

The Prevalence of Depression and Anxiety in Women with Ovarian Cancer: An Updated Systematic Review and Meta-Analysis of Cross-Sectional Studies

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Abstract

Background: This study aimed to determine the pooled prevalence of anxiety and depression in women with ovarian cancer.

Methods: Databases (PubMed [Medline], Scopus, Web of Science, Embase, and PsycInfo) were searched to retrieve all cross-sectional studies between July 2013 and October 2021. All analyses were performed using STATA 16, and the random-effects model was applied to calculate the pooled prevalence with a 95% confidence interval (95%CI).

Results: Out of the 18 selected cross-sectional studies, 17 reported depression prevalence, and 16 reported anxiety prevalence in women with ovarian cancer. The pooled prevalence of depression and anxiety was 27% (95%CI: 14%-41%; $I^2=69.44\%$) and 33% (95%CI: 21%-44%; $I^2=78.55\%$), respectively.

Conclusion: Based on this result, the prevalence of depression and anxiety in women with ovarian cancer was higher than in the healthy female population. Thus, health policymakers should provide the facilities for doing more studies such as cohorts to measure the effect of various treatments or interventions to reduce the mental disorders in women with ovarian cancer.

Background

Ovarian cancer results from deformity and malignancy of the ovarian surface epithelium, the essential sign of which is the presence of a pelvic mass on physical examination[1, 2]. In general, ovarian cancer has a relatively poor prognosis due to the lack of early symptoms and delayed diagnosis [3] and is often diagnosed in advanced stages[2, 4]. Ovarian cancer is the third most common cancer worldwide[3]. The incidence and mortality of ovarian cancer vary in different countries[5]. According to the statistics provided by Global Cancer in 2020, the standardized age incidence per 100,000 people in women has been reported as 6.6, and the mortality rate is also 2.4. The highest number of cases in Asia was reported in China, with 149,686 cases in all women[1]. By 2040, the number of new cases of ovarian cancer in Asia is projected to increase by 39.8%, and this increase will be significant in Africa and North America[1].

To improve the prognosis of this type of cancer, management of life quality and psychosocial indicators (biological, mental, and psychosocial status) of women with ovarian cancer are essential. In addition to managing physical health, supportive psychosocial care is critical for ovarian cancer survivors in the community. Psychological problems can affect treatment compliance and can increase mortality in cancer patients. On the other hand, women with ovarian cancer experience a higher level of psychosocial distress than those with other women's cancers[3]. Some studies have shown that depression and anxiety are two common psychological disorders in cancer[6]. Anxiety in women with ovarian cancer is often described as fear, nervousness, worry, apprehension, and threat[7]. Depression is also defined in this group as feelings of sadness, hopelessness, and lack of energy[8].

Anxiety, depression, and other side effects of mental disorders affect the quality of life in patients with ovarian cancer and also worsen the patients' symptoms and the severity of the disease[9]. Perhaps the most

common cause of depression and anxiety in women with ovarian cancer is a loss of reproductive capacity and an inability to access expensive medical care[10]. In a study performed by Watts S et al. in 2015, results showed that the prevalence of depression before, during, and after treatment in women was 25.34%, 22.99%, and 12.71%, respectively. The prevalence of anxiety before, during, and after treatment were 19.12%, 26.23, and 27.09, respectively[11]. Given the importance of the role of women as the core of the family and the need to pay attention to their physical and mental health, it is essential to assess their mental health status at the time of ovarian cancer.

On the other hand, preliminary studies in this area have shown contradictory and different results concerning the rate of mental disorders such as depression or anxiety in women with ovarian cancer. In this case, the decision to allocate health facilities is difficult. In addition, many cross-sectional studies worldwide have examined the prevalence of depression and anxiety in women with ovarian cancer[11]. Depression and anxiety in patients with ovarian cancer are serious clinical problems. However, the prevalence of these studies is so wide-ranging that a meta-analysis is needed to accurately determine the prevalence of these outcomes in affected women to inform health policymakers. A meta-analysis study entitled *depression and anxiety in ovarian cancer: a systematic review and meta-analysis of prevalence rates* was published by Watts S et al. in 2015[11]. Nevertheless, because several studies with contradictory results have been published on this issue after this meta-analysis, an updated meta-analysis is required to discover the cumulative prevalence of depression and anxiety in ovarian cancer based on all evidence in the existing literature. Thus, the present study aimed to determine the pooled prevalence of depression and anxiety in women with ovarian cancer in a systematic review and meta-analysis study, with the hope that by this result, the information needed to establish and design a program to promote the health of women with this type of cancer would be reported for other researchers and health policymakers.

Methods

This article has been written based on the preferred reporting items for systematic reviews and meta-analysis (PRISMA) standards. In addition, the study protocol has been registered in PROSPERO, whose registration code is CRD42021248733.

Search strategy

This study was a systematic review and meta-analysis conducted to determine the pooled prevalence of depression and anxiety in women with ovarian cancer. Articles published from January 2013 to October 2021 in 5 electronic databases (PubMed [Medline], Scopus, Web of Science, Embase, and PsycInfo) were retrieved and reviewed using the following keywords: "Depression", "Depressive Symptoms", "Emotional Depression", "Anxiety", "Social Anxiety", "Anxiety Symptoms", "Ovarian Cancer", "Ovarian Neoplasms", and "Ovary Neoplasm".

MeSH and Emtree were used to find the synonyms of the keywords. In addition, to find related articles, the manual search method was used to check the references of the final selected articles. The search strategy

was independently done and developed by the two authors (EN and DGH). The existing differences were resolved with the opinion of the third researcher (YM) with more experience.

