

A Systematic Review and Meta-Analysis of Depression in Postnatal Women in the Case of a Low-Income Country; Ethiopia, 2020

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Abstract

Background

Maternal mental health in the postpartum period is essential for the optimal development of the newborn and appropriate breastfeeding practices. Despite this, a shortage of concrete evidence exists regarding the magnitude of postpartum depression and associated factors. This meta-analysis study was therefore done to fill such a gap.

Methods

PubMed, Scopus, and EMBASE were investigated with no time limitation. A manual search for a reference list of articles was also done. Relevant data were extracted using Meta XL package and analysis was done Stata-11 meta-prop package. Heterogeneity was checked with Cochran's Q-statistics and the Higgs I^2 test. Furthermore, sub-group and sensitivity analyses were done. Egger's test and funnel plots tests were engaged to identify publication bias.

Results

A total of 16 studies that assessed 11400 postpartum women in Ethiopia were included. The average estimated prevalence of postpartum depression was 21.9% (95% CI: 18.98, 24.77). The pooled prevalence of postpartum depression was higher in studies that used SRQ-20; 24.6% (95% CI: 18.42, 30.84) than studies that used PHQ-9; 18.9% (95% CI: 11.52, 26.28). Moreover, the pooled estimated prevalence of postpartum depression was slightly higher in the southern part of Ethiopia (22.6%) than Addis Ababa (21.2%). Poor marital relation (pooled aOR = 3.56) (95% CI: 2.50, 4.63), unplanned pregnancy (pooled aOR = 3.48) (95% CI: 2.18, 4.79), previous history of depression (pooled aOR = 4.33) (95% CI: 2.26, 6.59), poor social support (pooled aOR = 4.5) (95% CI: 3.34, 5.56), domestic violence (pooled aOR = 3.77) (95% CI: 2.62, 4.92), family history of mental illness (pooled aOR = 4) (95% CI: 1.56, 6.56), use of substance (pooled aOR = 4.67) (95% CI: 4.00, 5.34), low income (pooled aOR = 2.87) (95% CI: 1.59, 4.14), stressful life event (pooled aOR = 3.5) (95% CI: 1.39, 5.87) and perinatal complications (pooled aOR = 3.8) (95% CI: 1.45, 6.15) were among the associated factors for postpartum depression in Ethiopia.

Conclusion

More than one in five women was with postpartum depression and factors such as poor marital relations, history of depression, poor social support, domestic violence, unplanned pregnancy, family history of mental illness were related to it. Therefore, maternal postnatal care services should be geared to incorporate this public essential health concern.

Plain English Summary

To date evidences showed that 10–20% of postpartum women develop depressive disorders worldwide and this is much higher in low income countries like Ethiopia. Therefore it is essential to have a pooled estimated data regarding depressive symptoms and related factors in postnatal women so that initiation of early intervention would be implemented. In this meta-analysis study we incorporated 16 studies that assessed 11400 postnatal women which were obtained from a detailed search of pub-med, Scopus and EMBASE databases.

From the sixteen studies data was extracted using a meta-XL package and main meta-analysis was done with STATA-11 meta-prop-package. Since Higgs I^2 statistics was suggestive of heterogeneity between included studies, further sub-group and sensitivity analysis was done.

The pooled estimated prevalence of depression among postnatal women was high; slightly higher than 1 in 5 women in Ethiopia were with postpartum depression. This pooled estimated prevalence was higher in studies assessed with SRQ-20 than those assessed with PHQ-9. Besides, postpartum depression was higher in the southern region of the country than Addis Ababa.

We also established that poor marital relation, unplanned pregnancy, previous history of depression, poor social support and domestic violence were among the top contributing factors for depression in postnatal women in Ethiopia. Therefore, postnatal maternal care services should integrate depression in postpartum period and also it's associated factors.

Background

Women with depression in the postpartum period show manifestations like sleep disturbance, change in appetite patterns, feeling of sadness, recurrent guilty feeling, crying, low energy, and unease feelings of anxiety and suicidal ideas(1). Nowadays postpartum depression is increasingly taking a lion share in the burden of disease among women of 15 to 49 years of age (2). Globally, 10–20% of postnatal women develops depression at a point in time (3). A survey by the World Health Organization(WHO) identified that 20–40% of childbearing age women in the developing world sustained depression in the antepartum and postpartum period at a given time (4). Besides, 19% of postnatal women in low and middle-income countries(5, 6) and one among twenty postnatal women in Ethiopia (7) develops postpartum depression.

Different studies across the world reported different prevalence rates for postpartum depression.

A systematic review and meta-analysis study in 2018 by S Shorey et al. (8) reported the worldwide estimated prevalence of postpartum depression to be 17%. Besides, a study including low and middle-income countries and assessed 34 studies reported that 19.8% of postpartum women have a common mental disorder (9). Furthermore, another study that incorporated 38412 women and 23 studies in low and middle-income countries (6) reported 19.2% of women as having postpartum depression. Another systematic review and meta-analysis study in India which assessed 38 studies reported a pooled prevalence of postpartum depression to be 22% (10). Moreover, other individual studies reported earlier showed that postpartum depression was 17.6% in Portugal (11), 27.3% in China (12), 61.4% in Korea (13), 18.6% in Qatar (14), 34.8% in Iraq (15), 34% in Jamaica (16), 15.4% in Turkey (17), 13.5% and 10.3% in Oman (18), 31.7% in South Africa (19), and 43% in Uganda (20). In Ethiopia, the prevalence of postpartum depression varies between 12.2–33.8% (21–36).

Poor social support (37), poverty (38), and childbirth without the presence of relatives (39), history of depression (40), and poor woman autonomy (41) from socio-demographic variables, multi-parity (42), prime-parity (43, 44), multiple children at home (45), negative attitude toward to one's pregnancy (22, 46–49), depression during pregnancy (42, 50), premarital pregnancy (51, 52), miscarriage (53), and prenatal high anxiety (47) from pregnancy and newborn related factors, alcohol use in the husband (54), intimate partner violence (22, 55, 56), poor husbands education (45),

husbands unemployment (46, 57), and psychiatric problems in the husband (58) among husband related factors were among the associated factors for the development of postpartum depression. In the context of Ethiopia too, poor marital relation (27, 29, 32, 34, 35, 59), unplanned pregnancy (21, 22, 24, 27, 29, 32, 34), previous history of depression (21, 27, 28, 34), domestic violence (21, 22, 27, 34), poor social support (21, 32–35), and family history of mental illness (24, 28, 31) were among the documented factors responsible for the development of postpartum depression (PPD).

Postpartum depression in women has a great impact on the health of both the mother and her baby. Early discontinuation of breastfeeding (60), negative emotion and poor health care utilization (61), cognitive impairment, and behavioral defects (62), poor mother-infant bonding resulting in rejection of the infant (63), and suicidal behaviors (64) are common complications of postpartum depression. Furthermore, a community-based cross-sectional study in Ethiopia (23) revealed that maternal postnatal depression strongly affects a child's nutritional status leading to stunting and underweight as well as inappropriate complementary feeding practices of infants.

Even though maternal mental health problems in the postpartum period are much more prominent in poorly developed nations including Ethiopia, there still exists a gap in the pooled magnitude of postpartum depression and the associated factors. The objective of the present meta-analysis was, therefore (1): To determine the pooled estimated prevalence of postpartum depression among women in the postnatal period in Ethiopia and (2): To determine the pooled odds ratio of the associated factors for postpartum depression in Ethiopia.

