14.0; Stata Corp LP, College Station, TX, USA). To determine heterogeneity, Inconsistency (I^2) was calculated. We used the fixed effects model or random-effects model

for meta-analysis if the heterogeneity between study results (I^2) was less than 50% or more than 50%. For studies that provided the mean of FSFI in different PCO groups, we pooled all means for PCO group. When the original data were reported as median and interquartile range (IQR), the median was considered as the mean, and the IQR was converted to standard deviation (SD) using the formula SD = IQR / 1.35. The standardized mean difference (SMD) was calculated as the effect size. Publication bias was assessed using a funnel plot, as well as Begg's and Egger's tests. Meta-regression analyses were performed to explore potential sources of heterogeneity among the included studies. The protocol was not registered in the PROSPERO.

Certainty assessment: For each summary estimate, we reported the pooled estimate as well as 95% CI to show certainty.

Results

A literature search revealed 1636 records, 84 full-texts were evaluated, and finally, 37 studies remained for systematic review (Figure 1).

Thirty-seven studies were included. Most studies were published in 2023, followed by 2022.Most studies were from Iran, followed by Turkey. In total 4073 cases, and 3145 controls were evaluated. Mean age, and BMI in PCO group ranged between 23.9-34 years, and 21.6-35.6 kg/m^2, respectively (Table 1, a and b). We used fixed-effect model for prevalence and random-effect model for other estimates.

The prevalence of SD in women with PCO ranged between 4% and 99%, and the pooled prevalence estimated as 73% (95%CI: 72%-74%) (I^2=0% justify fixed model use) (Figure 2).

The odds of SD in women with PCO ranged between 0.42 and 7.29, and pooled OR estimated as 2.45 (95% CI: 1.55-3.86) (I2=79.9%, P<0.001) (Figure 3).

The pooled mean of FSFI in PCO group estimated as 24.03 (95% CI: 22.96-25.09) (I2=99%, p<0.001) (Figure 4).

The SMD of total FSFI (case-control) ranged between -2.83, and 0.46, and the pooled SMD estimated as -0.48(95% -0.72, -0.25) (I2=94.6%, P<0.001) (Figure 5).

Funnel plot and Begg and Egger's test results show that there was no evidence of publication bias (Figure 6).

We considered the country of origin as the source of heterogeneity for total FSFI results, and conducted meta-regression analysis.

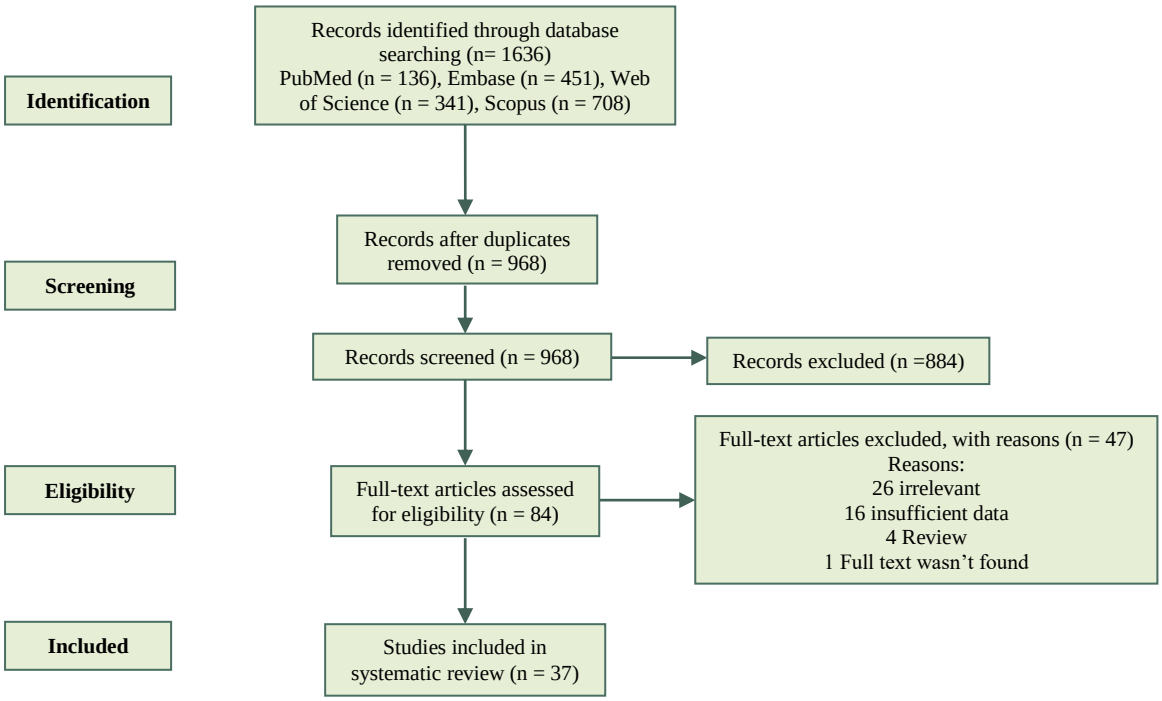

Figure 1: The flow chart of including studies shows that 3 studies were included for final analysis.

Table 1a: Study characteristics

Author	Year	Country	Study design	Participants	NOS	Age	BMI	Prevalence
Uzel et al. (12)	2021	Turkey	Case control	28 cases / 26 controls	7		Case: 29.6±7.1 / Control: 24.7±3.9	
Hashemi et al. (13)	2014	Iran	Cross sectional	535	6	30.6 ± 5.01	27.9 ± 6.1	63.5%
Kogure et al. (14)	2019	Brazil	Cross sectional	94	6	28.5±5.2	29.1±5.3	54.1%
Aba et al. (15)	2022	Turkey	Case control	97 cases / 95 controls	6	Case: 28.23±4.56 /Control: 29.33±5.61	Case: 25.08±4.3 /Control: 22.34±3.74	Case: 74.23% / Control: 44.21%
Ferrarsi et al. (16)	2013	Brazil	Cross sectional	24 Obese cases / 24 nonobese cases / 16 obese control / 19 nonobese control	7	Obese cases: 26.7 ± 4.6/ nonobese cases: 25.5 ± 5.7/ obese control: 31.7 ± 3.3/ nonobese control: 30.5 ± 5.7	Obese cases: 34.2 ± 2.8/ nonobese cases: 24.4 ± 3.4/ obese control: 34.9 ± 3.2/ nonobese control: 24.0 ± 2.7	
Shafti et al. (17)	2016	Iran	Case control	129 cases / 125 controls	6	Case: 30.10 / Control: 32.79		
Mojahed et al. (18)	2023	Iran	Case control	106 cases/ 106 controls	7	Case: 26.9±5.2 / control: 27.8±6.8		Case: 72.6%
Akbari Sene et al. (19)	2021	Iran	Case control	116 Infertile PCO / 93 Infertile control	6	Infertile PCO: 31.00 ± 5.00 / Infertile control: 34.00 ± 6.00	Infertile PCO: 26.66 ± 3.85/ Infertile control: 26.58 ± 4.43	Infertile PCO: 42.2%/ Infertile control: 37.6%
Ashraf et al. (20)	2022	Iran	Cross sectional	80 Infertile PCO cases / 160 fertile controls	6	Infertile PCO case: 31.94±4.44/ fertile Control: 31.66±1.89	Infertile PCO case: 27.04±3.24 / fertile Control: 26.13±3.75	Infertile PCO case: 98.8% / fertile Control: 36.2%
Daescu et al. (21)	2023	Romania	Cross sectional	54	7	26.54 ±2.94	Median (IQR): 26.55 (23.73–35.50)	59.3%
Deniz and Kehribar (22)	2020	Turkey	Case control	50 PCO cases / 50 PCO cases with infertility / 50 control	7	PCO case: 32.0±4.0/ PCO case with infertility: 31.7±3.7/ control: 31.0±4.0	PCO case: 25.1±2.2 / PCO case with infertility: 27.9±2.9 / control: 25.5±2.3	
Yarjanli et al. (23)	2022	Iran	Cross sectional	95 Phenotype A PCO/ 79 Phenotype B PCO/ 95 Phenotype C PCO/ 95 Phenotype D PCO/ 100 Control	8	Phenotype A PCO: 29.62±5.44 / Phenotype B PCO: 31.32±4.84 / Phenotype C PCO: 30.95±5.13 / Phenotype D PCO: 31.18±5.28 / Control: 29.95±4.10	Phenotype A PCO: 31.32±4.84 / Phenotype B PCO: 26.01± 31.55 / Phenotype C PCO: 25.96±3.99 / Phenotype D PCO: 25.87±3.59 / Control: 26.98±4032	
Lara et al. (24)	2015	Brazil	Case control	43 Cases / 51 Controls	7	Case: 27.80 ± 5.34 / Control: 29.74 ± 5.26	Case: 27.91 ± 5.51/ Control: 25.99 ±5.49	Case: 69.7% / Control: 62.7%
Mantzou et al. (25)	2021	Greece	Case control	76 cases / 133 controls	6	Case: 22.17 ± 2.51/ Control: 21.62 ± 1.93	Case: 23.97 ± 5.39 / control: 22.1 ± 4.0	
Battaglia et al. (26)	2008	Italy	Cross sectional	25 cases: / 11 Control	6	Case: 27.7 ± 5.4 / Control: 30.7 ± 3.9	Case: 21.6 ± 2.4 / Control: 21.2 ± 2.0	Case: 4% / Control: 11%
Battaglia et al. (26)	2008	Italy	Cross sectional	25 cases: / 11 Control	6	Case: 27.7 ± 5.4 / Control: 30.7 ± 3.9	Case: 21.6 ± 2.4 / Control: 21.2 ± 2.0	Case: 4% / Control: 11%