Eligibility Criteria

In this meta-analysis, descriptive, analytical, or retrospective cross-sectional studies in which the target population was women with ovarian cancer and whose primary outcome was to measure the prevalence of depression and anxiety were included. All cross-sectional studies that reported depression and anxiety using specific and valuable tools through frequency were included in the meta-analysis.

Studies in languages other than English, cohorts, case-control studies, clinical trials, letters to the editor, case series, case reports, and systematic reviews were excluded from this meta-analysis. In addition, studies in which the study population included women with gynecological cancers other than ovarian cancer were also excluded.

Screening and Selection

An Endnote library (Version 8) was created to collect articles, remove duplicates, and screen titles and abstracts. Initially, the titles and abstracts were independently reviewed by one researcher (DGH), and the second researcher (EN) randomly inspected 10% of the reviewed articles. If necessary, disputes were resolved by discussion and referral to the third party (YM). The screened articles were selected for full-text review if they contained the desired information in the title or abstract review. A full-text review was separately done by one of the authors (YM).

Data Extraction

A checklist was prepared with the opinion of experts concerning the data extracted from the articles first, and then, the data were extracted. Required information included author name, the publication year of articles, the prevalence of depression and anxiety in women with ovarian cancer, type of study, sample size, country or region of the article, studied statistical population, method of measuring prevalence, and age of women with ovarian cancer.

Risk of Bias

Two authors (EN and DGH) evaluated the studies based on the Newcastle-Ottawa Quality Assessment Scale (NOS) checklist. This checklist is designed to assess the quality of observational studies, predominantly cross-sectional ones. This tool examines each study with six items in three groups, including selecting study samples, comparing and analyzing study groups, and measuring and analyzing the desired outcome. Each of these items is given a score of 1 if observed in the studies, and the maximum score for each survey is 9

points. In case of discrepancy in the score assigned to the published articles, the discussion method and the third researcher were used to reach an agreement[12].

Statistical Analysis

In this meta-analysis, first, the prevalence was extracted from the selected primary studies, and then, their standard error was calculated for each selected study. In addition to the prevalence of depression and anxiety, the total sample size of each study was extracted to perform the Metaprop command in STATA 16. This study used the inverse variance weighted random-effects model to estimate the pooled prevalence of depression and anxiety and its 95% confidence interval (95% CI) in women with ovarian cancer using the Metaprop and Metan commands in STATA 16. Cochrane Q and I^2 tests investigated the heterogeneity and variance between the studies selected for meta-analysis. Funnel plot diagrams and Egger tests were used to evaluate the publication bias. Also, the meta-regression analysis and chart were used to investigate the relationship of age with the estimated pooled prevalence. The subgroup analysis was done based on countries, NOS score, and age of patients.

Results

As a result of searching electronic databases, 1371 articles were obtained, of which 1221 remained after removing duplicates. In the next step, after screening based on the title, abstract, and full text based on the inclusion and exclusion criteria, 18 studies [13-30] were selected for meta-analysis (Fig. 1), of which 17 studies [13-18, 20-30] reported the prevalence of depression and 16 studies [13-19, 22-30] reported the prevalence of anxiety in women with ovarian cancer. Of 18 included studies, 6 were conducted in Australia [13, 15, 20, 25, 26, 30], 2 in the USA [16, 17], 2 in the United Kingdom [18, 19], 2 in China [22, 23], and one in each of the following countries: Norway [14], Czech Republic [21], Thailand [24], the Netherlands [27], Italia [28], and Poland[29]. The average age range of women in these studies were from 36.5 to 62.1 years old (Table 1).

Prevalence of depression in women with ovarian cancer

The lowest depression prevalence belonged to the study of Hodgkinson K et al. [13] with a prevalence of 2% (95% CI: 0% - 4%), and the highest depression prevalence belonged to the Slovacek L et al. study [21] with a prevalence of 83% (95% CI: 70% - 97%). A total of 3085 women with different degrees of ovarian cancer were studied in these articles, of whom 611 were diagnosed with depression based on various depression measurement tools. After combining the results of these studies, the pooled estimate of depression prevalence was 27% (95% CI: 14% - 41%; Fig. 2). In terms of heterogeneity, it was statistically significant, and the amount of heterogeneity according to the I Square index was equal to 69.44%. According to the Eggers test and funnel plot diagram, the publication bias occurred in the pooled prevalence of depression in women with ovarian cancer ($B = 9.36$; $SE = 3.11$; $P = 0.002$; Fig. 3a). The meta-regression results showed that with the increasing age of the affected women, the prevalence of depression also increased, but it was not statistically significant ($B = 0.05$; $SE = 0.01$; $P = 0.634$; Fig. 3b).

The results of subgroup analysis based on the variables of the country, age, and NOS score were reported in Table 2. Combining six studies [13, 15, 20, 25, 26, 30] examining 1169 Australian women with ovarian cancer showed a pooled prevalence of depression of 12% (95% CI: 1% - 23%) in Australia. Two studies [16, 17] were performed on 192 women with ovarian cancer in the United States. After combining these results, the pooled prevalence of depression in American women with ovarian cancer was 36% (95% CI: 10% - 64%). Two studies [22, 23] with a sample size of 468 people were conducted in China. After combining these studies, the pooled prevalence of depression in Chinese women with ovarian cancer was 47 (95% CI: 42% - 53%). Based on the different scores of the NOS quality assessment checklist, the results of the subgroup analysis showed that the studies with NOS score of 6 were two studies with a sample size of 107 people. After combining these studies, the pooled prevalence of depression in women with ovarian cancer was 11% (95% CI: 4% - 18%). Also, studies with a high-quality evaluation score (equivalent to 8) were 11 studies with a sample size of 2184 people. After combining these articles, the pooled prevalence of depression in women with ovarian cancer was 35% (95% CI: 15% - 56%).