Methods

Search strategy

Following the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines (65), we performed both an electronic and manual search for eligible articles. Our search for electronic libraries in Scopus, PubMed, and EMBASE and manual exploration of the reference list of articles was the backbone of the current meta-analysis. In searching articles for postpartum depression among women in the postnatal period using the PubMed database, we used the following searching terms: (Prevalence OR Epidemiology OR magnitude AND depression OR PPD OR "depressive disorder" AND mothers OR females OR women AND postpartum period AND factor OR "risk factor" OR determinant AND Ethiopia). Besides, the search for literature in EMBASE and Scopus was done per database-specific searching guidelines. Furthermore, the reference list of included studies was done and there was no specification for studies based on the study period.

Eligibility criteria's

Before the start of data refining, we stated a defining inclusion and exclusion criteria. Articles were eligible for inclusion if (1) assessed the outcome of interest among women in the postpartum period, (2) the primary outcome of interest were prevalence of postpartum depression and its associated factors, (3) design of the study was community and institution-based cross-sectional, case-control and cohort study design, (3) and (4) the study should be piloted in Ethiopia. Previously studied reviews, studies on women with an already known psychiatric problem, studies on animals, editorials, and studies reporting depression solely during pregnancy were excluded. MN and MA screened the topics and abstracts of searched articles stored in an endnote reference manager depending on the primary and prespecified eligibility criteria independently. After that, the next stage was a detailed exploration of the screened articles in the first step by the two review authors stated above independently. Any disagreement between the two authors regarding the eligibility of articles was settled through discussion in line with available logical evidence.

Methods for data extraction and quality assessment

The two declared authors (MN and MA) dig out the relevant data from the articles included in the final analysis autonomously using a standardized data extracted template. The included studies were extracted and summarized in the form of a table. Information's extracted and summarized in the table includes the author's name, publication year, study setting, study population, sample size, study design, and the assessment instrument for postpartum depression. Data from incorporated studies was extracted based on a template structured as suggested by PRISMA guidelines (65).

The modified Newcastle–Ottawa Scale (NOS) (66) was employed for the evaluation of the quality of studies. The domains of NOS scale in assessing the quality of studies include comparability between participants, representativeness of sample and sample size, statistical quality as well as ascertainment of cases.

2.4: Data synthesis and analysis

In this study, we engaged a random-effect model to work out the aggregate prevalence of postpartum depression and the associated factors for postpartum depression with their 95% CIs (67). Meta-XL version 5.3 (68) was employed to extract relevant data from included studies and the STATA11 Meta-prop package (69) was implemented to work out the pooled prevalence of postpartum depression and pooled odds ratio of the associated factors for Postpartum depression. Cochran Q -statistics and Higgs I^2 statistics (70) were also used to diagnose heterogeneity. The I^2 statistical value of and I^2 values of zero, 25, 50, and 75% connotes absence, little, moderate, and great heterogeneity respectively(70). Furthermore, subgroup analysis and sensitivity analysis tests were also done to explore the source of heterogeneity between the included studies. A funnel plot test (71) and eggars publication bias test were used to detect publication bias.

Results

Identification of studies

Our search with the pre-specified search strategies gives rise to an overall of 845 articles. Besides, 5 articles were obtained from the reference list of included articles making the total number of retrieved articles to be 850. Of this, we removed 24 duplicated studies before the further screening. In the next stage, we excluded 789 of the articles simply by observing their titles. Therefore the leftover 37 articles had been completely inspected for eligibility of inclusion into the current systematic review and meta-analysis study nevertheless only 16 articles were tailored in the final meta-analysis since the rest 21 articles were also excluded because of varieties of methodological and technical flaws (Fig. 1).

Characteristics of included studies

In this meta-analysis, a total of sixteen studies that assessed the prevalence of postpartum depression (21–36) and fourteen studies that assessed the associated factors(21, 22, 24, 26–35, 59) had been analyzed. A total of 11400 postpartum women had participated in this analysis. Region-wise, six (26, 28, 29, 34, 36, 59), six (22–25, 32, 35), three (21, 31, 33), one(27) and one (30) of the studies were from the southern part of Ethiopia, Amhara region, Oromia region, Addis Ababa and Tigray respectively. Of included studies three (26, 34, 36), ten (21–24, 27, 29–32, 35), and another three (25, 28, 33) utilized PHQ-9, EPDS, and SRQ-20 to asses depression in the postnatal women. Besides regarding, the design type of the study; eight (21, 23, 25, 28, 32–34, 36), seven (22, 24, 27, 29–31, 35) and one (26) were community-based cross-sectional, institution-based cross-sectional and cohort in respective order. Besides, six of the studies (23, 25, 27, 28, 30, 34) employed a multi-stage sampling method during data collection. All of the studies have reported a response rate for the study (21–36) (Table 1).

Table 1

Characteristics of studies on postpartum depression which are incorporated in this meta-analysis according to author first name, year of publication, setting of study, design, sample size, assessment instrument, study population and magnitude of postpartum depression and sampling methods, response rate

Author, year	Location of the study	Study design	Sample size	Tool	Study population	Depression (%) (n)	Sampling Method	Time of PPD assessment	Response rate (%)
Fantahun et al.,2018 (1)	Addis Ababa, Ethiopia	CS	618	EPDS(≥ 13)	Postnatal women	23.3 (n=144)	Multi-stage	Up to 6 weeks of delivery	97.6
Toru et al.2018 (2)	Southern Ethiopia	Community CS	456	PHQ-9	Postnatal women	22.4 (n=102)	Multi-stage	Up to 12 months of delivery	99
Abadiga,muktar 2019 (3)	Oromia, Ethiopia	Community CS	287	EPDS(≥ 10)	Postnatal women	20.9 (n=60)	Simple random	Up to 12 months of delivery	97.3
Abebe et al.2019 (4)	Amhara region	CS	511	EPDS(≥ 13)	Postnatal women	22.1(n=114)	Systematic sampling	Up to 6 months of delivery	97.3
MM Asaye et al 2020 (5)	Amhara region	CS	526	EPDS(≥ 13)	Postnatal women	25 (n=129)	Cluster sampling	Up to 6 weeks of delivery	100
Kerie et al.2018 (6)	Southern Ethiopia	CS	408	EPDS(≥ 10)	Postnatal women	33.8 (n=138)	Systematic sampling	Up to 12 months of delivery	96.7
Bitew et al.2019 (7)	Southern Ethiopia	Prospective cohort	1240	PHQ-9	Postnatal women	22.1(n=274)	NA	4–12 weeks after childbirth	94.6
Azale et al.2018 (8)	Southern Ethiopia	Community CS	3147	PHQ-9 ≥ 5	Postnatal women	12.2(n=385)	Population census	1 up to 12 months of delivery	100
Anato et al .2019 (9)	Amhara, Ethiopia	Community CS	232	EPDS(≥ 13)	Postnatal women	22.8 (n=53)	Multistage	5–10 months of delivery	97.5
Shewangizaw et al.2018 (10)	Harar, Ethiopia	CS	122	EPDS	Postnatal women	13.11 (n=16)	Convenience	1 week of delivery	100
Mariam et al.2016 (11)	Tigray , Ethiopia	CS	616	EPDS(≥ 8)	Postnatal women	19 (n=117)	Multistage	6 weeks of delivery	97.3
Shitu et al.2019(12)	Amhara, Ethiopia	Community CS	596	EPDS(≥ 8)	Postnatal women	23.7(n=141)	Cluster sampling	Up to 12 months of delivery	97.4
W Dargie et al.2020 (13)	Amhara, Ethiopia	CS	308	EPDS(≥ 13)	Postnatal women	15.6(n=48)	Systematic	Within 6 weeks of delivery	100
Teferra benti et al.2015(14)	Oromia ,Ethiopia	Community CS	340	SRQ-20 ≥ 6	Postnatal women	31.5(n=107)	Simple random	During px & 1-year after birth	95.2
G gebremichael et al.2018 (15)	Southern Ethiopia	Community CS	704	SRQ-20 ≥ 6	Postnatal women	22.6(n=159)	Multi-stage	1-year after birth	96.7
JN baumgartner et al.2014 (16)	Amhara, Ethiopia	Community CS	1294	SRQ-20 ≥ 7	Postnatal women	19.8(n=256)	Multi-stage	Within 2 years of delivery	98

