Unwanted Pregnancy and Maternal Mental Health Based on the WHO SRQ-20: A Meta-Analysis

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ABSTRACT

Background: The WHO (2019) reported that approximately 10% of pregnant women and 13% of postpartum women globally experience maternal mental health disorders. Several studies have identified unintended pregnancy as a contributing factor to these disorders. This systematic review and meta-analysis aimed to analyze and estimate the association between unintended pregnancy and maternal mental health disorders (MHD), using studies that applied the WHO Self-Reporting Questionnaire-20 (SRQ-20).

Subjects and Method: A systematic review and meta-analysis followed PRISMA guidelines and was registered in PROSPERO (CRD42025634410). Article searches were conducted up to January 15, 2025, in PubMed, ScienceDirect, Google Scholar, and Scopus using the keywords: "SRQ" AND ("mental health" OR "psychological well-being" OR "mental disorder") AND ("unwanted pregnancy" OR "unintended pregnancy" OR "unplanned pregnancy") AND ("mother" OR "maternal"). Inclusion criteria focused on observational studies using the WHO SRQ-20 to assess maternal mental health among women with unintended and intended pregnancies. Meta-analysis was performed using R Studio, with effect sizes reported as risk ratios (RR) or adjusted odds ratios (aOR) and 95% confidence intervals. Heterogeneity was assessed using the I² statistic, and funnel plots were generated to examine publication bias.

Results: A total of 12 studies from Ethiopia, Indonesia, India, Vietnam, Brazil, and Malawi, comprising 85,862 participants, were included in this meta-analysis. A total of 12 studies with a total of 85,862 participants were analyzed in this meta-analysis. The results showed that unintended pregnancy significantly increased the risk of maternal MHD. This finding was consistent in both cohort and cross-sectional studies, with effect sizes of (RR = 1.49; CI95%= 1.03 to 2.15; p= 0.030) and (aOR= 1.83; CI95%= 1.35 to 2.47; p < 0.001), respectively.

Conclusion: These findings highlight the strong association between unintended pregnancy and MHD. Limitations include high heterogeneity among studies, potential publication bias, and the predominance of observational designs, which preclude causal inferences. Despite these limitations, the results underscore the need for interventions that prioritize the overall health of pregnant women.

Keywords: Unwanted pregnancy, Maternal, mental health, WHO SRQ-20, Meta Analysis

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BACKGROUND

The global prevalence of maternal mental health disorders is approximately 10% of pregnant women and 13% of postpartum women, with much higher rates of 15.6% during pregnancy and 19.8% postpartum in low- and middle-income countries (LMICs) (eClinicalMedicine, 2024; WHO, 2019). A study in Malaysia reported that 23.6% of women experienced common mental health disorders (CMHD) in the second trimester, with a slight increase to 24.7% in the third trimester (Nagandla et al., 2016). Another study in Ethiopia also reported a combined prevalence of 24.7% for depression and 35.19% for anxiety among pregnant women (Wondmeneh and Wogris, 2024).

The World Health Organization prioritizes perinatal mental health in achieving the Sustainable Development Goals (SDGs), specifically SDG 3 (Health and Wellbeing) and SDG 5 (Gender Equality), as untreated perinatal mental disorders, such as depression and anxiety, significantly impair maternal and newborn health. However, lack of early detection and limited maternal mental health services cause mothers to suffer in silence, without adequate treatment, leading to low quality of life and adverse impacts for their children (McNab et al., 2022; Shanon McNab, Pasqueline Njau, 2024; WHO, 2021). Untreated CMHD increases the risk of pregnancy complications, inhibits mother-infant bonding, and contributes to developmental challenges in children, worsening maternal morbidity and mortality rates (Chan et al., 2014; Jahan et al., 2021).

Several risk factors contribute to the high prevalence of CMHD during pregnancy. Research reports show that socioeconomic factors such as low income and lack of social support have a significant relationship with CMHD (Biaggi et al., 2016; Lancaster et al., 2010; Luo et al., 2022; Saefurrohim et al., 2024). Other factors are obstetric factors such as unplanned pregnancy, history of obstetric complications, and experience of partner violence (Biaggi et al., 2016; Fadzil et al., 2013; Sheiner et al., 2005). In addition, demographic factors, including single marital status and unsatisfactory relationships, are also significant factors for the incidence of CMHD during pregnancy (Blondel and Zuber, 1988; Conlon et al., 2021).