Subgroup analysis based on age showed that six studies [14, 15, 23, 24, 28, 29] with a sample size of 1280 people determined the prevalence of depression in women with ovarian cancer, aged equal to or less than 55 years. After combining these results, the pooled prevalence of depression was estimated as 30% (95% CI: 12% - 50%) in women with ovarian cancer, aged equal to or less than 55 years. Also, the prevalence of depression in women with ovarian cancer older than 55 years, after combining 11 studies [13, 16-18, 20-22, 25-27, 30] with a sample size of 1704 people, was estimated as 26% (95% CI: 11% - 41%).

Prevalence of anxiety in women with ovarian cancer

In this section, 16 studies [13-19, 22-30] determined the prevalence of anxiety in women with ovarian cancer, with the lowest prevalence in the survey of Camara C et al. [27] with a value of 5% (95% CI: 1% - 8%) and the highest prevalence in the study of Stafford L et al. [25] with a value of 77% (95% CI: 68% - 87%). In these studies, a total of 2442 women with ovarian cancer were studied, of whom 737 people suffered from an anxiety disorder. After combining the results of these studies, the pooled prevalence was 33% (95% CI: 21% - 44%; Fig. 4). However, the amount of heterogeneity was statistically significant, and according to the I Square index, it was equal to 78.55%. Egger test and the funnel plot diagram showed that publication bias occurred in combination with the results of studies to determine the pooled prevalence of anxiety in women with ovarian cancer (B: 6.48; SE: 2.81; P: 0.021; Fig. 5a). The meta-regression results showed that with the increasing age of the affected women, the prevalence of anxiety also decreased, but it was not statistically significant (B: -0.02; SE: 0.01; P: 0.834; Fig. 5b).

The results of subgroup analysis based on the variables of the country, age, and NOS score were reported in Table 2. Five studies [13, 15, 25, 26, 30] determined the prevalence of anxiety in Australian women with ovarian cancer and examined a total of 556 people. The pooled prevalence of anxiety in Australian women with ovarian cancer was 30% (95% CI: 5% - 55%). Two studies [16, 17] were performed on 192 women with ovarian cancer in the United States. After combining these results, the pooled prevalence of anxiety in American women with ovarian cancer was 13% (95% CI: 1% - 26%). Two studies [22, 23] with a sample size of 468 people were conducted in China. After combining these studies, the pooled prevalence of anxiety in

Chinese women with ovarian cancer was 55% (95% CI: 49% - 61%). Two studies [18, 19] with a sample size of 148 women with ovarian cancer were performed in the UK. After combining these results, the pooled prevalence of anxiety in British women with ovarian cancer was 43% (95% CI: 19% - 47%). The studies with the NOS score of 6 were two studies with a sample size of 30 people. After combining these studies, the pooled prevalence of anxiety in women with ovarian cancer was equal to 28% (95% CI: 20% - 37%). Also, studies with a high-quality NOS score (equal to 8) were 9 studies with a sample size of 517 people. After combining these studies, the pooled prevalence of anxiety in women with ovarian cancer was 42% (95% CI: 20% - 63%).

Six studies [14, 15, 23, 24, 28, 29] with a sample size of 1280 people determined the prevalence of anxiety in women with ovarian cancer, aged equal to or less than 55 years. After combining these results, the prevalence of anxiety in women with ovarian cancer, aged equal to or less than 55 years, was 39% (95% CI: 21% - 57%). Also, the prevalence of anxiety in women with ovarian cancer older than 55 years, after combining ten studies [13, 16-19, 22, 25-27, 30] with a sample size of 1091 people, was equal to 29% (95% CI: 13% - 45%).

Discussion

The present meta-analysis aimed to determine the pooled prevalence of depression and anxiety in women with ovarian cancer. The results showed that the prevalence of depression and anxiety was 27% and 33%, respectively. In line with the objectives of the present meta-analysis, a prospective cohort study was conducted by Price MA et al., and the results showed that the prevalence of depression and anxiety in women with ovarian cancer was higher than those in the general population[31]. Ovarian cancer is the fifth leading cause of death among American women[32]. This type of cancer does not have an effective method for early diagnosis and effective treatment among women, so it is complicated to diagnose the early symptoms[33, 34]. According to various studies, 59% of patients have been diagnosed with metastatic symptoms, and most patients recur within 18 months[35, 36]. According to the National Cancer Institute, the 5-year survival rate for ovarian cancer is 47.4%. However, this survival rate in these patients is associated with low quality of life and severe symptoms. Patients undergo various drug and chemotherapy treatments during this period and are exposed to intestinal obstruction and other clinical conditions such as ascites. These factors lead to pain, fatigue, and ultimately lower quality of life and lack of continuity in treatment[37-39]. In this case, it seems that a negative attitude towards treatment and feelings of hopelessness can lead to increased distress[39-42]. As a result, it is necessary to pay more attention to ovarian cancer than other gynecological cancers[39, 40]. In the studies included in the present meta-analysis, most of the study population were treated with medication or chemotherapy. After chemotherapy, there were significant changes in the level of anxiety and depression. According to previous studies, the prevalence of depression after starting drug and chemotherapy treatment in women with ovarian cancer decreased, but the prevalence of anxiety increased. One of the possible causes of low depression scores and increased stress after chemotherapy was that patients who had been depressed at the time of diagnosis were treated. They gradually accepted the truth, but instead, they were more concerned about the side effects of medication or chemotherapy, the cost, the economic problems, and the life expectancy after treatment resulting in increased anxiety after chemotherapy[5, 11, 31, 43, 44].

