In the Name of GOD

Journal club

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Prevalence of depression in infertile men: a systematic review and meta-analysis

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Abstract

Background Generally, infertile men hide their depression, which can threaten their health and lower their quality of life. Given the role of depression and its impact on people's health, this systematic review and meta-analysis aimed to investigate the prevalence of depression in infertile men.

Methods This research is a systematic review and meta-analysis based on preferred reporting items for systematic reviews and meta-analyses (PRISMA). Using the keywords of "Depression", "Emotional Depression", "Infertility", "Prevalence", and "Epidemiology", all English language articles were searched in international databases (PubMed, Cochran library, Web of sciences, Scopus, Embase, PsyINFO, and Google scholar) by two reviewers independently and without considering the time limit until September 2022. Title, abstract, full text and quality of each study were evaluated by two reviewers independently using the Newcastle–Ottawa Scale checklist. The results were analyzed using programming language and R software, and I^2 test and Egger's Test were used to check heterogeneity and publication bias, respectively.

Results Twenty-two studies were included in the systematic part of this study; and 8 different measurement tools were used to identify depression. Then, based on the possibility of meta-analysis, 18 studies were included in 4 subgroups. Given the heterogeneity of the articles, random effect model was used. The overall prevalence of depression in infertile men was 18.30%. The lowest and highest overall prevalence of depression in men was reported to be 14.04% and 23.63% in the Zung Self-Rating Depression Scale (ZDS) and the Depression Anxiety Stress Scales (DASS) tools, respectively. The overall prevalence of depression among infertile men was reported to be 18.55% and 16.75%) and the Hospital Anxiety and Depression Scale (HADS) tools, respectively.

s study, the significant prevalence of depression in infertile men requires dy revealed varying degrees of depression among infertile men, emphasiz- ntal health, specifically in terms of depression, during infertility treatments mended to develop training programs for health service providers to effec- ul field.

Keywords: Men, Infertility, Depression, Meta-analysis

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1	BMC Public Health ISSN/ISBN: 1471-2458	Occupational M... Environmental ... + 1 more ...	ProQuest	4.500	Q2	6.10	Q1	178	ISI, Scopus, PubMed, DOAJ	

Introduction

- Infertility refers to the failure of getting pregnant after 12 months of unprotected sex, which can be caused by either one of the couple.
- Approximately 8–12% of the world's population is infertile.
- Among the causes of infertility, male infertility (MI) has been observed in 50% of cases.

Introduction

- Infertility has always caused various social, psychological, physical and financial stresses.
- The incidence of emotional and mental disorders among infertile people is reported to be 25–60%.

Introduction

- As a prevalent mental disorder, depression has involved approximately 121 million people worldwide.

- People who experience fertility problems suffer from anxiety and depression almost twice more than the general population

Introduction

- In the study of Ogawa et al., the rate of depression ın infertile men and women was 9.4% and 7.9%, respectively in Japan , however, Masoumi et al. reported 30.5% of depression among Iranian infertile couples. In Gamel et al., severe level of depression was observed in 42% of infertile men and infertility had adverse consequences on their mental health in Egypt . In study in Osmaniye, some degrees of depression were observed in 20% of infertile men, and 13.3% had clinical depression that required counseling.

The aim

Therefore, psychiatric evaluation of men has been considered as an essential part of the treatment process. Given the fact that no study has hitherto meta-analyzed the prevalence of depression among infertile men, the present study aimed to investigate this issue based on published studies from different countries of the world.

Methods

- This systematic study was reported based on preferred reporting items for systematic reviews and meta-analyses (PRISMA).

Methods

- PRISMA 2020 Checklist

Methods

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Search strategy developed

Relevant data extracted

Data analyses

Results

International databases

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- PubMed
- Cochrane library
- Web of sciences
- Scopus
- PsyINFO
- Embase
- Google scholar search engine

Methods

- By two researchers independently in English and without considering any time limit until September 2022.

Keywords

- Depression
- Emotional Depression
- Infertility
- Prevalence
- Epidemiology

Methods

- These keywords were combined with AND, OR operators and the specific search strategy of each database was used (search strategy, Additional file 1).

Methods

- Appendix 1-Search Strategy

Inclusion criteria

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Male infertility was defined as lack of pregnancy after one year of intercourse without using any contraceptive method, according to the doctor's diagnosis or sperm analysis results.

Studies with at least 30 samples

Cross-sectional studies

Cross-sectional data from longitudinal studies

Valid methods for evaluating depression (clinical interview or standard questionnaire)

Exclusion criteria

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- Review articles
- Non-English articles
- Mental illnesses
- Case reports
- Articles with non-human samples
- Articles whose full text was not available

Outcome measures

- Reported the prevalence of depression in infertile men
- By standard tools (clinical interview or questionnaires)

Data extraction

The data of the studies were extracted by two trained reviewers independently, and in case of disagreement, a third reviewer was asked to help in this regard.

Data extraction

- During the initial search, the articles were entered the EndNote software by two reviewers separately, and duplicate articles were removed.