Table 1a: Study characteristics (continue)

Author	Year	Country	Study design	Participants	NOS	Age	BMI	Prevalence
Drosdzol et al. (27)	2007	Poland	Cross sectional	50 cases / 40 controls	6	Case: 28.9±5.6 / Control: 30.5±5.3	Case: 24.6±3.8 / Control: 22.1±2.9	Case: 28.6%/ Control: 10.5%
Ercan et al. (28)	2013	Turkey	Case control	32 cases / 32 controls	6	Case: 27.4±3.3 / Control: 27.0±3.2	Case: 25.5±3.0 / Control: 24.4±3.6	Case: 25%/ Control: 19%
Eftekhar et al. (29)	2014	Iran	Cross sectional	130	7	27.02 ± 4.27	26.98 ± 8.4	57.7%
Veras et al. (30)	2011	Brazil	Cross sectional	88	6	27.2± 7.3		13.3%
Dashti et al. (31)	2016	Malaysia	Cross sectional	16	6	33.44±5.88	28.04±3.34	62.5%
Pastoor et al. (32)	2023	The Netherlands	Case control	68 cases / 67 controls	6	Case: 27.64 ± 5.74/ Control: 25.89 ± 5.69	Mean (range) Case: 24.79 (17–42)/ Control: 23.55 (18–35)	Case: 41.2% / Control: 11.9%
Kirmizi et al. (33)	2020	Turkey	Cross sectional	Fertile PCO: 3.86 ± 1.34 / Infertile PCO: 4.2 ± 1.05 / fertile control: 3.69 ± 0.92	6	Fertile PCO: 23.8 ± 4.05 / Infertile PCO: 26.13 ± 4.66/ fertile control: 31.9 ± 4.73	Fertile PCO: 26.72 ± 3.77/ Infertile PCO: 26.19 ± 6.02 / fertile control: 25.08 ± 4.84	Fertile PCO: 45% / Infertile PCO: 50% / fertile control: 36.7%
Noroozzadeh et al. (34)	2016	Iran	Cross sectional	63 cases / 216 controls	6	Case: 33.6±7.2/ Control: 36.3±6.9	Case: 27.14± 5.74/ Control: 27.35± 4.95	Case: 44.4% / Control: 36.1%
Fliegner et al. (35)	2019	Germany	Cross sectional	44	6	Median (IQR): 28.5(27-30.8)	Median (IQR): 25.8(21.2-32.6)	19.5%
Tian et al. (36)	2023	China	Cross sectional	408 Phenotype A PCO/ 114 Phenotype B PCO/ 73 Phenotype C PCO /214 Phenotype D PCO/ 385 Control	7	Phenotype A PCO: 26.89±3.95 / Phenotype B PCO: 27.47±3.88 / Phenotype C PCO: 28.17±4.38 / Phenotype D PCO: 27.87±3.91 / Control: 27.56±3.83	Phenotype A PCO: 26.78±3.89 / Phenotype B PCO: 25.77±4.42 / Phenotype C PCO: 25.06±3.53 / Phenotype D PCO: 23.24±3.70 / Control: 23.35±3.53	All PCO: 81.11% / Phenotype A PCO: 87.5% / Phenotype B PCO: 82.46% / Phenotype C PCO: 75.34% / Phenotype D PCO: 70.56% / Control: 61.30%
Tian et al. (37)	2021	China	Cross sectional	685	7	29.02±4.17	24.48 ±4.47	79.56%
Diamond et al. (38)	2017	US	Cross sectional	734 Infertile PCO / 860 Unexplained infertility	6	Infertile PCO: 28.9±4.3 / Unexplained infertility: 32.2±4.2		
Kępczyńska-Nyk et al. (39)	2020	Poland	Cross sectional	63 cases / 20 controls	6	Case: 26.56 ±5.45/ Control: 30.85 ±6.73	Case: 27.58 ±6.98/ Control: 24.18 ±4.37	Case: 33.3%
Bazarganipour et al. (40)	2013	Iran	Cross sectional	300	7	26.56 ± 4.44		16.6%

Table 1a: Study characteristics (continue)

Author	Year	Country	Study design	Participants	NOS	Age	BMI	Prevalence
Bahadori et al. (41)	2022	Iran	Cross sectional	55 Phenotype A PCO / 30 Phenotype B PCO / 56 Phenotype C PCO / 51 Phenotype D PCO / 50 Control	7	Phenotype A PCO: 29.18+5.71 / Phenotype B PCO: 31.55+5.68 / Phenotype C PCO: 31.67+5.05 / Phenotype D PCO: 31.28+5.5 / Control: 34.18±4.13	Phenotype A PCO: 27.21+4.80 / Phenotype B PCO: 26.59+3.85 / Phenotype C PCO: 25.60+3.67 / Phenotype D PCO: 26.45+3.75 / Control: 26.96±3.12	Phenotype A PCO: 45.5% / Phenotype B PCO: 53.3% / Phenotype C PCO: 42.8% / Phenotype D PCO: 41.1% / Control: 50%
Basirat et al. (42)	2019	Iran	Case control	120 Infertile PCO / 120 Infertile control	6	Infertile PCO: / Infertile control:	Infertile PCO: / Infertile control:	
Fereidooni et al. (43)	2022	Iran	Cross sectional	130	6	29.74 ± 5.3		60%
Benetti-Pinto et al. (44)	2014	Brazil	Cross sectional	56 cases / 102 controls	6	Case: 26.9 ± 4.9 / Control: 35.6 ± 7.3	Case: 31.9 ± 8.5/ Control: 28.5 ± 5.4	
Forouhari et al. (45)	2019	Iran	Cross sectional	32 Fertile PCO / 31 Infertile PCO	7	Fertile PCO: 28.33±4.92 / Infertile PCO: 27.81±4.32	Fertile PCO: 25.57±4.26 / Infertile PCO: 25.25±3.36	Fertile PCO: 54.5 % / infertile PCO: 85.7%
Altuntaş et al. (46)	2022	Turkey	Cross sectional	167 All PCO Cases / 72 phenotype A PCO / 42 Phenotype B PCO /38 Phenotype C PCO /16 Phenotype D PCO /73 Controls	8	All PCO Cases: 25.87±5.64 / phenotype A PCO: 25.83±5.21 / Phenotype B PCO: 24.78±6.40 /Phenotype C PCO: 25.63±4.97 /Phenotype D PCO: 29.44±6.07 /Control: 27.25±5.85	All PCO Cases: 29.32±5.60 / phenotype A PCO: 30.84±5.68 / Phenotype B PCO: 29.29±5.30 /Phenotype C PCO: 27.39±5.00 /Phenotype D PCO: 27.73±6.34 /Control: 23.77±4.22	
Gateva et al. (47)	2012	Bulgaria	Case control	16 Obese PCO / 41 lean PCO / 22 obese control	7	Obese PCO: 24.9 ± 4.4 / lean PCO: 24.2 ± 4.8 / Obese control: 32.5 ± 8.5	Obese PCO: 35.6 ± 4.9/ lean PCO: 22.7 ± 3.4 / Obese control: 40.2 ± 9.4	
Davar Tanha et al. (48)	2023	Iran	Case control	100 Cases / 93 Controls	7	Case: 29.7±5.4 / Control: 30.4± 4.1		Case: 62% / Control: 18.2%