The present meta-analysis results showed that the prevalence of depression and anxiety was higher in women with ovarian cancer aged less than 55 years. According to previous studies, stress and psychological disorders have occurred more in younger women than in older ones. In this case, it is recommended that psychological interventions be performed earlier to improve the outcome in these people. Younger women with ovarian cancer develop more severe mental disorders because they have lived with the disease for less than women over 55 years. Older women live with this cancer and are more accustomed to it. In younger women, because the level of life expectancy is higher than that in women with older ages, the rate of anxiety and depression is also higher[42, 43, 45, 46].

This meta-analysis showed the prevalence of depression and anxiety in Chinese women with ovarian cancer was higher than in Australian, American, and British women. Of course, the results of only two studies [22, 23] in China were combined, and the number of studies in this country was lower than those in other countries. Still, the meta-analysis showed a higher prevalence of these two outcomes in Chinese women with ovarian cancer. The higher prevalence of depression and anxiety in women with ovarian cancer in China and other developed countries can be attributed to the development of diagnostic methods and timely and appropriate screening of mental disorders in these communities. In contrast, in developing countries, this is not possible.

On the other hand, conducting training programs to promote the culture of the society and the attitude of women with ovarian cancer is another influential factor in the high prevalence of this disease. In developed countries, access to appropriate facilities and training patients encourage them to seek care and participate in screening programs. The results of previous studies have shown that, in people living in rural areas, the rate of depression, anxiety, and low quality of life was higher. Cultural context may influence the expression of emotions, which in many cases prevents early diagnosis and appropriate treatment of depression. Most comparative studies have reported worse outcomes for women with ovarian cancer living in rural areas. These women have more significant needs and limited access to diagnostic and treatment resources[47-50]. The long-term use of social media, applications, and other communication tools to communicate with physicians is another compelling factor in encouraging patients to undergo screening, which is more available in developed countries than underdeveloped or developing ones[31, 42, 51]. Socioeconomic status in different countries can also be another reason for differences in the prevalence of depression and anxiety in women with ovarian cancer[52, 53].

In this meta-analysis, studies that received lower-quality assessment scores based on the NOS checklist reported a lower prevalence of anxiety and depression in women with ovarian cancer. As could be seen from the present meta-analysis results, the prevalence of depression and anxiety was more deficient in studies that received a score of 6 based on the NOS checklist. Low-quality cross-sectional studies can underestimate the prevalence of depression and anxiety in women with ovarian cancer. The heterogeneity in the subgroup analyses of the present meta-analysis significantly decreased, which indicated the identification of heterogeneity sources. The age of the studied women, the quality of the articles, the differences in the methods or methodology of the studies, and the different studied populations were the causes of heterogeneity in the combination of studies to determine the pooled prevalence of depression and anxiety in women with ovarian cancer.

The noteworthy point of this meta-analysis was the acceptable level of heterogeneity in general analysis and subgroup analysis. One of the limitations of the present meta-analysis was the small number of studies in terms of subgroup analyses such as different countries and the types of treatment received as chemotherapy or medication. Also, the limited and incomplete report of the initial studies regarding the treatment and chemotherapy process and the class of used drugs did not allow subgroup analyses based on different treatments.

Conclusion

This meta-analysis demonstrated the prevalence of 27% for depression and the prevalence of 33% for anxiety in ovarian cancer, indicating the importance of mental disorders such as depression and anxiety in women with cancer, especially ovarian cancer. In people with ovarian cancer, periodic monitoring and screening tests are essential in psychological status, especially before and after starting medication and chemotherapy. Performing such assessments to identify patients' psychological changes, screening based on various risk factors, and planning interventions through social support can help prevent depression and anxiety.

Abbreviation

NOS: New castle- Ottawa Quality Assessment

MeSH: Medical Subject Headings

EMTREE: Medline Subject Headings

PRISMA: The Preferred Reporting Items for Systematic Reviews and Meta-Analysis

PROSPERO: International Prospective Register of Systematic Reviews

CI: Confidence Interval

Declarations

Ethics approval and Consent to participate

Not Applicable.

Consent for publication

Not applicable

Availability of data and materials

The datasets generated and analyzed during the current study are not publicly available due to their sensitive and potentially personally identifiable nature. However, they are available from the corresponding author on

reasonable request.

Authors' contributions

Conceptualization: YM; methodology: YM, HD, DG, and EN; software: YM, EN; validation: SK, MA; Qualitative data collection and analysis: YM, DG, and EN; investigation: SK, MA, and EEA; resources, YM; data curation: YM, HD, EN, and EEA; writing—review and editing: YM, HD, and EEA; supervision: YM; project administration: YM.

All authors have read and agreed to the published version of the manuscript.

Competing interests

All the authors declare that they have no conflict of interest

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Tables

Table 1: The characteristics of included studies

Author (Year)	Country	Kind of study	Sample size	Age	Outcome	No. (%)	Tools
Hodgkinson K et al. (2006) [13]	Australia	Retrospective	199	59	Depression	4(7%)	(HADS)
					Anxiety	11(20%)	(HADS)
Liavaag AH Et al. (2009) [14]	Norway	Cross-sectional	184	52	Depression	19(10.32%)	(HADS)
					Anxiety	54(29.34%)	(HADS)
Bisseling KC et al. (2009) [15]	Australia	Retrospective	62	36.5	Depression	3(5%)	(HADS)
					Anxiety	17(27%)	(HADS)
Norton TR et al. (2004) [16]	USA	Cross-sectional	143	55.4	Depression	79 (55 %)	BDI
					Anxiety	29 (20 %)	MHI
Wenzel LB et al. (2002) [17]	USA	Cross-sectional	49	55.9	Depression	8(16.3%)	(QOL-CS)
					Anxiety	3(6.1%)	(QOL-CS)
Goncalves V et al. (2008) [18]	UK	Retrospective	118	61.1	Depression	13(11%)	(HADS)
					Anxiety	38(31%)	(HADS)
Goncalves V et al. (2010) [19]	UK	Retrospective	30	58.8	Depression	NA	(HADS)
					Anxiety	17(56%)	(HADS)
Price MA et al. (2010) [20]	Australia	Retrospective	613	60.5	Depression	36(5.9%)	(HADS)
					Anxiety	NA	(HADS)
Slovacek L et al. (2009) [21]	Czech Republic	Cross-Sectional	30	62.1	Depression	25(83.3%)	(SDS)
					Anxiety	NA	(SDS)
Liu CL et al. (2017) [22]	China	Cross-Sectional	198	56	Depression	93(47%)	(HADS)
					Anxiety	102(51.5%)	(HADS)
Chen J et al. (2020) [23]	China	Cross-Sectional	270	53.5	Anxiety	127(47.03)	SCSQ
					Depression	156(57.77)	SCSQ
Chittrakul S et al. (2015) [24]	Thailand	Cross-Sectional	112	53	Anxiety	78(70)	(HADS)
					Depression	91(81)	