A meta-analysis reported that unwanted pregnancy increases the risk of depression during pregnancy (23.3% vs. 13.9%; aOR 1.59) and postpartum (15.7% vs. 9.6%; aOR 1.51) (Nelson et al., 2022). A study in Ethiopia mentioned that pregnant women who are accidentally pregnant are 1.6 times more likely to have CMHD (Kurbi et al., 2023). Furthermore, women who experience unplanned pregnancies are usually not mentally prepared for the changes and responsibilities they will have to face. This finding is in line with studies in other LMICs (Fisher et al., 2013; Kalra et al., 2021). In developed countries like the United States, data shows that 45% of pregnancies in 2008-2011 and 38% of births in 2017-2019 were unintended (CDC, 2023a, 2023b; Rossen et al., 2023).

This systematic study of the literature review aims to analyze and estimate of unintended pregnancy with the incidence of CMHD during the perinatal or postnatal period. This review focuses only on cross-sectional and cohort observational studies using the WHO Self-Reporting Questionnaire 20-item (SRQ-20) instrument, which

is an internationally recognized screening tool for detecting symptoms of non-psychotic mental disorders, such as depression and anxiety (Beusenberg et al., 1994; Harpham et al., 2005; Netsereab et al., 2018). The SRQ-20 has been shown to be valid in developing country populations (Do et al., 2023). These findings can guide policymakers in preventing unintended pregnancies and supporting affected women through targeted interventions.

SUBJECTS AND METHOD

1. Study Design

This was a systematic review and meta-analysis. Article searches were conducted using a combination of keywords ("SRQ") AND ("mental health" OR "psychological well-being" OR "mental disorder") AND ("unwanted pregnancy" OR "unplanned pregnancy" OR "unintended pregnancy") AND (mother OR maternal). Searches were conducted through databases such as PubMed, ScienceDirect, Google Scholar, and Scopus. All databases were last accessed on January 15, 2025, and then screened to determine inclusion and exclusion criteria and conduct critical appraisal. The article selection process was conducted using the PRISMA flowchart.

2. Inclusion Criteria

Inclusion criteria for this review included observational studies with cross-sectional and cohort designs that used the WHO SRQ-20 instrument to assess maternal mental health. Participants included women of reproductive age (15-49 years) who were pregnant or had given birth and had children under five years of age. Included studies should compare women with unintended pregnancies as the comparison group and women with intended pregnancies as the control group. The primary outcome assessed was the effect of unintended pregnancy on maternal CMHD.

3. Exclusion Criteria

The exclusion criteria for this study were articles not in English, incomplete access, and published more than 10 years ago.

4. Operational Definition of Variables

Mental health status of the mother: measured using the WHO Self-Reporting Questionnaire-20 (SRQ-20). Mothers scoring above the cutoff point on the SRQ-20 are categorized as experiencing symptoms of common mental disorders.

Pregnancy status: classified into two categories. Wanted/Planned pregnancy is a pregnancy that was desired and planned by the mother at the time of conception. An unwanted or Unplanned pregnancy is a pregnancy that was not desired or planned by the mother at the time of conception.

5. Study Instrument

The research is guided by the PRISMA flow diagram and quality assessment using the Critical Appraisal Skills Program (CASP, 2018). PROSPERO registration number CRD42025634410.

6. Data Analysis

The collected articles are then processed using the R Studio version 2024.12.1+563, 2025 Posit Software. To maintain consistency and ensure comparability between studies, this meta-analysis used bivariate analysis results because the variable of unwanted pregnancy was not included in the multivariate model in some of the analyses. Results were summarized in tables and visualizations (forest plot). Heterogeneity was analyzed using the I^2 statistic. Reporting bias was assessed by comparing the results reported in the article with the original study protocol. Funnel plots were used to detect possible publication bias.

RESULTS

The process of searching for articles is carried out through several journal data-