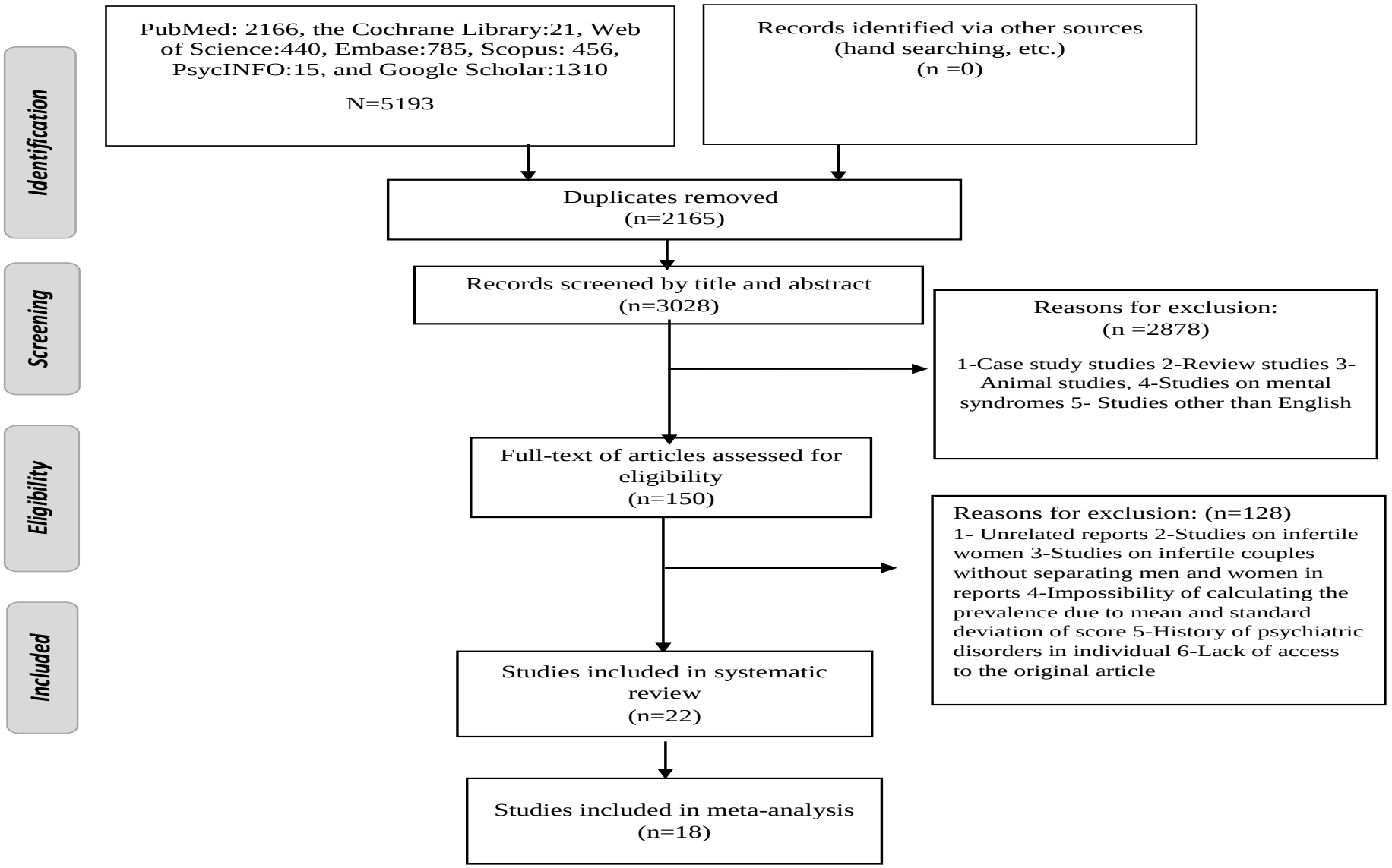

Figure 1. Flowchart for selection of studies

Data extraction

- duration of infertility
- prevalence of depression in infertile men
- name of authors
- mean age
- type of infertility
- sample size
- place of research
- year of publication
- type of tool

Quality evaluation

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For quality assessment, we used the Newcastle–Ottawa Scale (NOS) checklist.

Quality evaluation

This checklist consists of 5 sections representativeness of the sample, sample size, non-respondents, ascertainment of depression and quality of descriptive statistics reporting.

Accordingly, the articles that met the inclusion criteria were scored 0–5 based on the quality of the study and using NOS. Then, based on the total scores of < 3 and ≥ 3, the articles were classified respectively as high-risk and low-risk studies in terms of their quality (Table 1).

Quality evaluation

- In this study, quality assessment was done by two reviewers independently, and in case of disagreement, the opinions of a third reviewer were also used (Additional file 2).

Statistical analysis

- The data were analyzed using programming language and software.
- In this study, I^2 index was used to check the heterogeneity of the studies. Egger's test was also used to check publication bias.
- The overall prevalence of depression in infertile men was performed. Subgroup analysis was performed based on the type of tool. The significance level for statistical tests was considered to be 0.05.

Ethics approval and consent to participate

- Ethics approval was obtained from the Ethics Committee, Faculty of Pharmacy and Nursing and Midwifery, Shahid Beheshti University (Ethical code: IR.SBMU.RETECH.REC.1401.288).
- All methods were carried out in accordance with relevant guidelines and regulations.

Results

- Initially 5,193 articles were found.
- After removing the duplicate articles, the title and abstract of the remaining articles were reviewed, and after discarding the articles unrelated to the purpose of the research and considering the inclusion and exclusion criteria, the original text of 150 articles was further reviewed. Finally, 22 articles entered the final study and were analyzed.