Stafford L et al. (2010) [25]	Australia	Cross-Sectional	71	58.5	Depression	28(16%)	HADS
					Anxiety	55(31%)	
Urbaniec OA et al. (2011) [26]	Australia	Cross-Sectional	45	56.7	Depression	9 (20 %)	BDI and STAI
					Anxiety	13 (28.9 %)	
Camara C et al. (2019) [27]	Netherlands	Cross-Sectional	130	60	Anxiety	6(3.9%)	HADS
					Depression	5(4.3%)	
Cicero G et al (2017) [28]	Italia	Cross-Sectional	120	44.95	Anxiety	48(40%)	(HADS)
Kulpa M et al. (2016) [29]	Poland	Cross-Sectional	532	54	Anxiety	43 (8.21%)	(HADS) (MHLC) (ERQ)
					Depression	37(6.09%)	
Shand LK et al. (2018) [30]	Australia	Cross-Sectional	108	56.36	Depression	7(5.84%)	HADS
					Anxiety	12(10.46%)	

Table 2: The subgroup analysis for determining the prevalence of depression and anxiety in women with ovarian cancer based on countries, NOS score, and age.

Figures

Outcomes	Subgroup		No. of Studies (Sample size)	Pooled Prevalence (% 95 CI)	Heterogeneity Assessment		
					I Square	P value	Q test
Depression	Countries	Australia	6 (1169)	12 % (1 – 23 %)	62.13 %	0.553	15.44
		USA	2 (192)	36 % (10 – 64 %)	77.02 %	0.043	19.99
		UK	1 (118)	11 % (5 – 17 %)	-	-	-
		China	2 (468)	47 % (42 – 53 %)	0.04 %	0.994	0.00
		Czech Republic	1 (30)	83 % (70 – 97 %)	-	-	-
		Netherlands	1 (130)	4 % (1 – 7 %)	-	-	-
		Norway	1 (184)	10 % (6 – 15 %)	-	-	-
		Poland	1 (532)	7 % (5 – 9 %)	-	-	-
		Thailand	1 (112)	81 % (74 – 88 %)	-	-	-
	NOS Score	6	2 (107)	11 % (4 – 18 %)	81.30 %	0.033	5.35
		7	5 (693)	19 % (1 – 37 %)	58.59 %	0.078	45.66
		8	11 (2184)	35 % (15 – 56 %)	69.55 %	0.044	58.99
	Age	<=55	6 (1280)	30 % (12 -50 %)	55.45 %	0.098	5.45
		>55	11 (1704)	26 % (11 – 41 %)	79.32 %	0.033	56.69
Anxiety	Countries	Australia	5 (556)	30 % (5 – 55 %)	78.69 %	0.001	101.82
		USA	2 (192)	13 % (1 – 26 %)	48.51 %	0.553	1.70
		UK	2 (148)	43 % (19 – 47 %)	33.49 %	0.366	1.26
		China	2 (468)	55 % (49 – 61 %)	44.80 %	0.183	1.81
		Italy	1 (120)	40 % (31 – 49 %)	-	-	-

	Netherlands	1 (130)	5 % (1 – 8 %)	-	-	-
	Norway	1 (184)	29 % (23 – 36 %)	-	-	-
	Poland	1 (532)	8 % (6 – 8 %)	-	-	-
	Thailand	1 (112)	70 % (61 – 78 %)	-	-	-
NOS Score	6	2 (30)	28 % (20 – 37 %)	0.02 %	0.870	0.03
	7	5 (135)	18 % (7 – 29 %)	94.31 %	0.001	73.51
	8	9 (517)	42 % (23 – 60 %)	98.33 %	0.001	88.03
Age	<=55	6 (1280)	39 % (21 – 57 %)	67.08 %	0.082	3.04
	>55	10 (1091)	29 % (13 – 45 %)	48.76 %	0.098	3.01