bases which include Google Scholar, PubMed, and ScienceDirect. The review process for related articles can be seen in the PRISMA flow diagram in Figure 1.
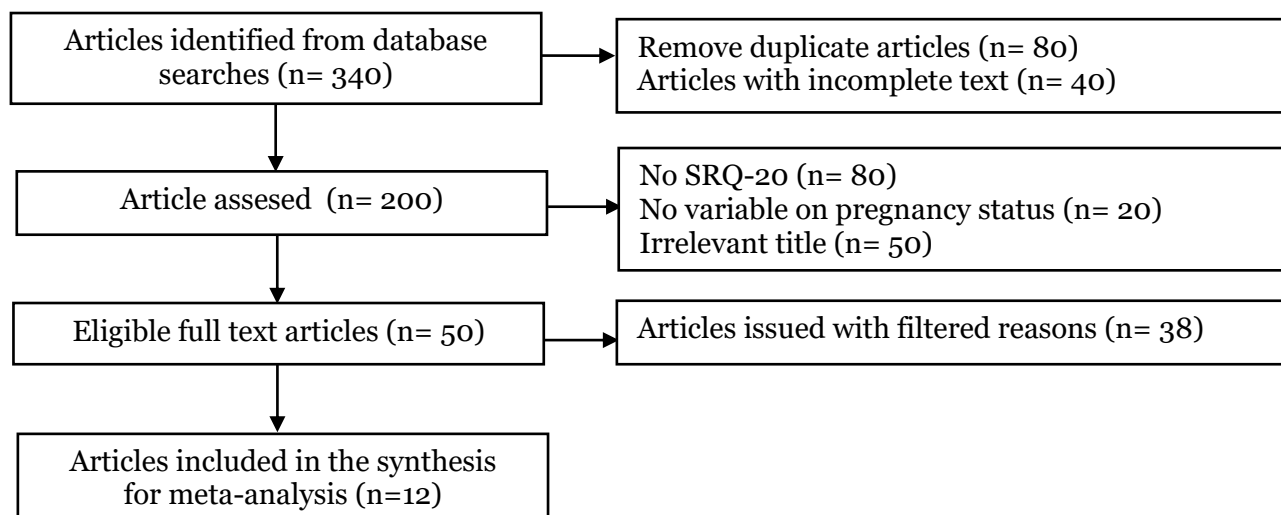
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┌─────────────────────────────┐        ┌──────────────────────────────────────┐
│ Articles identified from    │───────▶│ Remove duplicate articles (n= 80)    │
│ database searches (n= 340)  │        │ Articles with incomplete text (n= 40)│
└─────────────────────────────┘        └──────────────────────────────────────┘
              │
              ▼
┌─────────────────────────────┐        ┌──────────────────────────────────────┐
│ Article assesed  (n= 200)   │───────▶│ No SRQ-20 (n= 80)                    │
│                             │        │ No variable on pregnancy status (n= 20)│
└─────────────────────────────┘        │ Irrelevant title (n= 50)             │
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┌─────────────────────────────┐        ┌──────────────────────────────────────┐
│ Eligible full text articles │───────▶│ Articles issued with filtered reasons│
│ (n= 50)                     │        │ (n= 38)                              │
└─────────────────────────────┘        └──────────────────────────────────────┘
              │
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┌─────────────────────────────┐
│ Articles included in the    │
│ synthesis for meta-analysis │
│ (n=12)                      │
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**Figure 1. Results of the PRISMA Flow Diagram
Showing the Study Selection Process**

Figure 2. Map of the distribution of articles included in the meta-analysis

Figure 2 illustrates the geographical distribution of the studies included in the meta-analysis. A total of 12 studies were mapped, showing that the majority originated from Africa (n=8), followed by Asia (n=2), and South America (n=2). This distribution highlights a predominance of research conducted in African countries, suggesting a regional focus or possibly a higher burden of the studied condition in that area. The relatively limited number of studies from Asia and South America may indicate a gap in research or limited publication accessibility from these regions.

Table 1. Critical Appraisal Checklist for Qualitative Studies Using CASP

Primary Study	1	2	3	4	5	6	7	8	9	10	11	12	Total
Addisu et al. (2024)	2	2	2	2	2	2	2	2	2	2	2	2	24
Ariasih et al. (2024)	2	2	2	2	2	2	2	2	2	2	2	2	24
Catalao et al. (2023)	2	2	2	2	2	2	2	2	2	2	2	2	24
Kurbi et al. (2023)	2	2	2	2	2	2	2	2	2	2	2	2	24
Belete et al. (2021)	2	2	2	2	2	2	2	2	2	2	2	2	24
Gizachew et al. (2020)	2	2	2	2	2	2	2	2	2	2	2	2	24
Barsisa et al. (2021)	2	2	2	2	2	2	2	2	2	2	2	2	24
Lucchese et al. (2017)	2	2	2	2	2	2	2	2	2	2	2	2	24
Bekele et al. (2017)	2	2	2	2	2	2	2	2	2	2	2	2	24
Nguyen et al. (2016a)	2	2	2	2	2	2	2	2	2	2	2	2	24
Nguyen et al. (2016b)	2	2	2	2	2	2	2	2	2	2	2	2	24
Nguyen et al. (2016c)	2	2	2	2	2	2	2	2	2	2	2	2	24
Brito et al. (2015)	2	2	2	2	2	2	2	2	2	2	2	2	24
Tefera et al. (2015)	2	2	2	2	2	2	2	2	2	2	2	2	24