Table 1b: FSFI domain results

Desire	Arousal	Lubrication	Orgasm	Satisfaction	Pain	Total FSFI
Case: 2.56±1.27/ Control: 2.58±0.80	Case: 3.10±1.31 / Control: 2.95±0.98	Case: 3.54±1.37 / Control: 4.00±0.71	Case: 3.07±1.42 / Control: 3.43±0.54	Case: 2.10±1.30 / Control: 2.15±1.02	Case: 3.16±1.72 / Control: 4.60±1.39	Case: 18.76±4.77 / Control: 20.92±2.50
3.3±1.0	3.9±1.2	4.7±1.2	4.2±1.2	3.9±1.5	4.4±1.7	24.5±5.7
Case: 3.41±1.15/ Control: 3.85±1.13	Case: 2.53±1.21/ Control: 3.19±1.16	Case: 2.36±0.95/ Control: 3.5±0.69	Case: 2.49±0.67/ Control: 3.51±0.66	Case: 2.37±1.07/ Control: 2.43±1.14	Case: 3.31±1.37/ Control: 4.97±1.17	Case: 16.65±5.93/ Control: 18.89±6.53
Case: 6.18±1.56 / Control: 6.55±1.68	Case: 12.74±3.92 / Control: 13.38±4.73	Case: 13.72±4.13 / Control: 13.92±4.64	Case: 10.81±3.55 / Control: 11.53±4.12	Case: 11.40±3.75 / Control: 12.19±4.18	Case: 10.57±3.82 / Control: 10.80±4.16	
Case: 4.1±0.8 / control: 3.7±1.1	Case: 3.8±1.6/ control: 3.9±1.4	Case: 3.5±1.7/ control: 4.4±1.5	Case: 3.8±1.8/ control: 4.5±1.5	Case: 3.9±1.7/ control: 4.7±1.2	Case: 2.9±1.7/ control: 4.3±1.4	Case: 22.1±7.8/ control: 25.7±7.3
Infertile PCO: 3.78 ± 1.01 / Infertile control: 3.81 ± 1.09	Infertile PCO: 3.69 ± 1.23 / Infertile control: 3.67 ± 1.32	Infertile PCO: 4.92 ± 1.15 / Infertile control: 5.07 ± 1.07	Infertile PCO: 4.52 ± 1.17 / Infertile control: 4.68 ± 0.95	Infertile PCO: 5.06 ± 1.00 / Infertile control: 5.11 ± 0.95	Infertile PCO: 5.00 ± 1.09 / Infertile control: 5.04 ± 1.00	Infertile PCO: 26.97 ± 4.73 / Infertile control: 27.38 ± 3.72
Infertile PCO case: 3.04±0.74/ fertile Control: 4.39±1.14	Infertile PCO case: 3.21±0.75/ fertile Control: 5.03±1.05	Infertile PCO case: 3.52±0.80 / fertile Control: 4.99±0.83	Infertile PCO case: 3.50±0.69 / fertile Control: 4.49±0.81	Infertile PCO case: 4.16±0.95 / fertile Control: 5.10±0.78	Infertile PCO case: 4.16±1.22/ fertile Control: 5.05±0.85	Infertile PCO case: 21.60±2.90/ fertile Control: 29.07±2.50
Median (IQR) 3.60 (3.00–5.40)	Median (IQR) 4.05 (3.00–5.10)	Median (IQR) 4.80 (3.37–5.40)	Median (IQR) 4.00 (2.40–5.20)	Median (IQR) 4.80 (3.30–5.20)	Median (IQR) 4.80 (4.00–6.00)	25.08 ±4.62
PCO case: 3.63±0.93/ PCO case with infertility: 3.21±0.75	PCO case: 3.53±0.86 / PCO case with infertility: 3.39±0.71	PCO case: 3.73±0.77 / PCO case with infertility: 3.2±0.95	PCO case: 3.52±0.77 / PCO case with infertility: 3.21±0.76	PCO case: 3.61±0.75/ PCO case with infertility: 3.23±0.72	PCO case: 3.72±0.73 / PCO case with infertility: 3.13±0.61	PCO case: 21.71±3.73 / PCO case with infertility: 19.45±4.50 / control: 27.57±4.14
Phenotype A PCO: 3.78±0.90 / Phenotype B PCO: 3.39±0.81 / Phenotype C PCO: 3.63±0.76 / Phenotype D PCO: 3.70±0.98 / Control: 4.36±0.98	Phenotype A PCO: 4.05±1.08 / Phenotype B PCO: 3.06±1.04 / Phenotype C PCO: 4.02±1.06 / Phenotype D PCO: 3.99±1.03 / Control: 5.85±0.38	Phenotype A PCO: 4.51±1.01 / Phenotype B PCO: 4.08±3.74 / Phenotype C PCO: 4.93±0.98 / Phenotype D PCO: 4.56±0.98 / Control: 5.41±0.77	Phenotype A PCO: 4.56±1.13 / Phenotype B PCO: 4.15±1.10 / Phenotype C PCO: 4.52±1.11 / Phenotype D PCO: 4.58±1.05 / Control: 5.26±0.57	Phenotype A PCO: 4.64±1.14 / Phenotype B PCO: 4.25±1.07 / Phenotype C PCO: 4.85±1.08 / Phenotype D PCO: 4.86±1.15 / Control: 5.03±0.79	Phenotype A PCO: 3.41±1.24 / Phenotype B PCO: 3.65±1.19 / Phenotype C PCO: 3.69±1.45 / Phenotype D PCO: 3.57±1.30 / Control: 4.85±0.81	Phenotype A PCO: 25.00±4.22 / Phenotype B PCO: 18.61±8.60 / Phenotype C PCO: 25.56±4.63 / Phenotype D PCO: 24.77±4.73 / Control: 30.77±1.35
Case: 3.68 ± 1.36/ Control: 3.28 ± 1.47	Case: 3.22 ± 1.98/ Control: 2.78 ± 1.92	Case: 3.19 ± 1.98 / Control: 2.78 ± 1.81	Case: 3.58 ± 2.18 / Control: 3.56 ± 2.17	Case: 4.12 ± 1.48 / Control: 4 ± 1.39	Case: 3.41 ± 2.42 / Control: 3.68 ± 2.57	Case: 21.21 ± 9.64/ Control: 20.08 ± 9.43
Case: 4.07±0.98/ Control: 4.25±0.95	Case: 4.48±1.44/ Control: 5.04±1.19	Case: 4.69±1.54/ Control: 5.29±1.17	Case: 4.11±1.61/ Control: 4.78±1.40	Case: 4.78±1.31/ Control: 5.22±1.10	Case: 4.66±1.85/ Control: 4.94±1.55	Case: 26.76±6.81/ Control: 29.51±5.83
Case: 4.9±1.1/ Control: 4.3±1.2	Case: 5.0±1.0/ Control: 5.3±0.8	Case: 4.9±1.0/ Control: 5.2±0.9	Case: 4.1±0.9 / Control: 4.3±1.2	Case: 4.2±0.9/ Control: 4.4±1.0	Case: 5.3±0.9 / Control: 5.5±0.5	Case: 28.6±3.0/ Control: 29.3±3.1
3.78 ± 0.88	3.94 ± 0.84	4.53 ± 0.3	4.45 ± 0.08	4.71 ± 0.9	4.53 ± 1.02	
3.86 ± 1.35	2.96 ± 0.92	4.56 ± 0.98	5.52 ± 0.90	4.42 ± 0.83	4.65 ± 1.58	25.51 ± 2.77

Table 1b: FSFI domain results (continue)