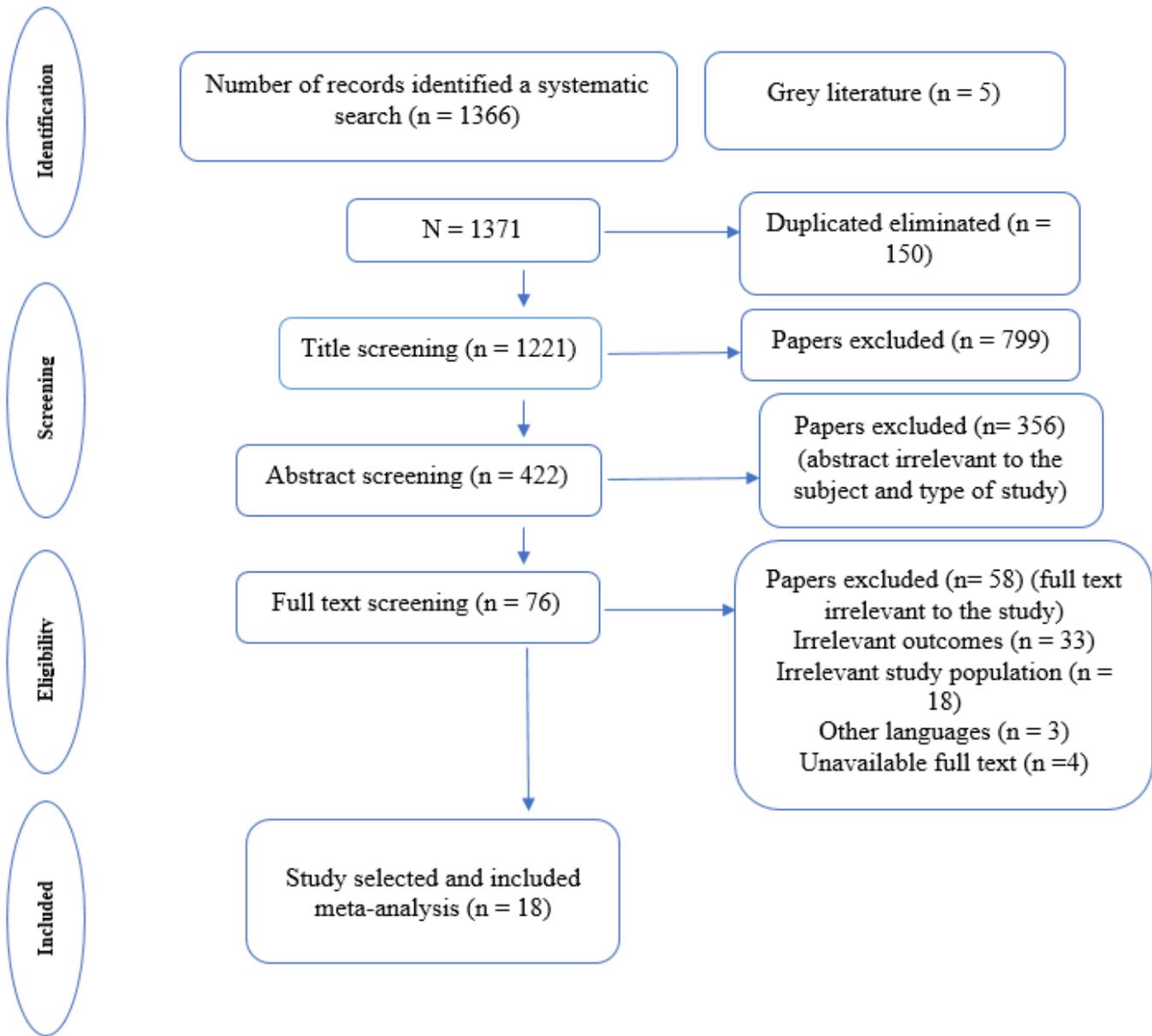
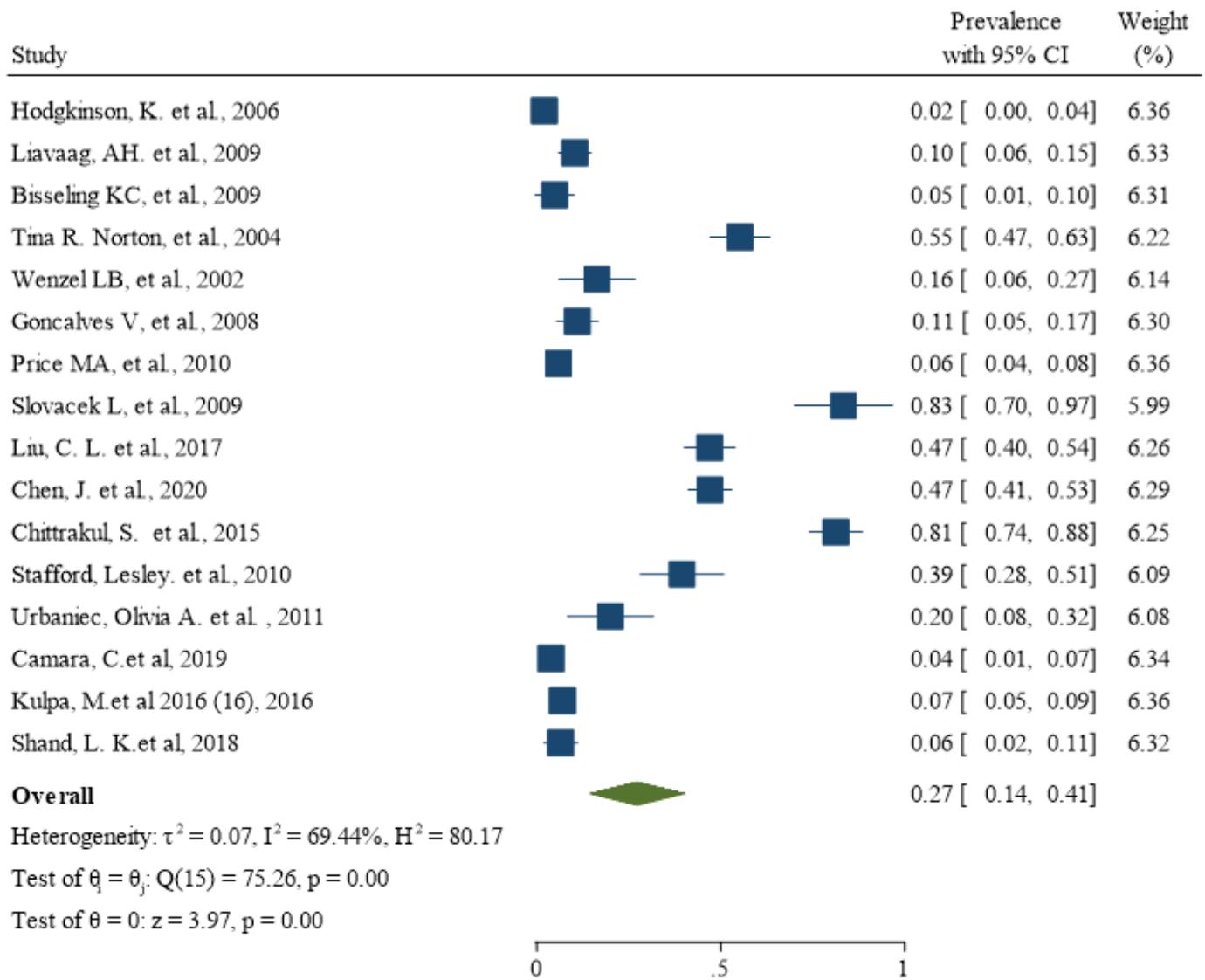