Quality of Included Studies

In assessing the quality of included studies, we used the modified Newcastle Ottawa quality assessment as a gold standard. The quality of studies varies from 7 to 10 implying that none of the studies have poor quality. One of the studies has moderate quality(31) and the remaining fifteen were having good quality (Additional file 1).

The pooled prevalence of postpartum depression in this study

Sixteen studies (21–36) were incorporated to yield the pooled estimated effect size of postpartum depression. The reported magnitude of postpartum depression among the included studies ranges from 12.2%(36) to 33.8% (29). The average estimated prevalence of postpartum depression using the random effect model was 21.9% (95% CI: 18.98, 24.77). The variation attributed between the included studies which were not due to chance was considerable ($I^2 = 98\%$, p -value = 0.000) from the variance between the included studies (Fig. 2).

Subgroup analysis of the prevalence of postpartum depression by the tools used to measure postpartum depression.

Since the average effect size for the prevalence of postpartum depression was significantly influenced by the difference between the included studies, it was mandatory to conduct a subgroup analysis. Therefore, we used the measurement tools for postpartum depression to perform subgroup analysis. The subgroup analysis by assessment instrument yields that, measurement with SRQ-20 provided significantly higher result, 24.6%% (95% CI: 18.42, 30.84) with ($I^2 = 98\%$, $p < 0.001$) than the result with PHQ-9 which was 18.9% (95% CI: 11.52, 26.28) ($I^2 = 99\%$, $p < 0.001$) (Figure-3).

Sub-group analysis of the prevalence of postpartum depression by the setting of the study.

Although a subgroup analysis was done based on the setting where the study was done, there was no significant difference in the pooled prevalence of postpartum depression between community-based studies (22%) and institution-based studies (21.7%).

Sub-group analysis of the prevalence of postpartum depression by the regional location of the study.

The pooled prevalence of post-partum depression was slightly higher in studies from the southern part of Ethiopia (22.6%) than the central region (Addis Ababa) (21.2%) and this difference was also significant statistically ($p = 0.001$).

Sensitivity analysis

We performed a leave out a sensitivity analysis to detect the source of heterogeneity. However, our result showed that the average prevalence of postpartum depression when each study was left out from the analysis ranges from 21.08% (18.47, 23.68) to 22.52% (20.34, 24.69). Therefore, the result was not outweighed by the influence of a single study (Table 2).

Table 2

A sensitivity analysis of the prevalence of postpartum depression in women at postnatal period when each indicated studies are removed at a time with its 95% confidence interval.

No	Study excluded	Prevalence of postpartum depression	95% Confidence interval
1	Fantahun et al.,2018	21.77	18.69, 24.86
2	Toru et al.2018	21.83	18.77, 24.90
3	Kerie et al. 2018	21.08	18.47, 23.68
4	Bitew et al.2019	21.85	18.66, 25.05
5	Azale et al.2018	22.52	20.34, 24.69
6	G gebremichael et al.2018	21.82	18.72, 24.93
7	Abadiga,muktar 2019	21.93	18.97,24.90
8	Teferra benti et al.2015	21.23	18.41, 24.05
9	Abebe et al.2019	21.85	18.78, 24.93
10	MM Asaye et al 2020	21.66	18.62, 24.70
11	Anato et al .2019	21.81	18.78,24.84
12	Shitu et al.2019	21.75	18.67, 24.82
13	W Dargie et al.2020	22.29	19.29,25.29
14	JN baumgartner et al.2014	21.87	18.98, 24.77
15	Shewangizaw et al.2018	22.45	19.47, 25.43
16	Mariam et al.2016	21.87	18.98, 24.77

Publication bias

A scatter plot of the logit event rate of postpartum depression on the X-axis and its standard error on the Y-axis was done and showed that it seems as there was a publication bias since the graph was slightly asymmetrical (Fig. 4). However, the egggers publication bias test revealed that there was no significant publication bias ($B = 71.2$, $SE = 44$ and $P\text{-value} = 0.13$).

Associated factors for postpartum depression in Ethiopian women

As stated previously, fourteen studies (21, 22, 24, 26–35, 59) had reported one or more factors related to the development of depression in postnatal women. Our narrative synthesis revealed that poor marital relation (27, 29, 32, 34, 35, 59), unplanned pregnancy (21, 22, 24, 27, 29, 32, 34), previous history of depression (21, 27, 28, 34), domestic violence (21, 22, 27, 34), poor social support (21, 32–35), family history of mental illness (24, 28, 31), use of substance (21, 27, 34) and low income (27, 28, 59) were among the most commonly reported factors contributing to development of postpartum depression in postnatal women (Table 3).

Table 3
 Characteristics of associated factors for postpartum depression in Ethiopia by their Odds ratio, Confidence interval, association strength, author and year of publication.