Desire	Arousal	Lubrication	Orgasm	Satisfaction	Pain	Total FSFI
Fertile PCO: 3.86 ± 1.34 / Infertile PCO: 4.2 ± 1.05 / fertile control: 3.69 ± 0.92	Fertile PCO: 4.07 ± 1.31 / Infertile PCO: 4.14 ± 0.82 / fertile control: 4.09 ± 0.97	Fertile PCO: 4.5 ± 1.04 / Infertile PCO: 4.49 ± 0.82 / fertile control: 5.07 ± 0.76	Fertile PCO: 4.06 ± 1.45 / Infertile PCO: 4.35 ± 0.98 / fertile control: 4.41 ± 1.05	Fertile PCO: 4.1 ± 1.91 / Infertile PCO: 4.94 ± 1.25 / fertile control: 4.93 ± 1.5	Fertile PCO: 4.11 ± 1.08 / Infertile PCO: 4.26 ± 1.58 / fertile control: 4.43 ± 1.54	Fertile PCO: 25.29 ± 6.58 / Infertile PCO: 26.57 ± 4.22 / fertile control: 26.8 ± 4.58
Median (IQR)	Median (IQR)	Median (IQR)	Median (IQR)	Median (IQR)	Median (IQR)	Median (IQR)
Case: 3.60 (3.00–4.20) / Control: 3.60 (3.00–4.20)	Case: 3.90 (2.70–4.80)/ Control: 3.90 (2.70–5.02)	Case: 4.50 (3.30–5.10)/ Control: 4.80 (3.07–5.40)	Case: 4.00 (2.80–5.20)/ Control: 4.40 (3.20–5.20)	Case: 4.80 (4.00–5.60)/ Control: 4.80 (4.00–6.00)	Case: 3.60 (1.20–4.80) / Control: 3.60 (1.20–4.80)	Case: 23.70 (18.20–28.00)/ Control: 25.25 (20.22–28.50)
Phenotype A PCO: 3.21±0.91/ Phenotype B PCO: 3.56±0.79 / Phenotype C PCO: 3.68±0.74 / Phenotype D PCO: 3.72±0.72 / Control: 3.81±0.85	Phenotype A PCO: 3.80±0.93 / Phenotype B PCO: 3.84±0.86 / Phenotype C PCO: 3.88±0.81 / Phenotype D PCO: 3.79±0.92 / Control: 3.99±1.02	Phenotype A PCO: 4.38±1.21 / Phenotype B PCO: 4.57±0.93 / Phenotype C PCO: 4.51±1.08 / Phenotype D PCO: 4.56±1.15 / Control: 4.58±1.17	Phenotype A PCO: 3.70±0.74 / Phenotype B PCO: 3.85±0.89 / Phenotype C PCO: 3.92±0.92 / Phenotype D PCO: 3.96±0.86 / Control: 4.03±0.93	Phenotype A PCO: 4.00±1.02 / Phenotype B PCO: 4.35±1.15 / Phenotype C PCO: 4.40±1.12 / Phenotype D PCO: 4.47±1.08 / Control: 4.54±1.27	Phenotype A PCO: 3.98±1.13 / Phenotype B PCO: 3.98±0.87 / Phenotype C PCO: 3.96±0.93 / Phenotype D PCO: 3.97±1.04 / Control: 4.01±0.89	Phenotype A PCO: 23.14±3.22 / Phenotype B PCO: 24.15±1.97 / Phenotype C PCO: 24.33±2.33 / Phenotype D PCO: 24.47±2.57 / Control: 24.98±3.78
3.58± 0.82	3.94± 0.76	4.48± 0.62	3.83± 0.98	4.32± 0.78	4.04± 0.85	24.19± 2.84
Infertile PCO: 4.1±1.1 / Unexplained infertility: 4.0±1.0	Infertile PCO: 2.5±0.6 / Unexplained infertility: 2.5±0.6		Infertile PCO: 4.9± 1.3 / Unexplained infertility: 4.9± 1.3	Infertile PCO: 5.3± 0.9/ Unexplained infertility: 5.3± 0.9	Infertile PCO: 5.3± 1.1 / Unexplained infertility: 5.5± 1.1	Infertile PCO: 29.9± 4.6 / Unexplained infertility: 29.9± 4.9
Median (IQR)	Median (IQR)	Median (IQR)	Median (IQR)	Median (IQR)	Median (IQR)	Median (IQR)
Case: 3 (3.6–4.8) / Control: 3.6 (2.4–4.8)	Case: 4.5 (3.6–5.4) / Control: 3.9 (1.3–5.1)	Case: 5.1 (4.2–6) / Control: 5.4 (2.1–6)	Case: 4.4 (3.2–5.2)/ Control: 3.8 (1.6–5.2)	Case: 4.8 (4–6) / Control: 4.2 (2.9–5.4)	Case: 5.6 (3.6–6) / Control: 4.8 (4–6)	Case: 28.5 (23–31.3) / Control: 24.9 (15.3–31.1)
4.09(3.03-5.13)	4.20(3.14-5.27)	4.85(3.90-5.82)	4.72(3.74-5.70)	4.96(3.84-6.08)	4.12(2.92-5.34)	
Phenotype A PCO: 3.75±0.85 / Phenotype B PCO: 3.48±0.72/ Phenotype C PCO: 3.69±0.94 / Phenotype D PCO: 3.69±0.73 / Control: 3.75±0.77	Phenotype A PCO: 4.12±0.87 / Phenotype B PCO: 4.51±.85/ Phenotype C PCO: 4.01±1.04 / Phenotype D PCO: 4.08±0.84 / Control: 4.51±0.85	Phenotype A PCO: 4.69±0.82 / Phenotype B PCO: 4.32±1.15/ Phenotype C PCO: 4.63±0.91 / Phenotype D PCO: 4.95±0.99 / Control: 4.89±0.86	Phenotype A PCO: 4.68±0.903 / Phenotype B PCO: 4.106±1.22/ Phenotype C PCO: 4.43±1.02 / Phenotype D PCO: 4.66±0.92 / Control: 4.66±0.912	Phenotype A PCO: 4.90±1.02 / Phenotype B PCO: 4.45±1.18 / Phenotype C PCO: 4.71±1.14 / Phenotype D PCO: 4.95±0.84 / Control: 4.79±0.905	Phenotype A PCO: 2.99±1.06 / Phenotype B PCO: 3.09±1.206 / Phenotype C PCO: 3.17±0.96 / Phenotype D PCO: 3.16±1.26 / Control: 6.59±9.01	Phenotype A PCO: 25.16±3.33 / Phenotype B PCO: 22.7±4.2 / Phenotype C PCO: 24.66±4.16 / Phenotype D PCO: 25.51±3.29 / Control: 28.78±9.49
Infertile PCO: 3.94 ± 0.85 / Infertile control: 3.92 ± 0.84	Infertile PCO: 3.92 ± 0.92 / Infertile control: 3.88 ± 0.91	Infertile PCO: 4.41 ± 0.85 / Infertile control: 4.49 ± 0.73	Infertile PCO: 3.5 ± 0.8 / Infertile control: 3.49 ± 0.84	Infertile PCO: 4.78 ± 1.19 / Infertile control: 4.92 ± 1.05	Infertile PCO: 4.64 ± 1.13 / Infertile control: 4.80 ± 1.16	Infertile PCO: 25.13 ± 3.95 / Infertile control: 25.35 ± 3.87
3.69 ± 1.09	3.49 ± 1.32	3.82 ± 1.53	2.93 ± 1.36	3.82 ± 1.35	4.83 ± 1.06	22.95 ± 5.77
Case: 3.4 ± 1.2/ Control: 3.6 ± 1.2	Case: 3.9 ± 1.1/ Control: 4.2 ± 1.1	Case: 4.7 ± 0.6/ Control: 5.7 ± 8.5	Case: 4.5 ± 0.7/ Control: 5.4 ± 7.6	Case: 2.8 ± 1.2/ Control: 4.1 ± 1.6	Case: 5,8 ± 1.4/ Control: 5.3 ± 1.2	Case: 25.0 ± 3.3/ Control: 28.2 ± 16.1

Table 1b: FSFI domain results (continue)

Desire	Arousal	Lubrication	Orgasm	Satisfaction	Pain	Total FSFI
Fertile PCO: 3.93± 0.80 / Infertile PCO: 3.60±0.95	Fertile PCO: 3.94± 0.72 / Infertile PCO: 3.36±0.98	Fertile PCO: 4.54± 1.16 / Infertile PCO: 4.03±1.26	Fertile PCO: 4.38± 1.01 / Infertile PCO:2.72±1.09	Fertile PCO: 5.07± 2.20 / Infertile PCO: 4.34±1.11	Fertile PCO: 3.95± 1.46 / Infertile PCO: 3.98±1.26	Fertile PCO: 25.81± 4.39 / Infertile PCO: 22.03±4.77
All PCO Cases: 4.25±2.15 / phenotype A PCO: 4.41±2.16 / Phenotype B PCO: 3.98±2.01 /Phenotype C PCO: 4.26±2.35 /Phenotype D PCO: 4.13±2.09 /Control: 3.89±2.09	All PCO Cases: 6.98±9.54 / phenotype A PCO: 7.77±9.74 / Phenotype B PCO: 6.00±9.77 /Phenotype C PCO: 4.87±8.59 /Phenotype D PCO: 10.63±9.38 /Control: 5.86±8.71	All PCO Cases: 3.18±4.26 / phenotype A PCO: 3.64±4.40 / Phenotype B PCO: 2.60±4.20 /Phenotype C PCO: 1.92±3.59 /Phenotype D PCO: 5.50±4.27 /Control: 2.49±3.94	All PCO Cases: 3.38±4.85 / phenotype A PCO: 4.10±5.52 / Phenotype B PCO: 2.57±4.36 /Phenotype C PCO: 2.08±3.83 /Phenotype D PCO: 5.25±4.14 /Control: 2.69±3.95	All PCO Cases: 4.38±5.95 / phenotype A PCO: 5.10±6.34 / Phenotype B PCO: 3.52±5.68 /Phenotype C PCO: 2.92±5.35 /Phenotype D PCO: 6.63±5.45 /Control: 3.86±5.78	All PCO Cases: 4.03±5.57 / phenotype A PCO: 4.74±6.00 / Phenotype B PCO: 3.21±5.31 /Phenotype C PCO: 2.39±4.65 /Phenotype D PCO: 6.69±5.10 /Control: 3.62±5.28	All PCO Cases: 26.33±30.71 / phenotype A PCO: 29.94±32.27 / Phenotype B PCO: 21.83±30.60 /Phenotype C PCO: 18.58±26.37 /Phenotype D PCO: 39.25±28.94 / Control: 22.21±28.24
Case: 3.4±1.3/ Control: 4.3±1.6	Case: 3.9±1.5 / Control: 5.3±1.6	Case: 4.4±1.2/ Control: 5.1±1.5	Case: 4.5±1.3 / Control: 4.9±1.3	Case: 4.4±1.3 / Control: 5.4±1.6	Case: 4.6±1.6/ Control: 5.7±1.8	Case: 25.4±4 / Control: 30.9±4.5