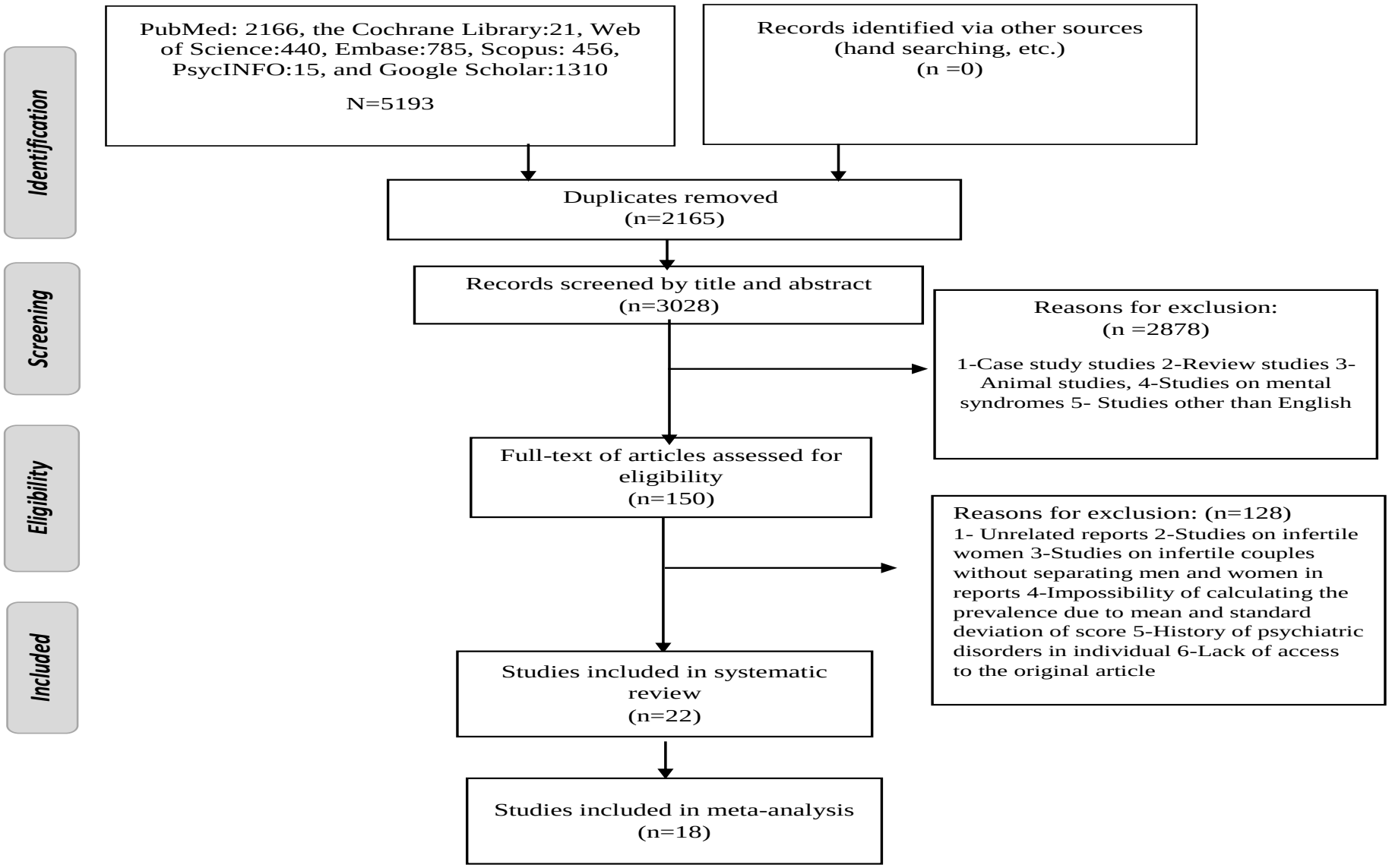

Figure 1. Flowchart for selection of studies

Results

- The total sample size of the studies was 6,496 infertile men, and the smallest and the largest sample sizes were 48 and 872 subjects, respectively.

Results

- The lowest and highest prevalence rates were 3.2% and 40.12% which were reported in Portugal and Egypt, respectively.

Types of tools

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- MINI
- MHI-5
- CES-D
- DASS
- BDI
- ZDS
- HADS
- D-S

Results

- One study used Mini International Neuropsychiatric Interview (MINI) [20], 3 studies the Depression Anxiety Stress Scales (DASS) [14, 32, 40], one study the Center of Epidemiologic Studies Short Depression Scale (CES-D) [31], one study the Mental Health Inventory–5 (MHI-5) [38], one study Depression Scale (D-S) [28], 3 studies the Zung Self-Rating Depression Scale (ZDS) [33, 37, 41], 4 studies the Hospital Anxiety and Depression Scale (HADS) [26, 27, 36, 42] and 8 studies the Beck Depression Inventory (BDI) [21,22,23,24,25, 29, 34, 39] to identify depression (Table 1).

domized studies in meta-analyses, modified by Zhang et al. [19]. This checklist consists of 5 sections representativeness of the sample, sample size, non-respondents, ascertainment of anxiety and quality of descriptive statistics reporting. Accordingly, the articles that met the inclusion criteria were scored 0–5 based on the quality of the study and using NOS. Then, based on the total scores of < 3 and ≥ 3, the articles were classified respectively as high-risk and low-risk studies in terms of their quality (Table 1). In this study, quality assessment was done by two reviewers independently, and in case of disagreement, the opinions of a third reviewer were also used (Additional file 2). This systematic study was reported based on preferred reporting items for systematic reviews and meta-analyses (PRISMA) [18].

Statistical analysis

In this study, I^2 index was used to check the heterogeneity of the studies. Egger's test was also used to check publication bias. The overall prevalence of depression in infertile men was performed. Subgroup analysis was performed based on the type of tool. The data were analyzed using programming language and software. The significance level for statistical tests was considered to be 0.05.

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Results

Initially 5,193 articles were found. After removing the duplicate articles, the title and abstract of the remaining articles were reviewed, and after discarding the articles unrelated to the purpose of the research and considering the inclusion and exclusion criteria, the original text

inventory–5 (MINI-5) [38], one study Depression Scale (D-S) [28], 3 studies the Zung Self-Rating Depression Scale (ZDS) [33, 37, 41], 4 studies the Hospital Anxiety and Depression Scale (HADS) [26, 27, 36, 42] and 8 studies the Beck Depression Inventory (BDI) [21–25, 29, 34, 39] to identify depression (Table 1).

Types of tools

MINI

The MINI is a short and structured diagnostic interview that was originally developed in the 1990s by psychiatrists and clinicians in the United States and Europe to assess DSM-III-R and ICD-10 psychiatric disorders [43]. It is widely recognized and utilized as part of the clinical evaluation process for depression and anxiety in primary care [44]. The MINI is considered the most effective structured psychometric diagnostic interview tool globally, and it is employed by mental health professionals and healthcare organizations in more than 100 countries. Numerous studies have confirmed its validity and reliability [45–48].

HADS

HADS is a 14-item scale with each seven items for anxiety and depression subscales. Each item is scored on a scale ranging from zero to three [49]. The total scores for each subscale range from 0 to 21 (0 to 7 indicating normal, 8 to 10 mild, 11 to 14 moderate, and 15 to 21 severe) [50]. The HADS offers several advantages, including its brevity, ease of scoring, and relatively high sensitivity. Its reliability and validity have been confirmed through studies conducted in various countries worldwide [51–53].

ZDS

The ZDS is a short self-administered survey used to measure the level of depression in a patient [54]. It was developed by Zung to assess depression severity [55]. Zung has reported a split-half reliability coefficient of 0.73, which has been confirmed through various studies examining its validity and reliability [54, 56, 57] The questionnaire consists of 20 items rated on a Likert scale from 1 to 4, and the total score ranges from 20 to 80 (20 to 44 indicating normal, 45 to 59 mild, 60 to 69 moderate, and 70 and above severe) [58].

BDI

The BDI consists of 21 items designed to evaluate various symptoms of depression [59]. There are different versions of this tool [60]. The total score on the BDI ranges from 0 to 63, with higher scores indicating greater levels of depression (0 to 9 indicating no symptoms, 10 to 18 mild, 19 to 29 moderate, and 30 to 63 severe) [61]. The BDI has demonstrated high construct validity in relation to the medical symptoms it measures. Studies have reported coefficient alpha values ranging from 0. 8 to above 0. 90 [62–65].

DASS

The 21-item DASS was developed by Lavibond and Lavibond in 1995 to assess stress-anxiety-depression [66]. The questionnaire comprises three components, with each subscales containing 7 items. The final score for each subscale is calculated by summing the scores of the corresponding items. Each question is scored from zero to 3. Since the DASS-21 is a shortened version of the original scale (which had 42 items), the final score for each subscale should be doubled [67]. The validity and reliability of the DASS-21 have been established, and its usefulness has been supported in both public and clinical settings [68–70].

CES-D

The CES-D was developed by Rudolph to assess depressive symptoms in the general population. This 20-item questionnaire is combined of different questionnaires [71]. Each item is scored on a scale from 0 to 3, and the maximum possible score is 60. Higher scores, particularly above 16, indicate a need for further clinical evaluation to diagnose mood disorders [72, 73]. The CES-D demonstrates adequate screening sensitivity and specificity when used in the general population or primary care settings. However, it should not be solely relied upon as a diagnostic measure for depression. Depending on the test

objectives, a cut-off score of 20 may be more appropriate than the value of 16, which is suggested [72].