Associated factors	Odds ratio(AOR)	95% CI	Strength of association	Author, year of publication
Being unmarried	2.5	1.20, 4.90	Strong and positive	Fantahun et al,2016
Income difficulty	2.3	1.30, 4.00	Strong and positive	Fantahun et al,2016
Death of a child	3.2	1.30, 8.00	Strong and positive	Fantahun et al,2016
Unplanned pregnancy	2.9	1.60, 5.00	Strong and positive	Fantahun et al,2016
Substance use	4.9	1.10, 21.30	Strong and positive	Fantahun et al,2016
Previous depression	4.2	2.30, 7.80	Strong and positive	Fantahun et al,2016
Domestic violence	3.1	1.60, 5.90	Strong and positive	Fantahun et al,2016
18 up to 23 years age	3.9	1.53, 9.90	Strong and negative	Toru et al.2018
Unplanned pregnancy	3.4	1.71, 6.58	Strong and negative	Toru et al.2018
Sleeping problem of child	3.7	1.79, 7.72	Strong and negative	Toru et al.2018
Domestic violence	2.9	1.72, 8.79	Strong and negative	Toru et al.2018
Unsatisfied marital relation	2.7	1.32, 5.62	Strong and negative	Toru et al.2018
Poor social support	4.3	1.79, 10.60	Strong and negative	Toru et al.2018
History of depression	7.4	3.12, 17.35	Strong and negative	Toru et al.2018
Substance use	5.2	2.52, 10.60	Strong and negative	Toru et al.2018
Unplanned pregnancy	7.8	3.19, 19.26	Strong and negative	abadiga, 2019
Primi-parity	4.99	1.54,16.09	Strong and negative	abadiga, 2019
History of depression	3	1.06, 8.82	Strong and negative	abadiga, 2019
Domestic violence	5.9	2.44, 14.40	Strong and negative	abadiga, 2019
Substance use	3.9	1.52,10.30	Strong and negative	abadiga, 2019
Poor social support	6.6	2.25, 19.29	Strong and negative	abadiga, 2019
Stressful life event	4.5	2.64, 7.54	Strong and negative	Abebe et al.2019
Domestic decision making	4.3	2.54, 7.14	Strong and negative	Abebe et al.2019
Unplanned pregnancy	1.9	1.02, 3.41	Strong and negative	Abebe et al.2019
Partner violence	3.2	1.76, 5.67	Strong and negative	Abebe et al.2019
Hospitalization of the baby	2.2	1.17, 4.31	Strong and positive	Abebe et al.2019
Abortion history	1.8	1.07,2.96	Strong and positive	MM Asaye et al 2020
Low birth weight of baby	3.1	1.78, 5.48	Strong and positive	MM Asaye et al 2020
GA of baby< 36 weeks	2.2	1.22, 3.88	Strong and positive	MM Asaye et al 2020
Unplanned pregnancy	2	1.24, 3.31	Strong and positive	MM Asaye et al 2020
Relative mental illness	1.2	1.09, 3.05	weak and positive	MM Asaye et al 2020
Has no ANC visit	4.05	1.81, 9.05	Strong and positive	MM Asaye et al 2020
Has no PNV	1.8	1.11, 3.00	strong and positive	MM Asaye et al 2020
Unplanned pregnancy	4.5	2.31, 8.71	Strong and positive	Kerie et al.2018
Age 15-24 years	0.4	0.18, 0.98	Weak and negative	Kerie et al.2018
Chronic illness	7.7	2.34, 25.44	Strong and positive	Kerie et al.2018
Death of the infant	4.1	1.78, 9.51	Strong and positive	Kerie et al.2018
Unstable marriage	6	2.79, 12.99	Strong and positive	Kerie et al.2018

Intimate partner violence	aRR=1.06	1.00, 1.12	Strong and positive	Bitew et al.2019
Depression in pregnancy	aRR=1.3	1.15, 1.45	Strong and positive	Bitew et al.2019
Premature baby	11.4	NA	Strong and positive	Shewangizaw et al.2018
Poor satisfaction with care	8.7	NA	Strong and positive	Shewangizaw et al.2018
Family hx of mental illness	7.4	NA	Strong and positive	Shewangizaw et al.2018
Single/divorced/widowed	3.5	1.35, 8.82	Strong and positive	Shitu et al.2019
Unwanted pregnancy	1.9	1.14, 3.33	Strong and positive	Shitu et al.2019
Undesired infant sex	1.8	1.13, 2.86	Strong and positive	Shitu et al.2019
Infant illness	2.1	1.30, 3.34	Strong and positive	Shitu et al.2019
Poor social support	3.2	1.55, 6.43	Strong and positive	Shitu et al.2019
Rural residence	2.6	2.56, 4.19	Strong and positive	Azale et al.2018
Grand multi-parity	2.0	1.22, 3.26	Strong and positive	Azale et al.2018
Perinatal complications	2.6	1.89, 3.44	Strong and positive	Azale et al.2018
Past history of abortion	1.5	1.07, 2.11	Moderate and positive	Azale et al.2018
Hunger in past 1 month	2.4	1.75, 3.23	Strong and positive	Azale et al.2018
Lower perceived wealth	2.1	1.19, 3.76	Strong and positive	Azale et al.2018
Poor marital relation(12)	2.5	1.79, 3.42	Strong and positive	Azale et al.2018
stressful event in past	2.4	1.82, 3.06	Strong and positive	Azale et al.2018
Being widowed	4.2	1.14, 15.20	Strong and positive	Wubetu et al.2020
Poor social support	5.1	1.00, 26.18	Strong and positive	Wubetu et al.2020
Hospitalization of a child	3.3	1.39, 7.93	Strong and positive	Wubetu et al.2020
Death of family member	2.9	1.101, 8.50	Strong and positive	Wubetu et al.2020
Have no death of one's child	0.3	0.11,0.86	Strong and Negative	Teferra et al.2015
Poor support from family	3.3	1.11, 9.52	Strong and positive	Teferra et al.2015
Low income	4.2	1.90,9.30	Strong and positive	G Gebremichael et al.2018
Pregnancy complications	5	2.50, 10.40	Strong and positive	G Gebremichael et al.2018
Smoking in husband	4.1	1.60, 10.60	Strong and positive	G Gebremichael et al.2018
Previous depression	2.7	1.54, 4.80	Strong and positive	G Gebremichael et al.2018
Family hx of psychiatry illness	3.6	1.40, 9.10	Strong and positive	G Gebremichael et al.2018

The pooled odds ratio of the poor marital relationship among the above-mentioned studies was 3.56 (95% CI: 2.50, 4.63) (**Fig. 5**). This implied that women with poor marital relationships were 3.56 times at higher risk of developing PPD than women who good marital relationships. Also, the pooled odds ratio for unplanned pregnancy for the nine studies reported above was found to be 3.48 (95% CI: 2.18, 4.79) (**Fig. 6**). This showed that women who gave birth from an unplanned pregnancy were 3.5 times more likely to be depressed than women with a planned pregnancy. The previous history of depression was also an associated factor for the development of PPD with a pooled estimate odds ratio of 4.33 (95% CI: 2.26, 6.59); (21, 27, 28, 34). Besides domestic violence and poor social support were also having a significant association with the development of PPD with the estimated pooled odds ratio of 3.77 (95% CI:2.62, 4.92) (21, 22, 27, 34), 4.5 (95% CI: 3.34, 5.56) (21, 32–35) respectively.

Furthermore, the pooled odds ratio of family history of mental illness (24, 28, 31), use of substance (21, 27, 34) and low income (27, 28, 59), stressful life event(22, 59) and perinatal complications (28, 59) was 4 (95% CI:1.56, 6.56), 4.67(95% CI:4.00, 5.34), 2.87 (95% CI: 1.59, 4.14), 3.5 (95% CI: 1.39, 5.87) and 3.8 (95% CI: 1.45, 6.15) respectively (Table 4).

Table 4
Pooled estimate of the associated factors for postpartum depression in Ethiopia.