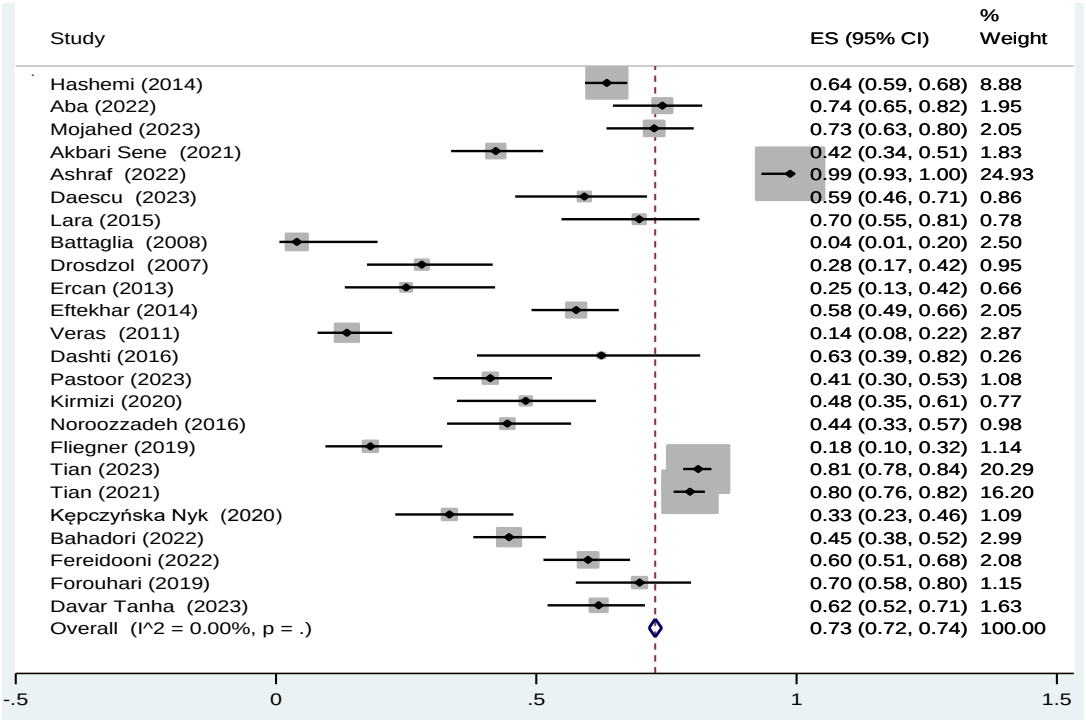

Figure 2: The pooled prevalence of SD in women with PCO is estimated as73%

The results showed that the country is not a source of heterogeneity (coefficient=-0.34, standard error=0.036, p=0.35).

The pooled SMD of desire subscale of FSFI (case-control) estimated as -0.14(95% -0.30, 0.02) (I^2=86.9%, P<0.001) (Figure 7).

The pooled SMD of arousal subscale of FSFI (case-control) estimated as -0.34(95% -0.58, -0.09) (I^2=94.7%, P<0.001) (Figure 8).

The pooled SMD of lubrication subscale of FSFI (case-control) estimated as -0.37(95% -0.56, -0.19) (I^2=90.6%, P<0.001) (Figure 9).

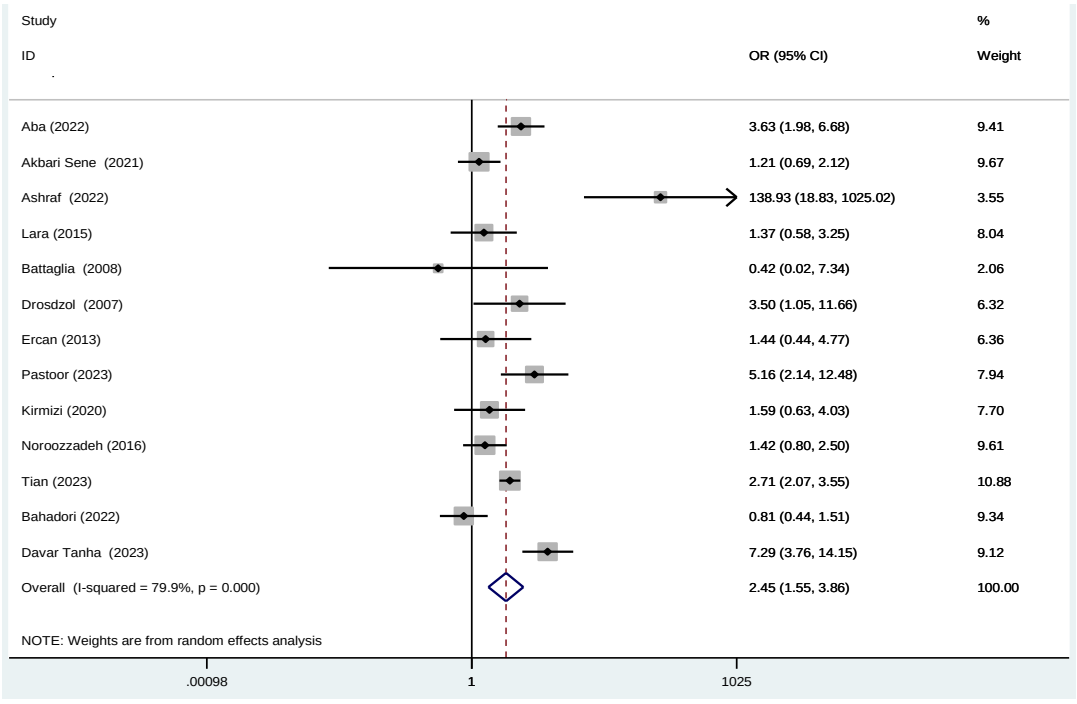

Figure 3: The pooled odds of SD in women with PCO is estimated as 2.45

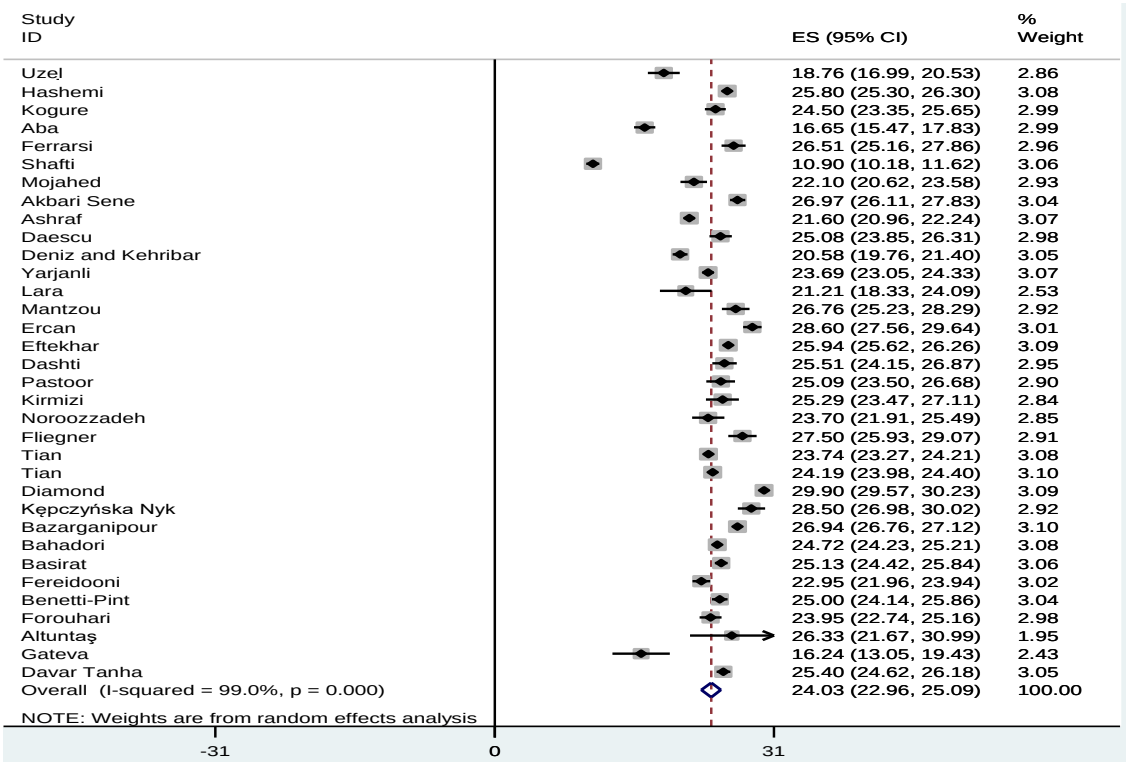

Figure 4: The pooled odds of SD in women with PCO is estimated as 2.45

The pooled SMD of orgasm subscale of FSFI (case-control) estimated as -0.31(95% -0.46, -0.15) (I^2=86.2%, P<0.001) (Figure 10).