D-S

The D-S is used to measure fearful and irritable depression. It consists of 16 items that are rated on a 4-point

The overall prevalence of depression in infertile men was found to be 18.30% (95%CI: 14.50–22.82)

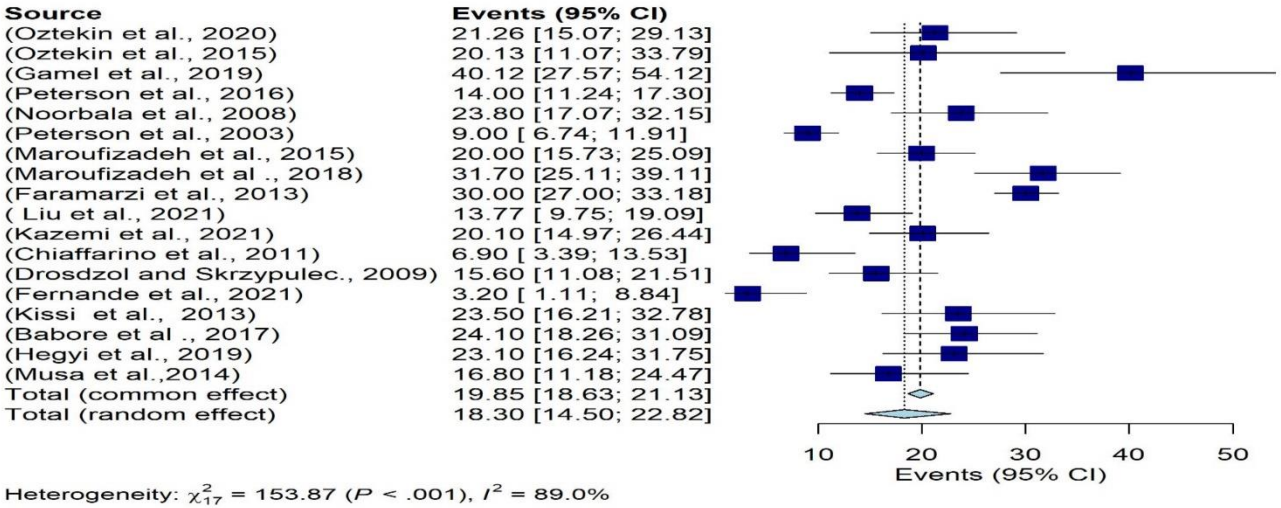


Figure 2. The overall prevalence of depression in infertile men

The results of the funnel chart for assessing the overall prevalence of depression and the results of Egger's test ($t = -2.00$, $df = 16$, p-value $= 0.062$) which indicate the absence of diffusion bias are also shown in Fig. 3.

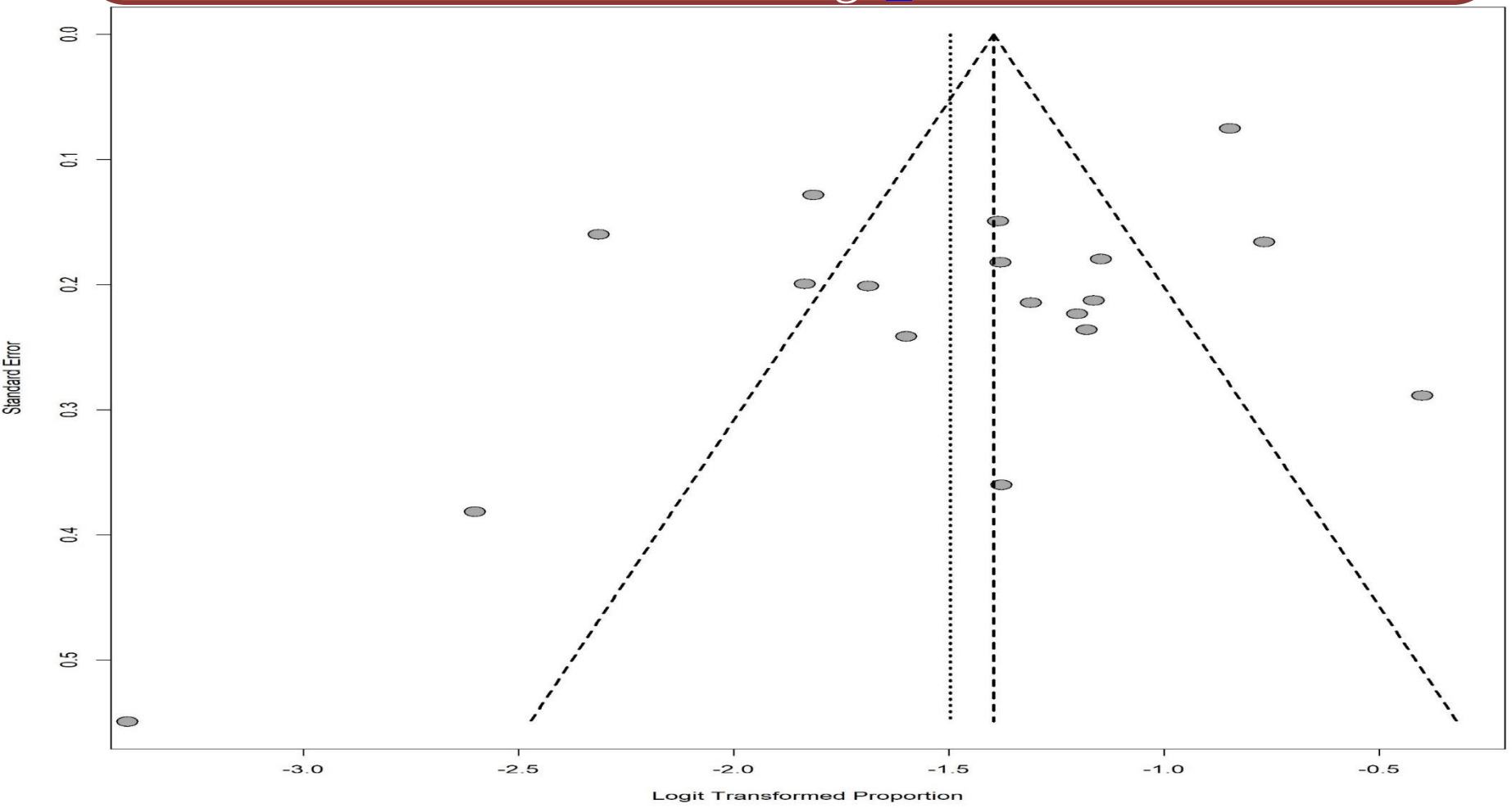


Figure 3. Funnel chart of overall prevalence of depression in infertile men

Based on the analysis in the subgroup of BDI tool, the overall prevalence of depression in men was 18.55% (95%CI: 14.12–23.98)