Associated factors	Odds ratio(AOR)	95% confidence interval	Strength of association	Author, year of publication
Perinatal complications	2.6	1.89, 3.44	Strong and positive	Azale et al.2018
Past history of abortion	1.5	1.07, 2.11	Moderate and positive	Azale et al.2018
Hunger in past 1 month	2.4	1.75, 3.23	Strong and positive	Azale et al.2018
Lower perceived wealth	2.1	1.19, 3.76	Strong and positive	Azale et al.2018
Poor marital relation(12)	2.5	1.79, 3.42	Strong and positive	Azale et al.2018
stressful event in past	2.4	1.82, 3.06	Strong and positive	Azale et al.2018
Being widowed	4.2	1.14, 15.20	Strong and positive	Wubetu et al.2020
Poor social support	5.1	1.00, 26.18	Strong and positive	Wubetu et al.2020
Hospitalization of a child	3.3	1.39, 7.93	Strong and positive	Wubetu et al.2020
Death of family member	2.9	1.101, 8.50	Strong and positive	Wubetu et al.2020
Have no death of one's child	0.3	0.11,0.86	Strong and Negative	Teferra et al.2015
Poor support from family	3.3	1.11, 9.52	Strong and positive	Teferra et al.2015
Low income	4.2	1.90,9.30	Strong and positive	G Gebremichael et al.2018
Pregnancy complications	5	2.50, 10.40	Strong and positive	G Gebremichael et al.2018
Smoking in husband	4.1	1.60, 10.60	Strong and positive	G Gebremichael et al.2018
Previous depression	2.7	1.54, 4.80	Strong and positive	G Gebremichael et al.2018
Family hx of psychiatry illness	3.6	1.40, 9.10	Strong and positive	G Gebremichael et al.2018
Associated factors	Risk groups	Pooled effect size& 95% CI	I ²	Studies pooled
Unplanned pregnancy	Women who have unplanned pregnancy	3.48 (2.18, 4.79)	90%	(1–6, 12)
Previous history of depression	Women having history of depression	4.33 (2.26, 6.59)	94%	(1–3, 15)
Poor social support	Women with poor social support	4.5 (3.34, 5.56)	96%	(2, 3, 12–14)
Domestic violence	Women who faced domestic violence	3.77 (2.62, 4.92)	94.6%	(1–4)
Poor marital relation	Single/divorced/widowed& dissatisfied marriage	3.74 (2.47, 5.00)	92%	(1, 2, 6, 12, 13, 17)
Substance use	Those women who are using substances	4.67(4.00, 5.34)	90.6%	(1–3)
Low income	Women with insufficient income	2.87(1.59, 4.14)	84%	(1, 15, 17)
Family history of mental illness	Women with history of mental illness in the family	4 (1.56, 6.56)	92.6%	(5, 10, 15)
Stressful life-event	Women who faced stressful event	3.5 (1.39, 5.87)	97%	(4, 17)
Perinatal complications	Women with perinatal complications	3.8 (1.45, 6.15)	98%	(15, 17)

Discussion

To date, this review and meta-analysis on depression and the related factors in women in the postnatal period are the first of its kind in the context of Ethiopia. Therefore, the pooled effect size of postpartum depression and related factors would add a body for the scientific community and other diverse stakeholders who are intended to intervene in this significant public health issue. We gathered data from a total of 11400 postpartum women and a total of sixteen studies from both institutional and community settings and the estimated pooled prevalence of postpartum depression were 21.9% (95% CI: 18.98, 24.77).

The result of the pooled estimated prevalence of postpartum depression in this study (21.9%) was in line with a systematic review and meta-analysis of depression in the postpartum period in India (22%) which analyzed 38 studies and 20043 women(10). It was also consistent with the result of a systematic review and meta-analysis study in women from low and middle-income countries which assessed 34 studies and 19.8% were having a postpartum common mental disorder(9). Furthermore, another study that incorporated 38412 women and 23 studies in low and middle-income countries (6) reported 19.2% of women as having postpartum depression which was also supportive of the current finding.

However, the result of the pooled estimated prevalence of postpartum depression in Ethiopia exceeds the worldwide estimated prevalence of postpartum depression; 17% reported in 2018 by S Shorey et al.2018 (8). The possible reason for the higher estimated prevalence in the earlier study as compared to our study could be due to the inclusion of a larger number of studies and participants in the included studies in the analysis (26 cross-sectional, 30 prospective cohort and 2 case-control studies with an overall of 58 studies and 37294 participants) but only 16 studies in our study. Moreover, women in the previous study were healthy subjects having no history of depression previously but our study found that a previous history of depression was among the factors responsible for the increased prevalence of postpartum depression. Moreover, our study was higher than the result of a systematic review and meta-analysis study in 11 high-income countries reported in 2005 in which the pooled estimated prevalence of postpartum depression was 12.9%(72).

Possible grounds for the difference could be due to a long time gap between the previous study and the present study. The difference in the time point for the assessment of postpartum depression could also bring the difference. The previous study includes studies that screened PPD only in the three months of the postpartum period but in the present study assessment period was far beyond this. Moreover, a socio-economic and cultural difference between high-income study subjects of the earlier study and low-income study subjects of the present study could happen and sources the variation.

Contrary to the subgroup analysis result of a worldwide meta-analysis study (8) that obtained that the pooled estimated prevalence of postpartum depression to be similar across the different measurement tools for PPD, the present study revealed that pooled prevalence of postpartum depression was higher in studies as measured with SRQ-20 (24.6%) (95% CI: 18.42, 30.84) than the result with PHQ-9 (18.9%) (95% CI: 11.52, 26.28). This could be because most studies that utilized SRQ-20 delineated a lower cut off point (SRQ-20 score \geq 6) which might result in overestimation of postpartum depression.

In line with the result of an earlier meta-analysis study (8), the pooled estimated size of postpartum depression showed a geographical difference. The pooled estimated post-partum depression was slightly higher in studies from the southern part of Ethiopia (22.6%) than the central region (Addis Ababa) (21.2%) which could be due to the relatively improved socio-economic and cultural advances in the central region of Ethiopia. This was however in contrary to the result of a meta-analysis in India(10).

However, no significant variation in the magnitude of PPD was noticed between the community and institutional settings of the studies. This was consistent with a review and meta-analysis study in India(10) in which little but insignificant variation was observed across the community and institutional setting studies.

Regarding the associated factors of postpartum depression, fourteen studies (21, 22, 24, 26–35, 59) had reported different factors and poor marital relation (27, 29, 32, 34, 35, 59), unplanned pregnancy (21, 22, 24, 27, 29, 32, 34), previous history of depression (21, 27, 28, 34), domestic violence (21, 22, 27, 34), poor social support (21, 32–35), family history of mental illness (24, 28, 31), use of substance (21, 27, 34) and low income (27, 28, 59) were among the most commonly reported factors.

The pooled odds ratio of the poor marital relationship among the above-mentioned studies was 3.56 that implies women with poor marital relationships were 3.56 times at higher risk of developing PPD than women who good marital relationships. A meta-analysis study in India has a similar conclusion supporting this(10). The possible reason for this could be poor marital relationship increasing the burden of psycho-social responsibility of child care and other household responsibility in the postpartum period as compared to the shared psychosocial responsibility in women which good marital relation.

Besides, the pooled odds ratio for unplanned pregnancy for the nine studies reported above was found to be 3.48. This showed that women who gave birth from an unplanned pregnancy were 3.5 times more likely to be depressed than women with a planned pregnancy. A consistent finding was reported in studies in turkey (17), Qatar (14), northwestern Brazil (73), and Iran (74). The possible reason for this could be the absence of psychological readiness in mothers with unplanned pregnancy predisposing them to be vulnerable to physiological, psycho-social challenges of pregnancy and the postpartum period.