Description of the question criteria:

1	=	Does the research address a clearly focused problem?
2	=	Was the group recruited in an acceptable way?
3	=	Is chronic kidney disease exposure measured accurately to minimize bias?
4	=	Were the results (death status) measured accurately to minimize bias?
5	=	Did the author identify all the important confounding factors? Have the authors accounted for confounding factors in the design and/or analysis?
6	=	Was the subject follow-up sufficiently complete? Is the follow-up of the subject long enough?
7	=	Are the results of this study reported in the aOR?
8	=	How precise are the results?
9	=	Can the results be trusted?
10	=	Can the results be applied to local residents?
11	=	Are the results of this study consistent with other available evidence?
12	=	What are the implications of this research for practice?

Answer score description:

0	=	No
1	=	Can't tell
2	=	Yes

This systematic review included 12 studies conducted in various countries with a publication year range of 2015-2024. Table 2 shows summary of studies reviewed in the systematic review. The study designs included cohort (n=3) and cross-sectional studies (n=9), with a total number of 81,424 mothers who had an unintended pregnancy. All studies used the WHO SRQ-20 to measure common mental disorders, with cut-off scores varying (>6 - >8). The majority of studies adjusted results for confounding variables such as maternal age, socioeconomic status, number of children, and access to healthcare. Unintended pregnancy rates in the study sample ranged from 0.40% to 34.30%. The prevalence of CMHD in mothers with unintended pregnancies varies significantly, with the highest percentage at 34.30% in Brazil (Lucchese, 2017) and the lowest at 0.40% in Indonesia (Ariasih, 2024). The majority of studies used a cross-sectional design and had similar quality scores, with some studies using a more

robust cohort design. Sample sizes varied from 337 to 70,953, which affected the generalizability of the findings. Overall, differences in study design, sample size, and methodological quality contributed to the variation in reported prevalence of MHD, suggesting the importance of a contextualized approach in understanding the relationship between unintended pregnancy and maternal mental health.

Table 2. Summary of Studies Reviewed in the Systematic Review

Researcher (Year)	Study Design	Country	Percentage of MHD from Total Unintended Pregnancies	Quality Scores	Sample Size	Sample Source
Addisu et al. (2024)	Cross-sectional	Northeast Ethiopia	4.9%	6	777	Pregnant women visiting ANC services
Ariasih et al. (2024)	Cross-sectional	Indonesia	0.4%	6	70,953	Mothers with children aged 0 to 5 years
Catalao et al. (2023)	Cohort	Malawi	5.0%	8	3,066	Pregnant women in rural Malawi (recruited in 2013)
Kurbi et al. (2023)	Cross-sectional	Northwest Ethiopia	4.6%	6	872	Pregnant women in their second and third trimesters
Belete et al. (2021)	Cross-sectional	Southern Ethiopia	1.6%	6	738	Pregnant women attending antenatal services in Hawassa
Gizachew et al. (2020)	Cross-sectional	Central Ethiopia	11.0%	6	557	Women with gestational ages between 16 and 42 weeks
Barsisa et al. (2021)	Cross-sectional	Southern Ethiopia	10.8%	6	776	Mothers with children aged 0 to 5 years
Lucchese et al. (2017)	Cross-sectional	Brazil	34.3%	7	330	Pregnant women enrolled in healthcare services in Midwest Brazil
Bekele et al. (2017)	Cross-sectional	Ethiopia	17.5%	6	753	Pregnant women coming for antenatal care
Nguyen et al. (2016a)	Cohort	Ethiopia	Not specified	8	1,906	Mothers with children aged 6-18 months
Nguyen et al. (2016b)	Cohort	India	Not specified	8	1,886	Mothers with children aged 6-18 months
Nguyen et al. (2016c)	Cohort	Vietnam	Not specified	8	1,855	Mothers with children aged 6-18 months
Brito et al. (2015)	Cohort	Northeast Brazil	15.2%	8	1,056	Mothers participating in prenatal care programs
Tefera et al. (2015)	Cross-sectional	Southeast Ethiopia	15.4%	6	337	Mothers with children under 1 year

Table 3 summarizes the cohort studies included in the meta-analysis investigating the relationship between pregnancy intention and maternal mental health. Most studies reported a positive association, indicating that unintended pregnancy may be linked to an increased risk of adverse mental health outcomes. The most recent study by Catalao (2023) reported the highest risk estimate (RR=2.63; 95% CI: 1.22 to 5.36), indicating a strong association between unintended pregnancy and poor mental health outcomes.