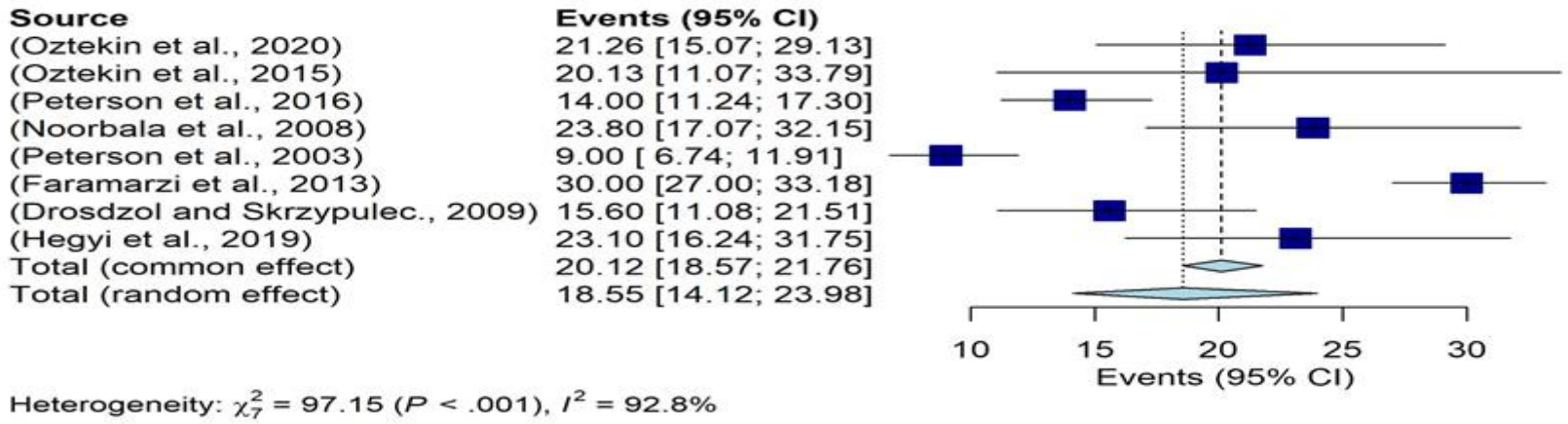


Figure 4. The overall prevalence of depression in infertile men in subgroup of BDI tool

The results of the funnel chart and the results of Egger's test (t = -1.34, df = 6, *p*-value = 0.2300) which indicate the absence of diffusion bias are also shown in Fig. 5.

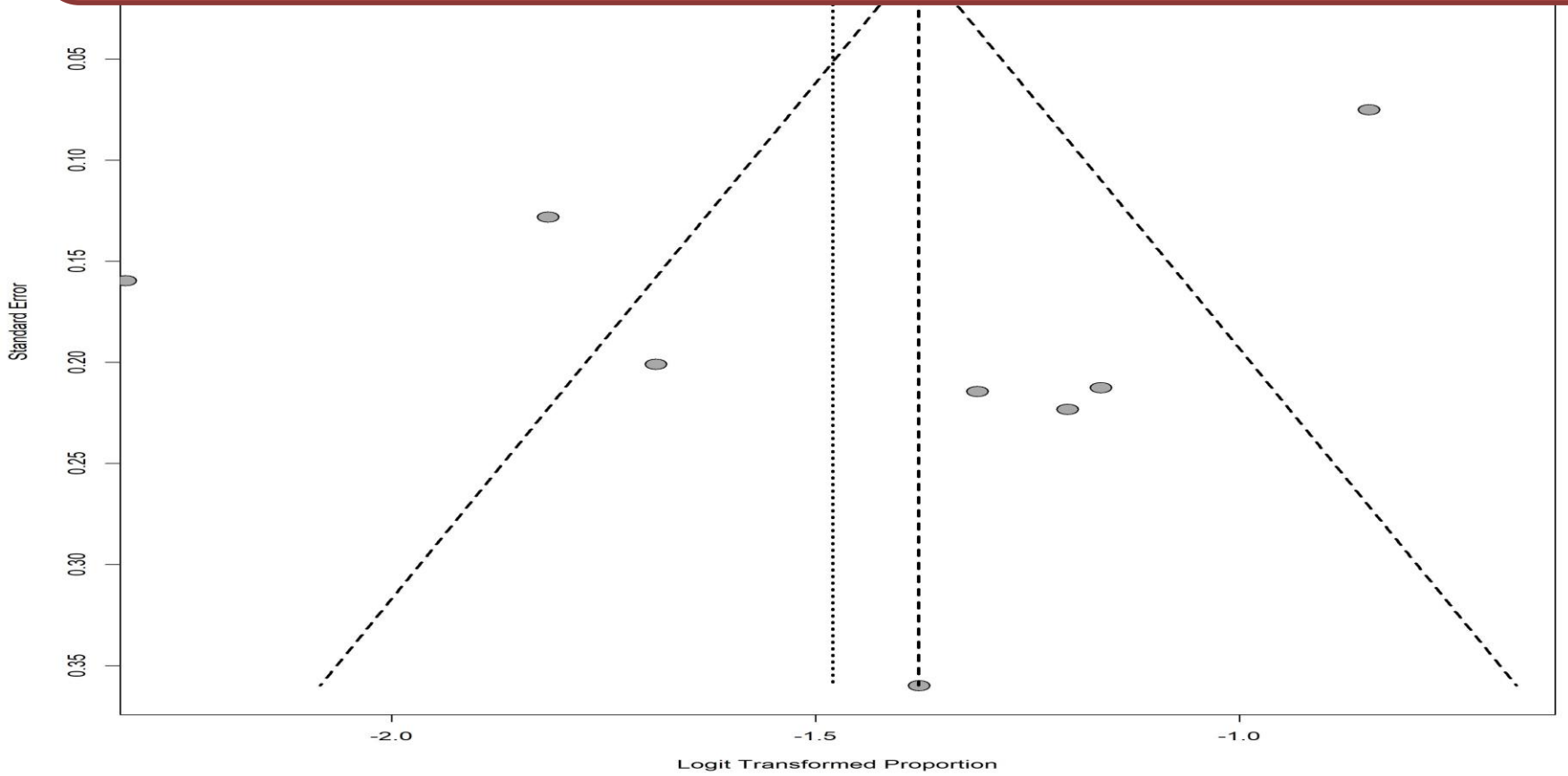


Figure 5. Funnel chart based on the BDI subgroup

Based on the HADS subgroup results, the overall prevalence of depressive in infertile men was 16.57% (95% CI: 7.3–33.27)