The pooled SMD of satisfaction subscale of FSFI (case-control) estimated as -0.25(95% -0.38, -0.12) (I^2=80.5%, P<0.001) (Figure 11).

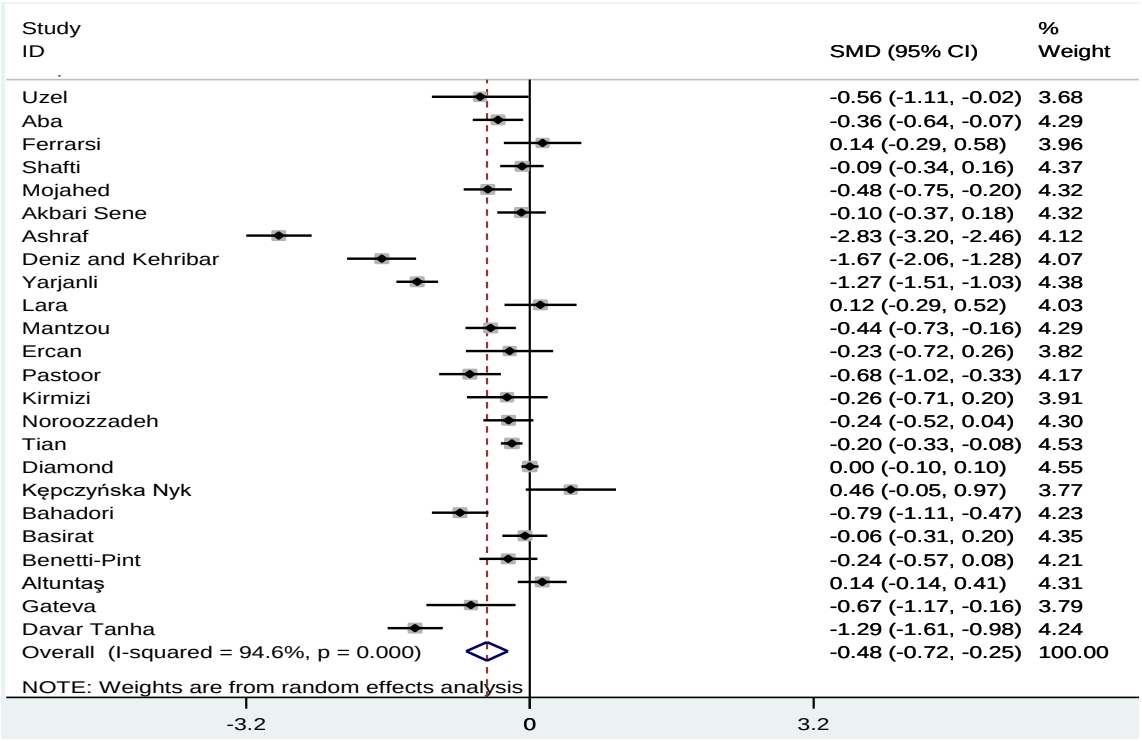

Figure 5: The pooled SMD of total FSFI is estimated as -0.48 (case-control)

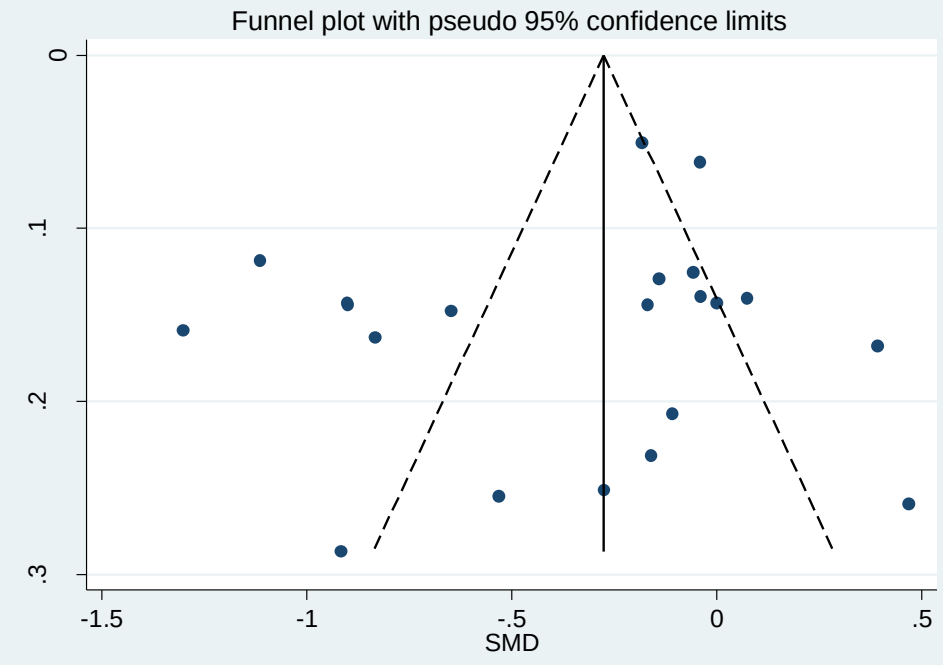

Figure 6: The funnel plot showing no evidence of publication bias

The pooled SMD of pain subscale of FSFI (case-control) estimated as -0.35(95% -0.54, -0.17) (I^2=90.6%, P<0.001) (Figure 12).

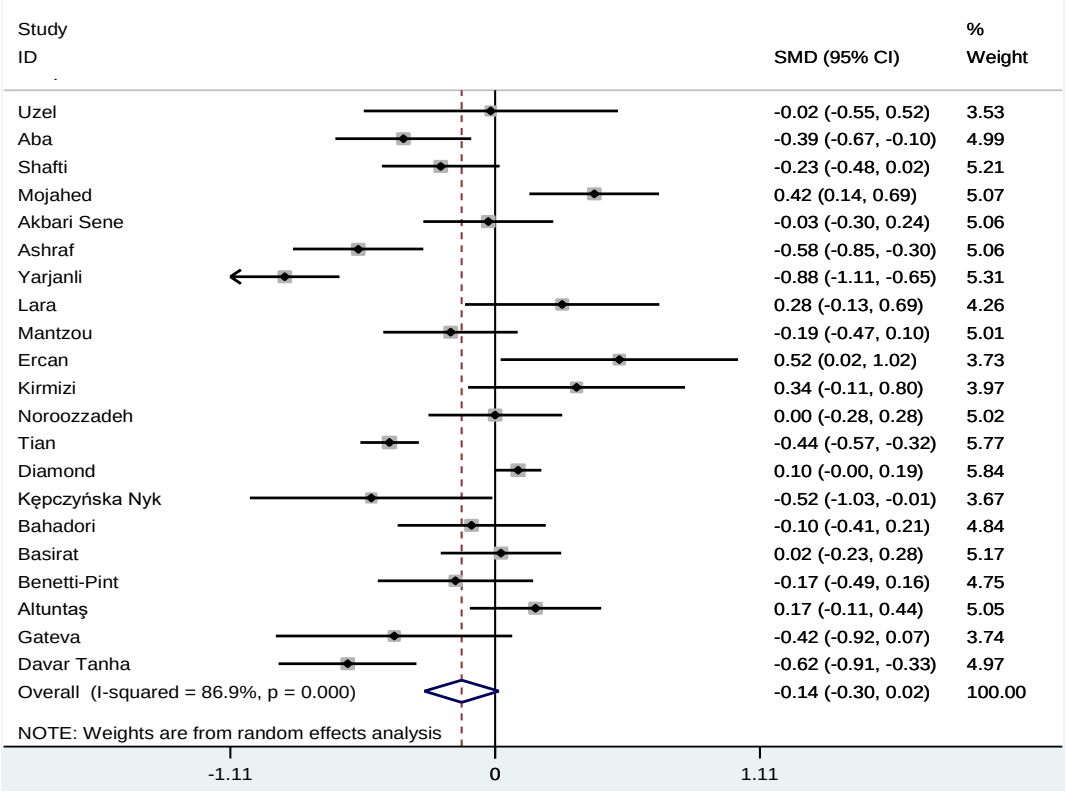

Figure 7: The pooled SMD of desire subscale of FSFI is estimated as -0.14(case-control)