Table 3. Description of the primary study meta-analysis for cohort studies on pregnancy intention and mental health

Author (Year)	RR	95% CI	
		Lower Limit	Upper Limit
Brito (2015)	1.37	1.06	1.77
Nguyen et al. (2016a)	1.92	1.62	2.27
Nguyen et al. (2016b)	1.07	0.61	1.88
Nguyen et al. (2016c)	0.81	0.55	1.2
Catalao (2023)	2.63	1.22	5.36

Table 4 summarizes the cross-sectional studies included in the meta-analysis investigating the relationship between pregnancy intention and maternal mental health. Most studies reported a positive association, indicating that unintended pregnancy may be linked to an increased likelihood of experiencing adverse mental health outcomes. The most recent study by Addisu (2024) reported one of the strongest associations (OR=3.82; 95% CI= 2.41 to 6.06), indicating a notable link between unintended pregnancy and poor mental health outcomes.

Table 4. Description of the primary study meta-analysis for cross-sectional studies on pregnancy intention and mental health

Author (Year)	OR	95%Cl	
		Lower Limit	Upper Limit
Tefera (2015)	1.02	0.46	2.26
Lucchese (2017)	1.08	1.00	1.17
Bekele (2017)	3.64	2.32	5.71
Barsisa (2019)	1.29	0.90	1.85
Gizachew (2020)	2.06	1.33	3.19