The previous history of depression (21, 27, 28, 34) and stressful life events (22, 59) was also an associated factor for the development of PPD with a pooled estimate odds ratio of 4.33 and 3.5 respectively. A consistent finding was observed in an Indian meta-analysis study(10). Furthermore, other several studies (6, 75, 76) reported that the presence of depression during pregnancy, facing stressful life events during pregnancy, and prior history of depression as related to postpartum depression which was also in line with the current study.

Besides domestic violence was also having a significant association with the development of PPD with the estimated pooled odds ratio of 3.77 (21, 22, 27, 34). A report by world health organization in 2013 (77) suggested a similar conclusion in that intimate partner violence in women predisposes to various mental health problems in the postpartum period.

Poor social support with a pooled odds ratio of 4.5 (21, 32–35) also increases the vulnerability of postpartum depression. This was also supporting the findings of the Indian review study(10). Multiple earlier studies also reported that good interpersonal relationships across the social support networks increase flexibility to stress and subsidize enormously women from developing postpartum depression (78–81) hence decreasing the risk of Postpartum depression. A study in Ghana on interventions for women with postpartum depression revealed that psychosocial support interventions are the most effective treatments implying an underlying psychosocial deficit in this target population(82).

Furthermore, the pooled odds ratio of family history of mental illness (24, 28, 31), use of a substance (21, 27, 34) and low income (27, 28, 59) and perinatal complications (28, 59) was 4, 4.67, 2.87, 3.5 and 3.8 respectively. A systematic review and meta-analysis study in which 17 articles were reviewed and postpartum depression between 3 and 52 weeks postpartum periods were assessed (83) reported that substance use as a contributing factor for postpartum depression in line with the current study.

Strengths And Limitations

To start with the strength, this study utilized a prespecified search strategy through the mentioned libraries that are intended to reduce the assessor's bias. The subsequent strength was that the independent extraction of data and quality assessment of the included studies by two autonomous reviewers also lessen the reviewer's bias. Furthermore, the employment of subgroup analysis and sensitivity analysis to distinguish the foundation of heterogeneity was also strength. On the opposing side, the limits of this meta-analysis study emanate from the presence of a high difference between the included studies that might upset the deduction of the study results. Besides, the use of two or three studies in the sub-group analysis might diminish the soundness of estimate.

Conclusion

This review and meta-analysis study obtained a high pooled estimated prevalence of postpartum depression (21.9%) suggesting that more than one in five women were having postpartum depression. The pooled estimate of postpartum depression was higher in studies that used SRQ-20 (24.6%) than studies that used PHQ-9 (18.9%). Moreover, the pooled prevalence of postpartum depression was slightly higher in the southern part of Ethiopia (22.6%) than Addis Ababa (21.2%). However, no significant difference in pooled prevalence was noticed across study settings (community versus Institutional). Poor marital relations, unplanned pregnancy, previous history of depression, poor social support, domestic violence, family history of mental illness, use of the substance, low income, stressful life event, and perinatal complications were among the associated factors for postpartum depression. Therefore, postnatal antenatal care services should integrate this significant mental health problem of women and its associated factors basically by delivering integrated postnatal care services for women.

Abbreviations

AOR: Adjusted Odds Ratio, **CI:** Confidence Interval, **CS:** Cross-Sectional, **EPDS:** Edinburgh Postnatal Depression Scale, **OR:** Odds Ratio, **PHQ-9:** Patient Health Questionnaire-9, **PPD:** Postpartum depression, **PRISMA-P:** Preferred Reporting Items for Systematic Reviews and Meta-analysis, **SRQ-20:** Self Reporting Questionnaire-20.

Declarations

Ethics approval and consent to participate

Not applicable

Consent for publication

Not applicable

Availability of Data and Materials

All relevant data concerning this systematic review and meta-analysis study is incorporated in the manuscript.

Competing Interests

We authors have no competing interests for this meta-analysis study.

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Authors' Contributions

MN premeditated the review idea on the prevalence and associated factors of postpartum depression in Ethiopia and defined the search strategies and manages the analysis of the research. MN and MA extracted the relevant data from included articles. Both authors participated in the quality assessment of included studies. MN writes the manuscript first draft and both of the authors revised and approved the final version of the manuscript.

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Figures

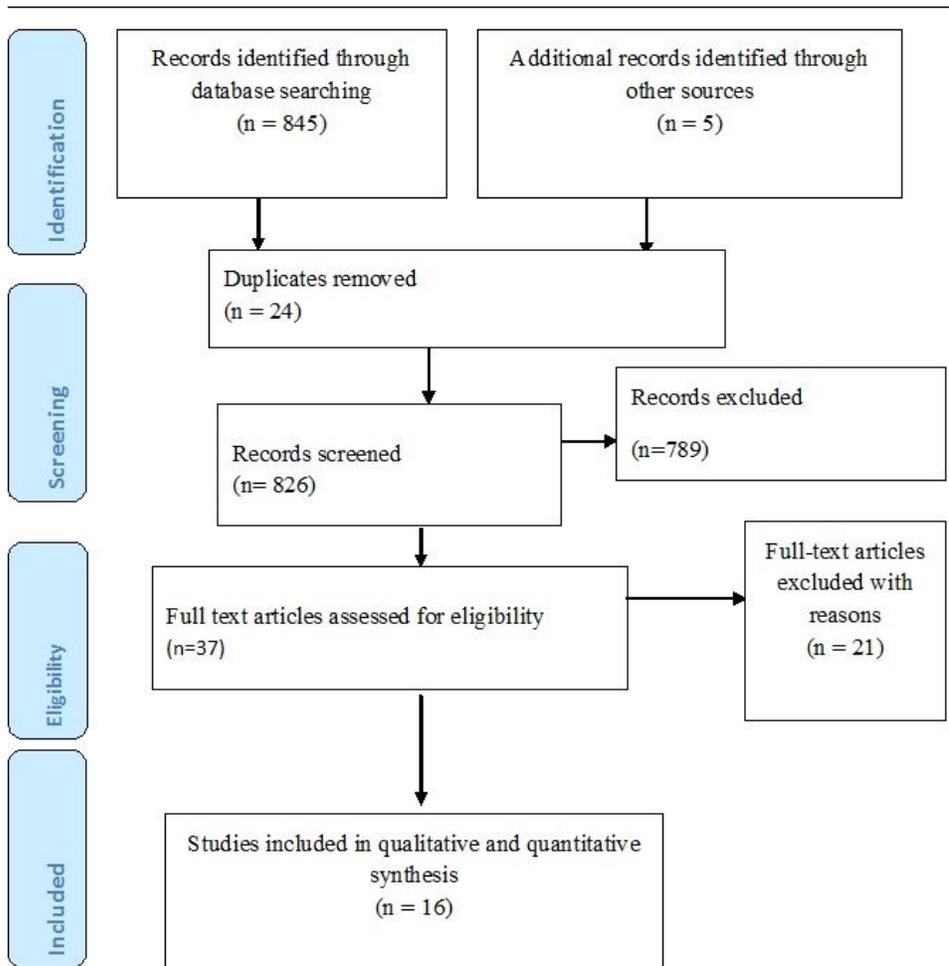


Figure 1

PRISMA flow chart for the review search process.