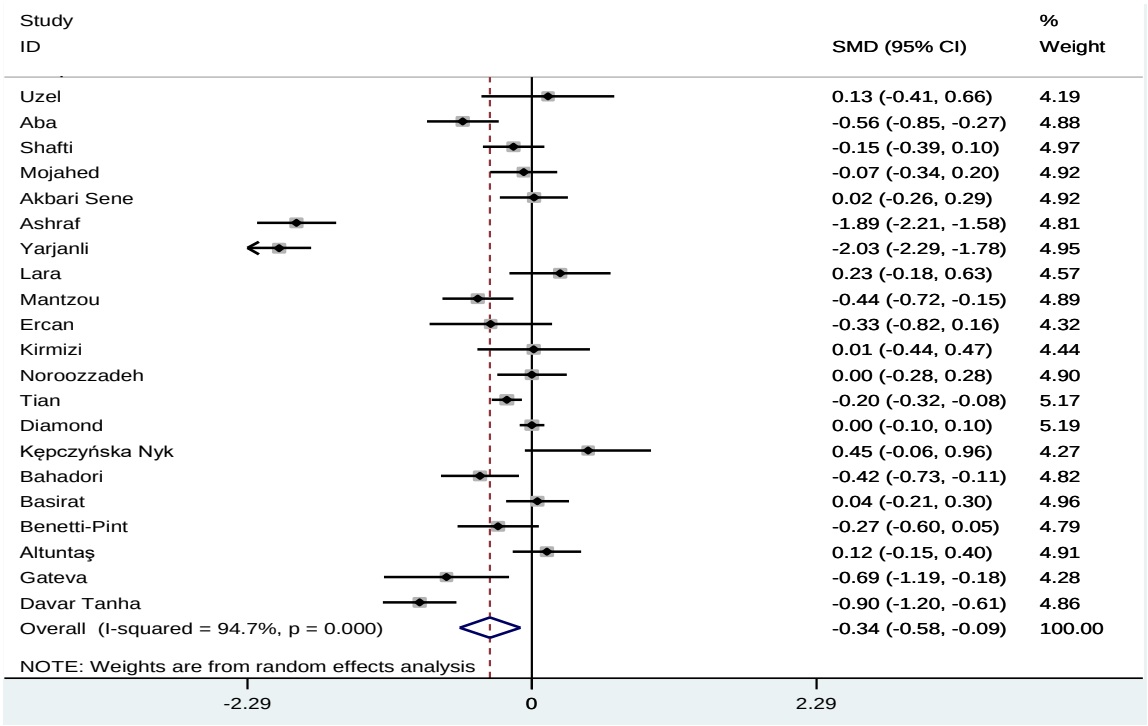

Figure 8: The pooled SMD of arousal subscale of FSFI is estimated as -0.34 (case-control)

Discussion

To our knowledge, this is the most comprehensive systematic review and meta-analysis to date that includes original studies utilizing the FSFI questionnaire to assess sexual dysfunction (SD) in women with PCOS. A total of 37 studies employing the FSFI were included.

We estimated the pooled prevalence and odds of developing SD in women with PCOS compared to healthy controls, as well as the pooled standardized mean difference (SMD) for total FSFI scores and its subscales.

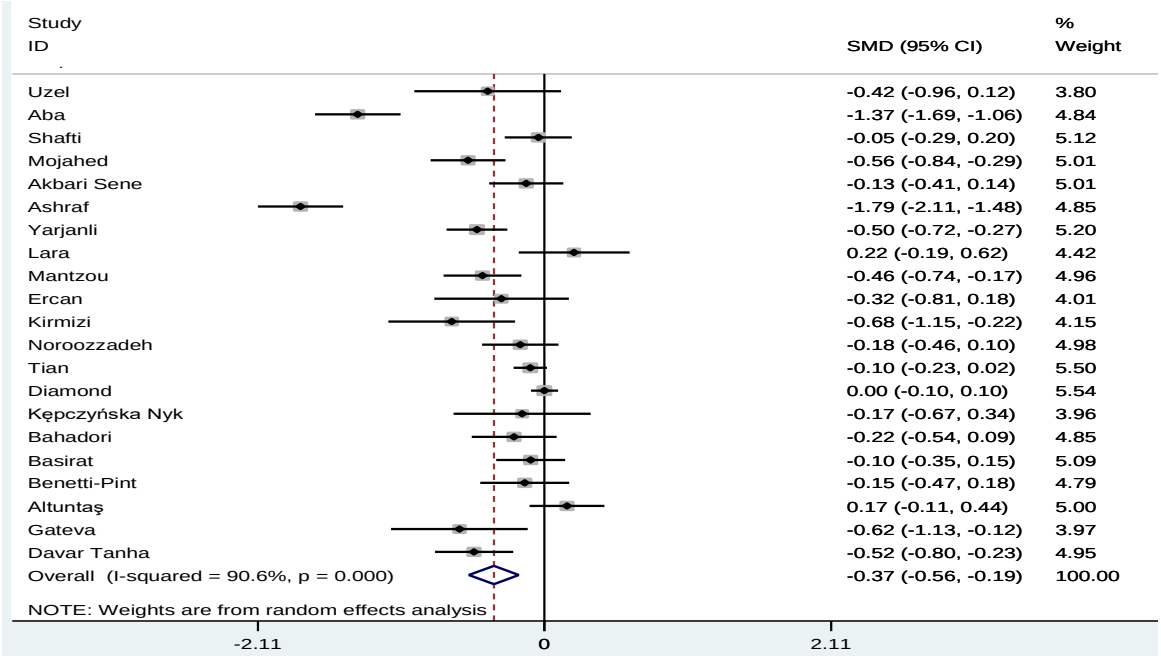

Figure 9: The pooled SMD of arousal subscale of FSFI is estimated as -0.34 (case-control)

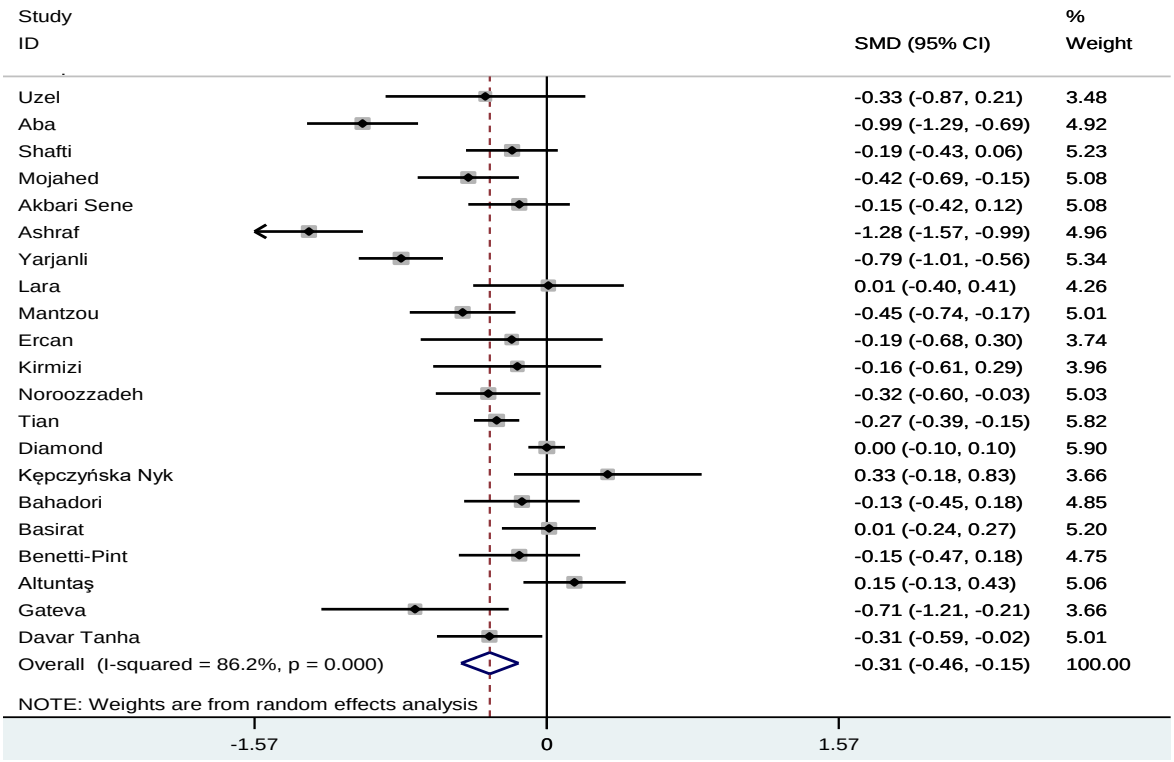

Figure 10: The pooled SMD of orgasm subscale of FSFI is estimated as -0.31(case-control)

Our findings showed that the pooled SMD for total FSFI was −0.48 (95% CI: −0.72 to −0.25), and all FSFI subdomains demonstrated statistically significant differences between women with PCOS and controls.