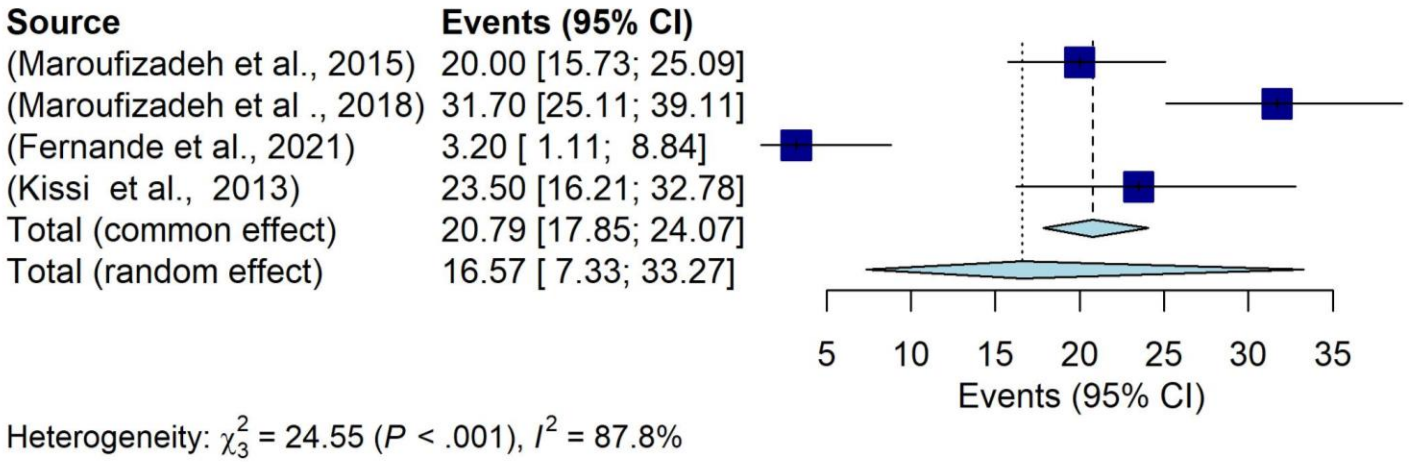


Figure 6. The overall prevalence of depression in infertile men in the HADS subgroup

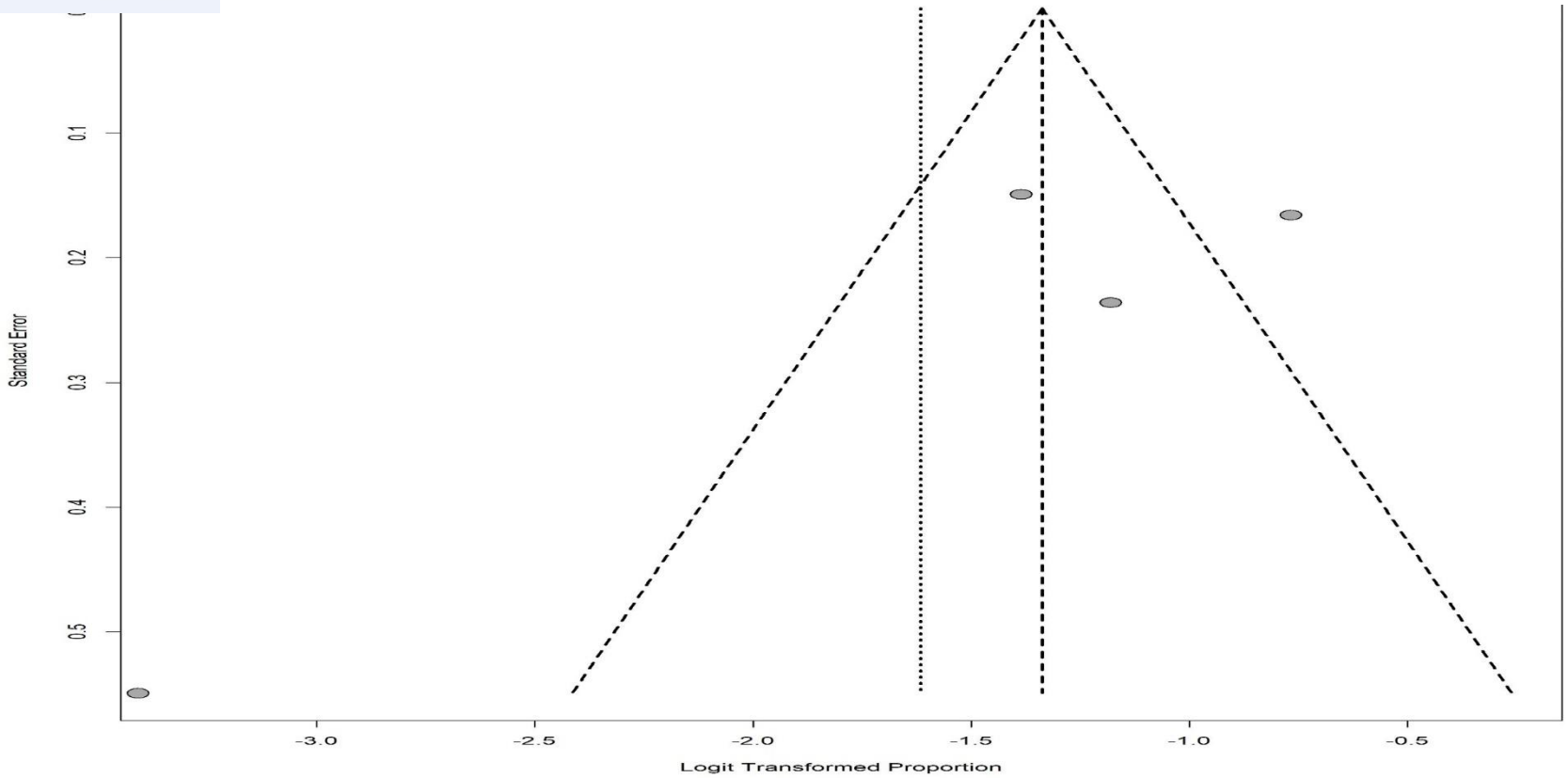


Figure 7. Funnel chart based on the HADS subgroup

The results of the DASS subgroup were indicative of the overall prevalence of 23.63% (95% CI: 15.07–35.06) in the depression of infertile men.