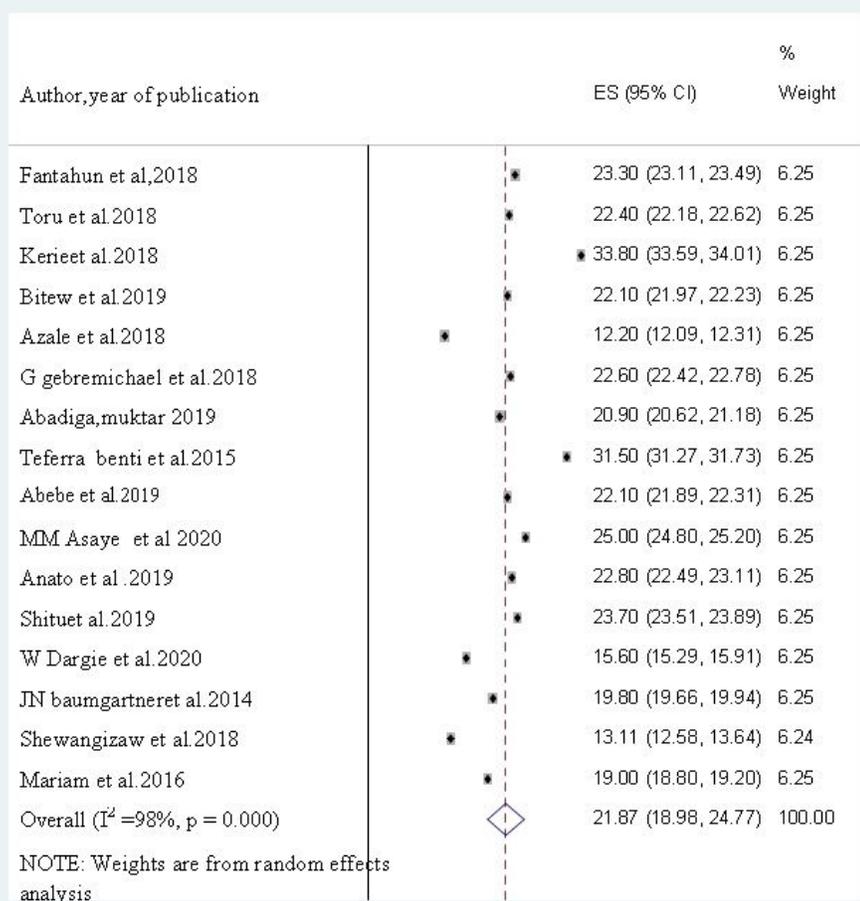


Figure 2

A forest plot for the prevalence of postpartum depression in Ethiopia.

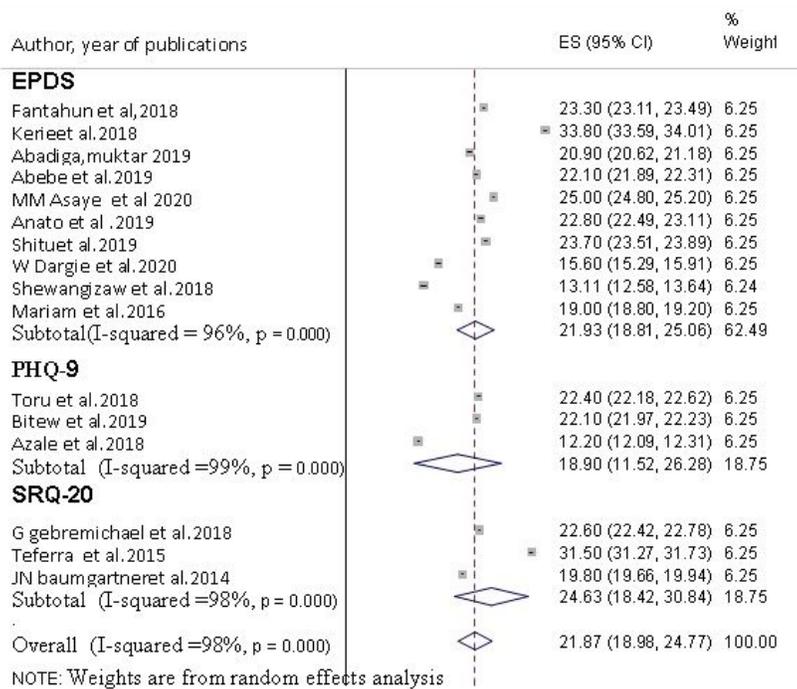


Figure 3

a forest plot for the sub-group analysis of the prevalence of postpartum depression by measurement tool used.

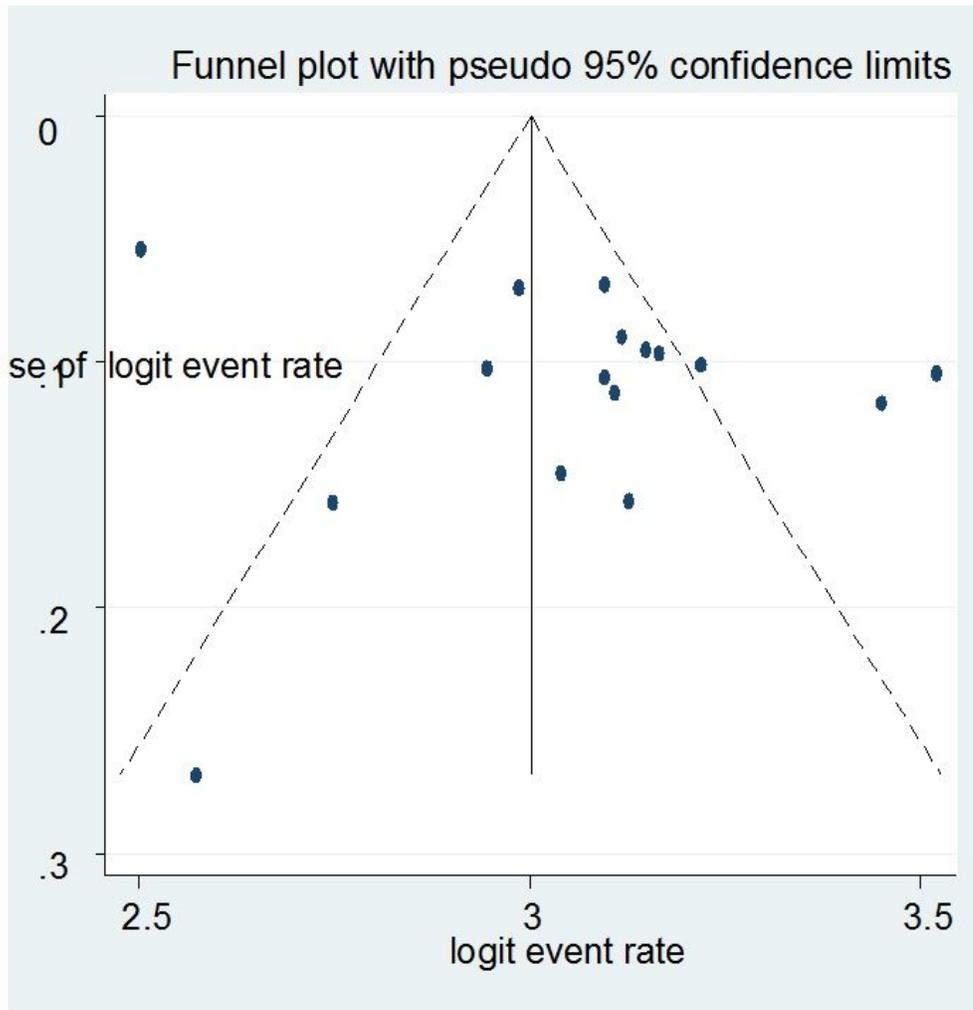


Figure 4

A funnel plot for the pooled adjusted odds ratio of poor marital relationship.