Figure 1

The Search outputs and study selection



Random-effects REML model

Figure 2

The pooled prevalence of depression in women with ovarian cancer around the word

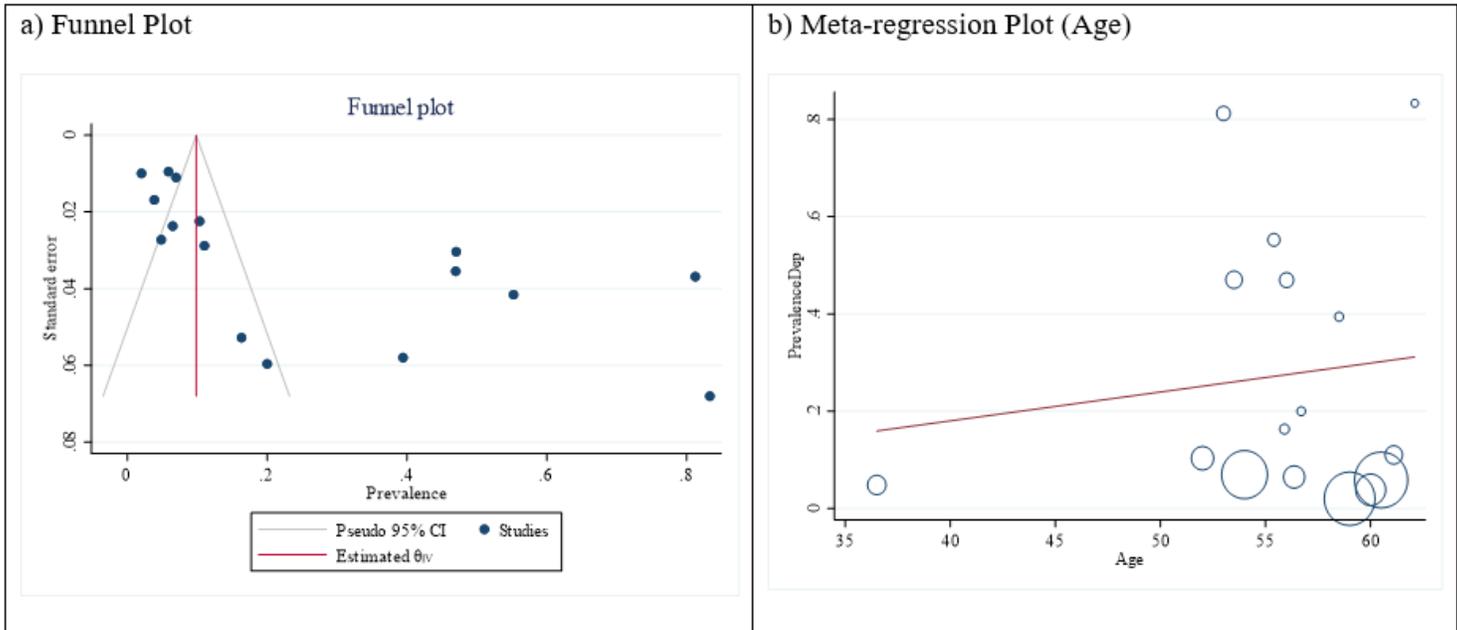


Figure 3

The funnel plot (a) and meta-regression plot (b) in the pooled prevalence of depression in women with ovarian cancer