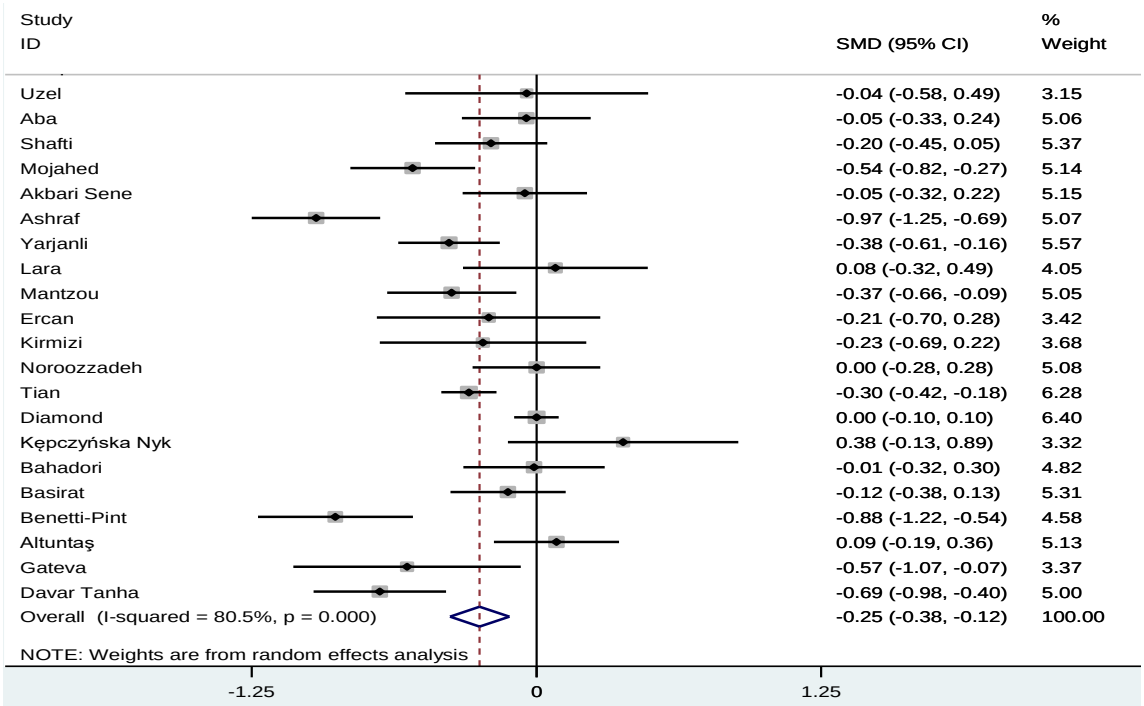

Figure 11: The pooled SMD of satisfaction subscale of FSFI is estimated as -0.31(case-control)

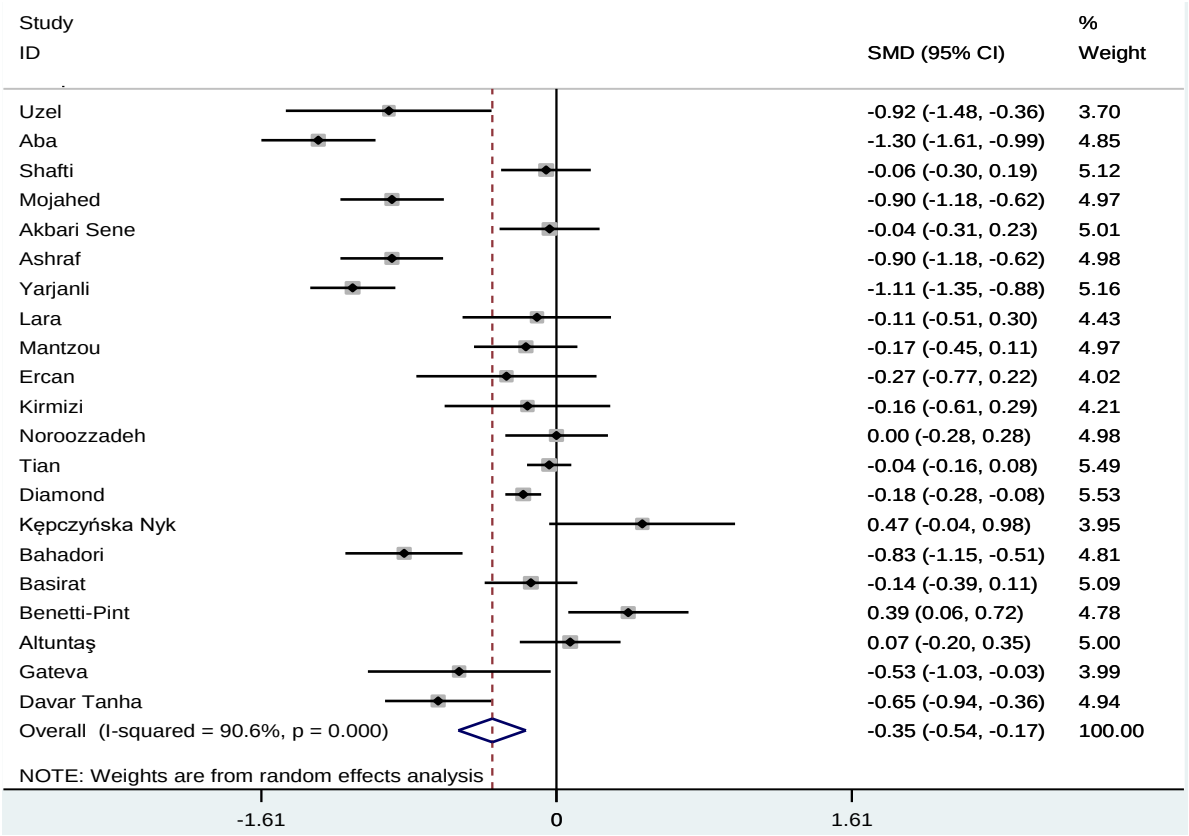

Figure 12: The pooled SMD of pain subscale of FSFI is estimated -0.35(case-control)

Higher levels of heterogeneity between the results of included studies could be due to various diagnostic criteria, FSFI cut-offs, and different populations with diverse cultures.

A recent systematic review that included 32 articles (of which only 20 used the FSFI) reported a pooled SMD of −0.75 (95% CI: −1.37 to −0.12). In that study, all FSFI subscales except for the desire domain showed significant differences between women with PCOS and controls (49).

In another systematic review and meta-analysis which is published in 2020, Loh et al included 12 studies that used the FSFI, and reported no significant difference between the pooled total FSFI, and its subscales in women with and without PCO, except for pain and satisfaction which were worse in PCO group than controls (50).

Our results also showed the pooled odds of developing SD in women with PCO is 2.45(95%CI: 1.55-3.86), showing that women with PCO are at higher risk of worse sexual function. In a study in Turkey, Aba et al reported lower FSFI in women with PCO than in controls, and the odds of SD were more than three times in cases than controls (15).

Majahed et al. reported that 72% of women with PCOS had sexual dysfunction (SD) and exhibited higher levels of depression and reduced sexual quality of life compared with controls (18). Diamond et al., in a study conducted in the United States, found no significant difference in FSFI scores between women diagnosed with PCOS and those without the condition (38) which is in agreement with Shafti et al findings (17). The underlying mechanisms of sexual dysfunction (SD) in women with PCOS are not fully understood. However, the coexistence of various physical and psychological factors—such as hirsutism, obesity, insulin resistance, depression, anxiety, and infertility—may collectively contribute to a diminished quality of life in this population (51). Women with PCO have a higher prevalence of infertility, which may negatively influence their sexual functioning and marital relationships (52). Factors such as menstrual irregularities, obesity, infertility, and hirsutism may contribute to reduced self-esteem and emotional distress, which in turn can predispose women with PCOS to sexual dysfunction (SD) (53). Trent et al. reported that young women with PCOS were less sexually active and expressed

greater concern about fertility than their healthy counterparts, factors that collectively impacted their quality of life (54). The study found that women with PCOS had 2.8-fold lower sexual activity compared with healthy controls. Furthermore, hormonal alterations, particularly elevated androgen levels, may contribute to the development of sexual dysfunction (SD). Evidence suggests that anti-androgen therapy in these women can improve sexual pain, orgasm, and satisfaction (55).

For the evaluation of sexual dysfunction, it is important to consider that its assessment is culturally influenced and can be challenging to conduct across different countries.

This study has several strengths. First, the number of included studies was relatively high, providing a robust evidence base. Second, the assessment of publication bias indicated that no relevant studies were missed in this systematic review. Third, we estimated both the pooled odds ratio for developing sexual dysfunction (SD) in women with PCOS and the standardized mean difference (SMD) across all FSFI subscales. Finally, we explored potential sources of heterogeneity by evaluating the effects of country of origin and year of publication.

Our findings suggest that sexual dysfunction is highly prevalent among women with PCO, driven by both biological and psychosocial factors. Future research should adopt longitudinal and interventional designs to clarify causality and evaluate targeted management strategies.

Conclusion

T This meta-analysis demonstrates a significantly higher prevalence of sexual dysfunction in women with PCO, emphasizing the need for routine sexual health assessment and holistic management, including psychological support, hormonal regulation, and lifestyle interventions.

Conflict of Interests

Authors declare no conflict of interests.

Acknowledgments

None.

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