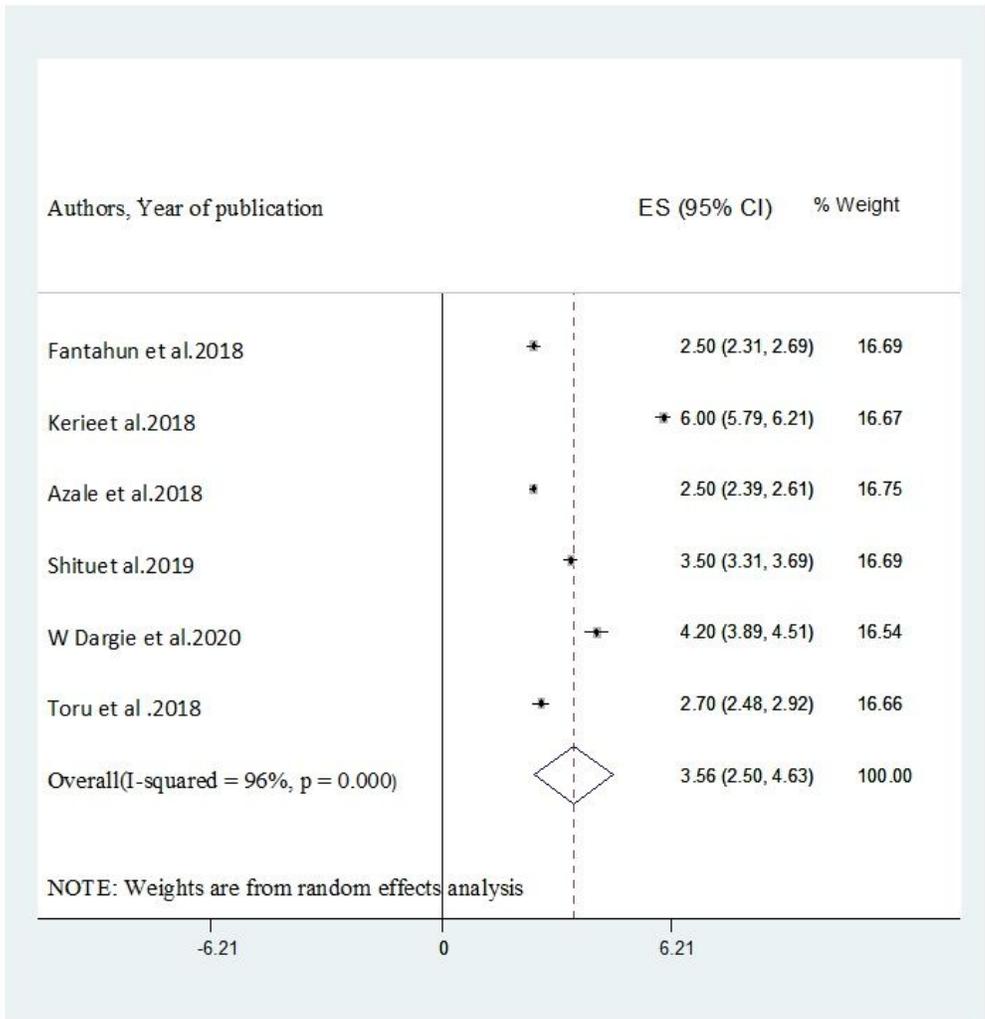


Figure 5

A forest plot for the pooled adjusted odds ratio of poor marital relationship.

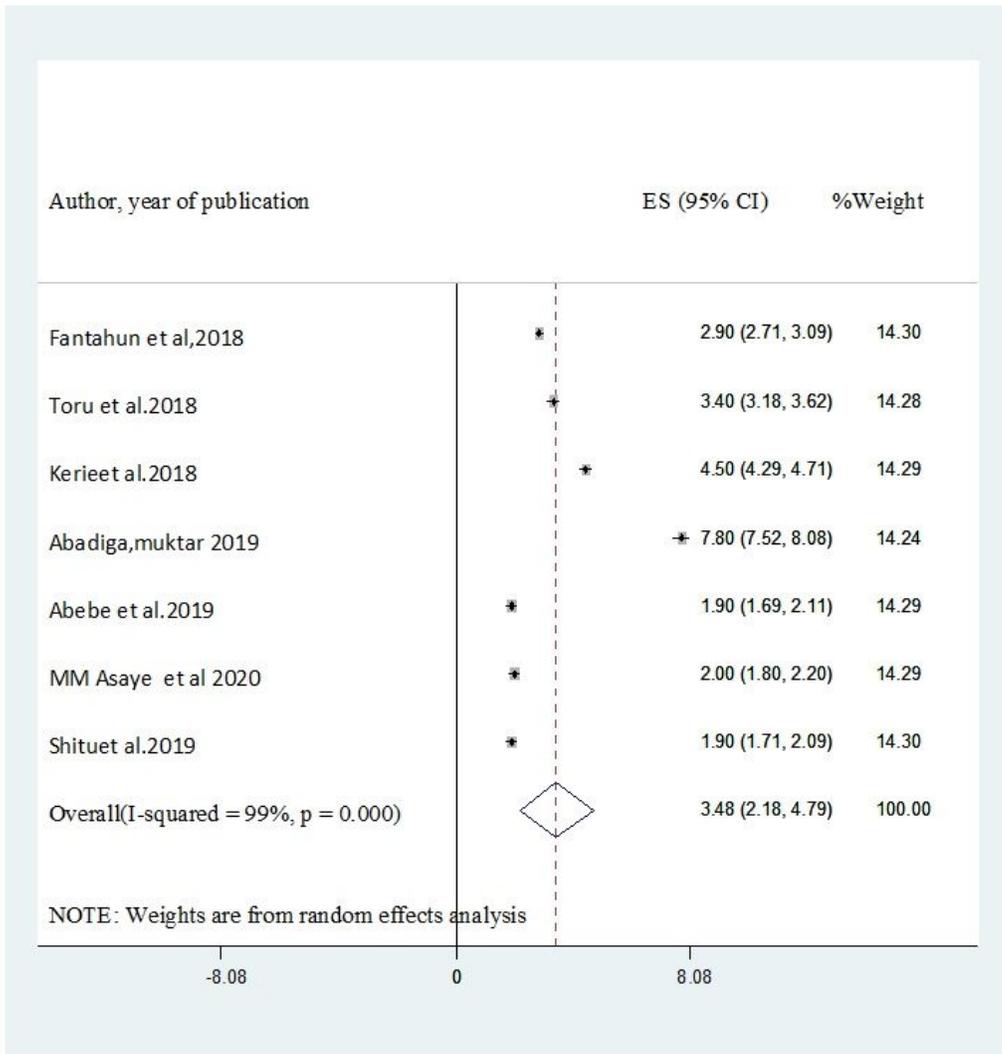


Figure 6

A forest plot for the pooled adjusted odds ratio of unplanned pregnancy.

Supplementary Files

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- [Additionalfile1.docx](#)