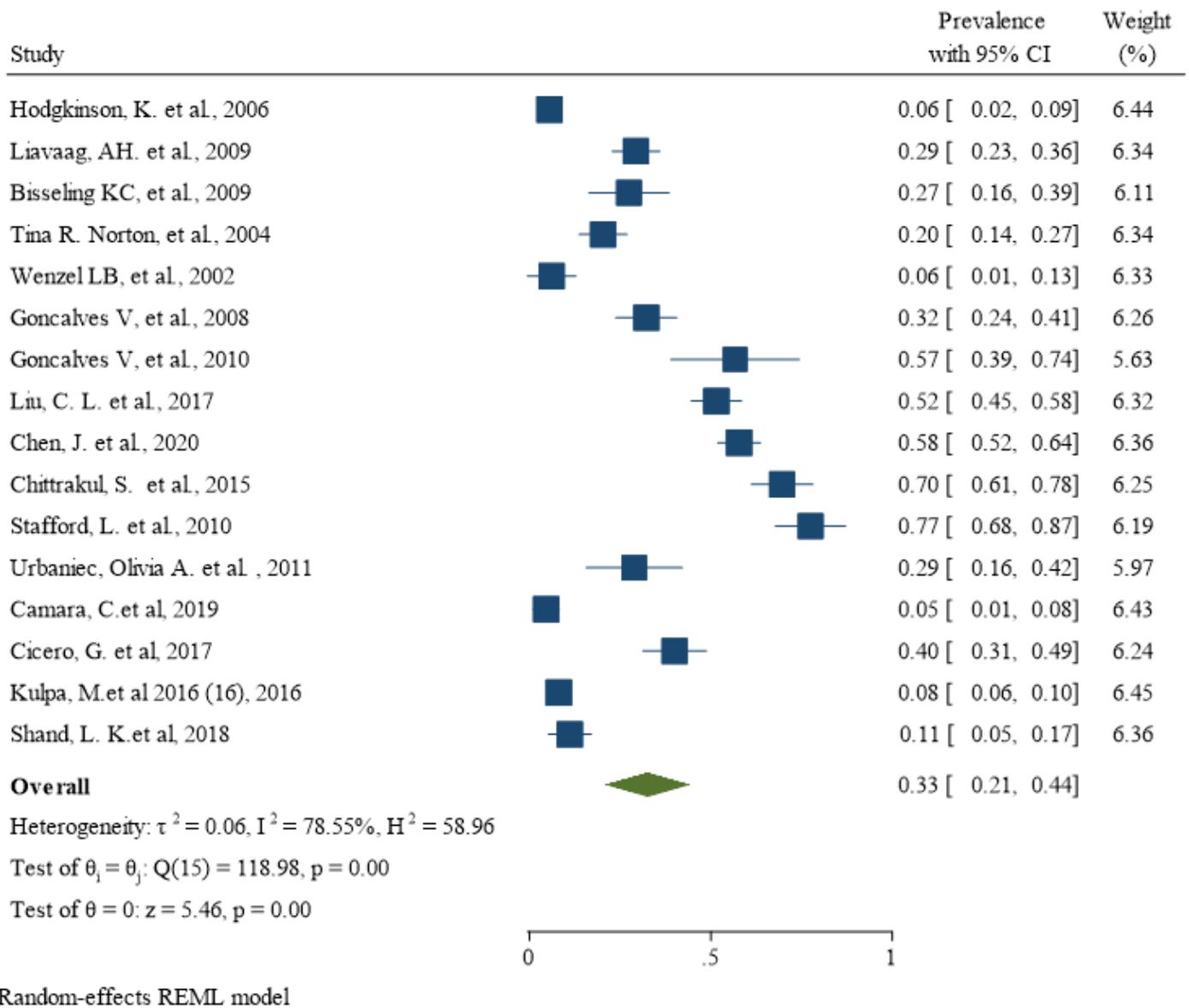


Figure 4

The pooled prevalence of anxiety in women with ovarian cancer around the word

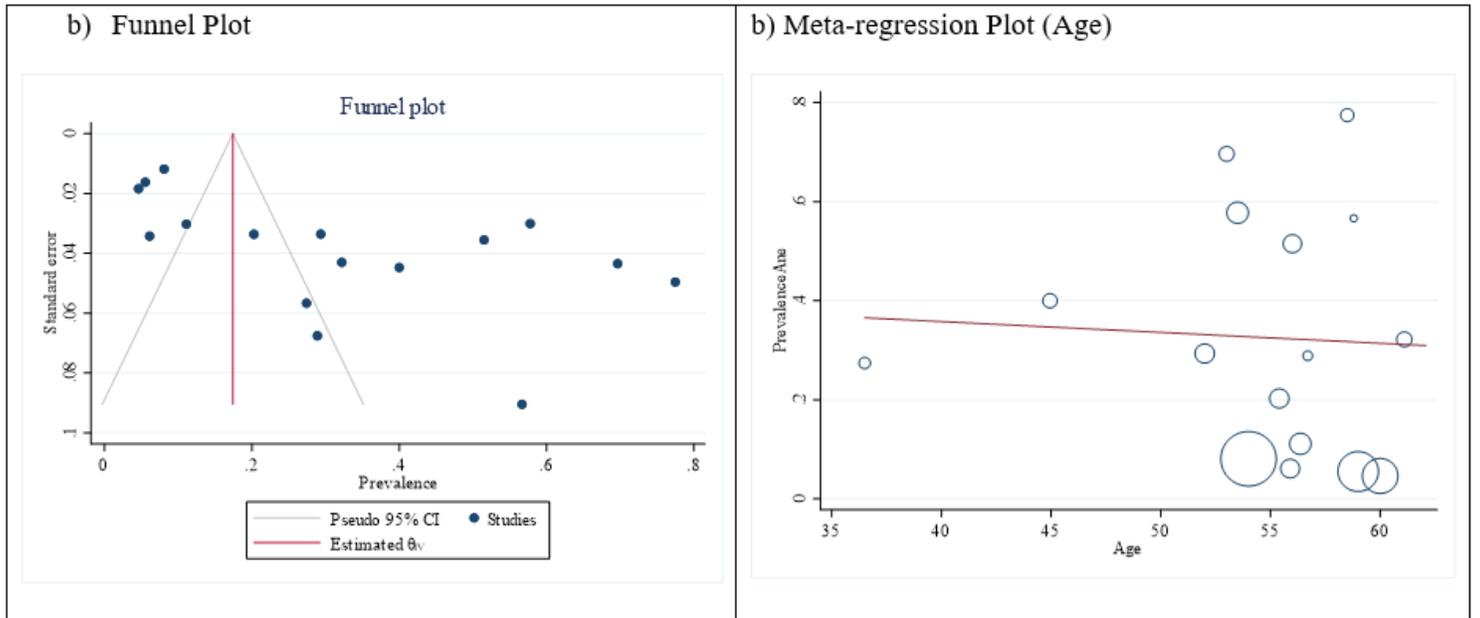


Figure 5

The funnel plot (a) and meta-regression plot (b) in the pooled prevalence of anxiety in women with ovarian cancer