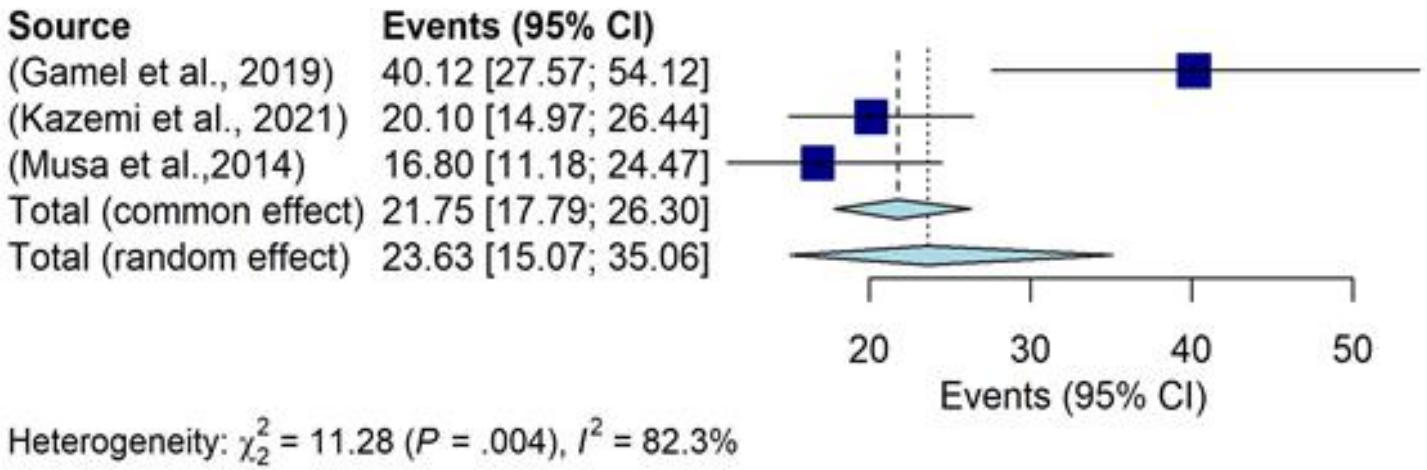


Figure 8. The overall prevalence of depression in infertile men in the DASS subgroup

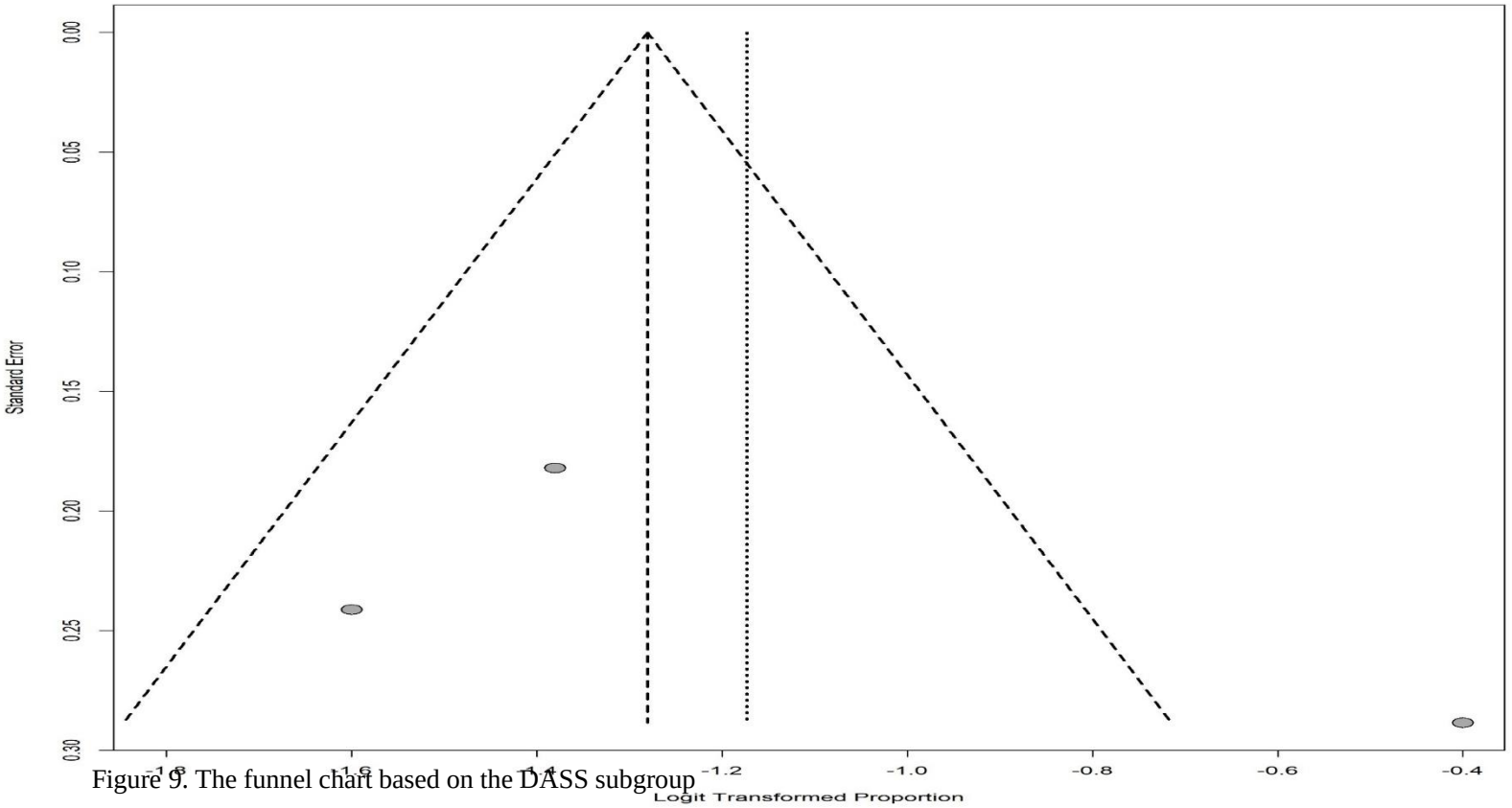
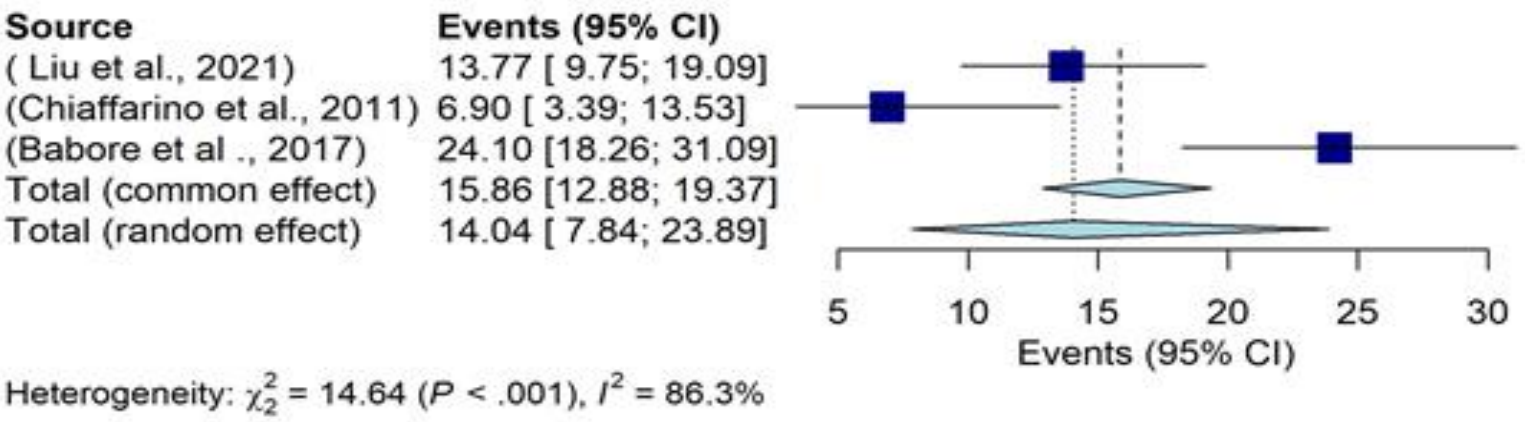


Figure 9. The funnel chart based on the DASS subgroup

The results of the ZDS subgroup were indicative of the overall prevalence of 14.04% (95% CI: 7.84–23.89) in the depression of infertile men.



Figur10. The overall prevalence of depression in infertile men in the ZDS subgroup

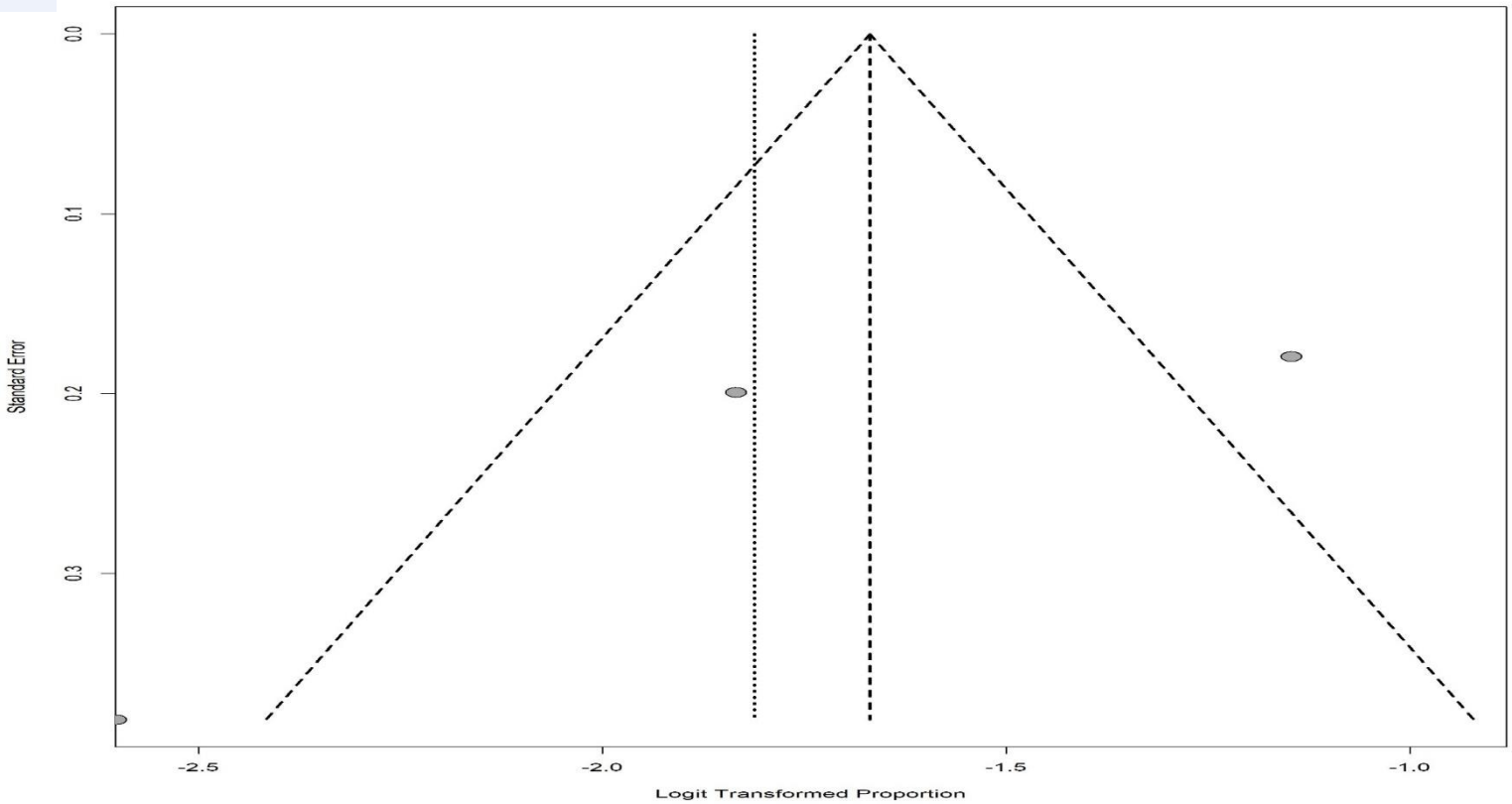


Figure 11. Funnel chart based on the ZDS subgroup

Discussion

The present study aimed to investigate the prevalence of depression in infertile men.

Based on the results of this meta-analysis, the lowest and highest prevalence of depression were 14.04% and 23.63%, which were based on the ZDS and DASS tools.

Discussion

- The overall prevalence of depression in infertile women has been reported to be 21–52%.

Discussion

- This inattention to the emotional reactions of infertile men can be partly related to men's insufficient information and their avoidance of talking about the issue of infertility with others.

Discussion

- The infertile men are also affected by psychological pressure.

Discussion

- Another important point is that knowing the prevalence rates of depression in infertile men makes specialists more alert to the assessment of mental distress, even in the initial visits or the screening stage.
- This, in turn, results in faster diagnosis makes treatment outcomes be fulfilled in a shorter time and increases the probability of success.

Discussion

- In all studies reviewed in the present meta-analysis, various questionnaires were used to diagnose depression in infertile men. Although the differences between the questionnaires were not significant, the BDI could be recommended as an initial diagnostic tool for depression in infertile men.

Limitation

- One of the limitations of the present study was the inclusion of studies with different tools in the measurement of depression, as a result of which it was almost impossible to combine all studies at once, though all scales were of the same type (subjective). Another limitation of the study was that non-English studies were not included, and the full text of some articles was not available.

Strengths

- One of the strengths of the study was addressing the prevalence of psychological aspects of infertility, especially in men, which have been less addressed before.

Conclusion

- Based on the results of the present meta-analysis, the prevalence of depression in men was 14–23%, which should not be overlooked. Accordingly, infertility specialists need to pay more attention on the psychological aspects of infertile men as well. In this regard, focusing on early screenings for men's depression during therapeutic interventions is needed to achieve better fertility outcomes. Therefore, it is recommended to develop educational packages or retraining programs for healthcare providers to improve their recognition and utilization of tools for diagnosing depression in men. These programs should be designed to consider the cultural and social context in which the healthcare providers operate.