Belete (2021)	2.01	1.04	3.88
Kurbi (2023)	1.71	1.02	2.83
Addisu (2024)	3.82	2.41	6.06
Ariasih (2024)	1.72	1.50	1.97
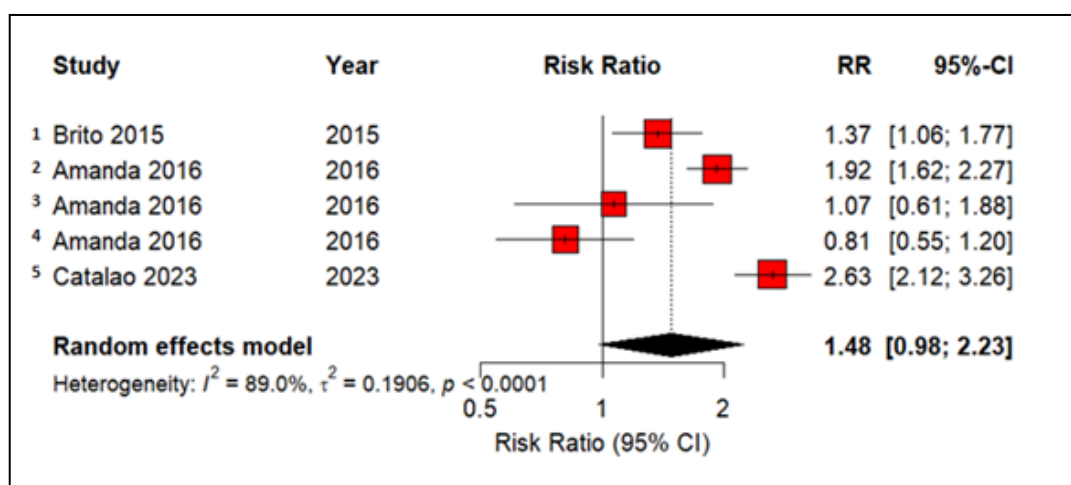
Figure 3. Forest Plot of Cohort Studies on Pregnancy Intention and Mental Health
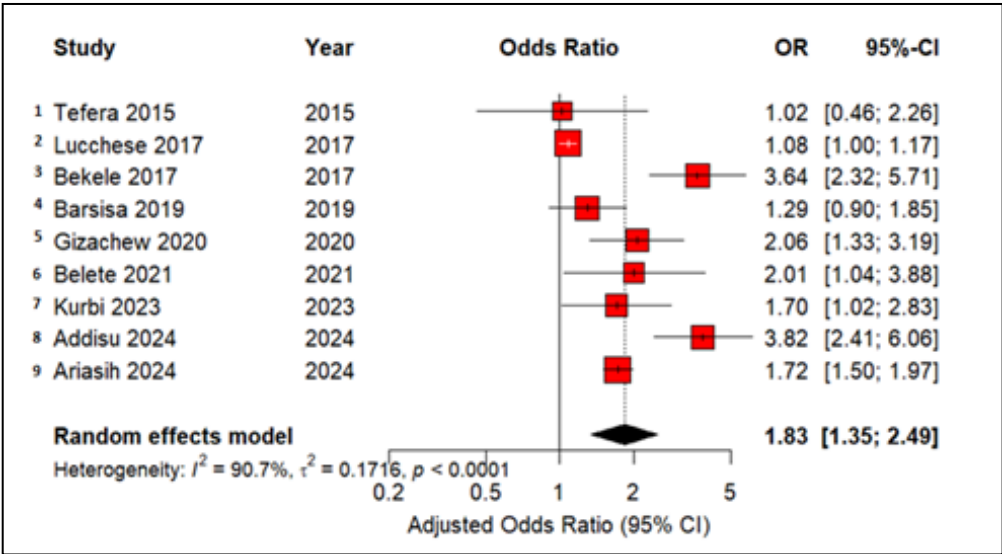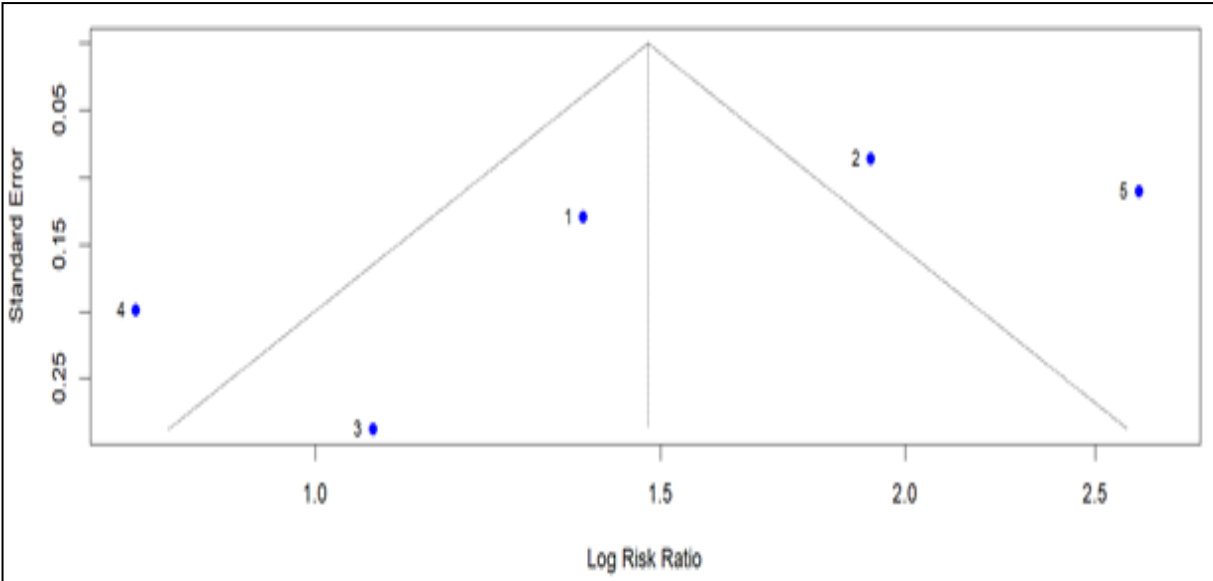
**Figure 4. Forest Plot Cross-sectional Studies
on Pregnancy Intention and Mental Health**

Based on the results of the meta-analysis in Figures 2 and Figure 3, unintended pregnancy significantly increased the risk of maternal CMD in both cohort and cross-sectional studies. In the cohort study, un-intended pregnancy had a 1.49 times higher risk (RR = 1.49; CI95%= 1.03 to 2.15; p= 0.030) compared to intended pregnancy, with a high degree of heterogeneity (I² = 89%). Meanwhile, in the cross-sectional study, the risk increased to 1.83 times (aOR = 1.83; CI95%= 1.35 to 2.47; p< 0.001), also with a high level of heterogeneity (I² = 91%). These results suggest that unintended pregnancy is strongly associated with an increased risk of maternal CMD, but inter-study variability needs to be considered in the interpretation of these findings.

**Figure 5. Funnel plot of Cohort Studies
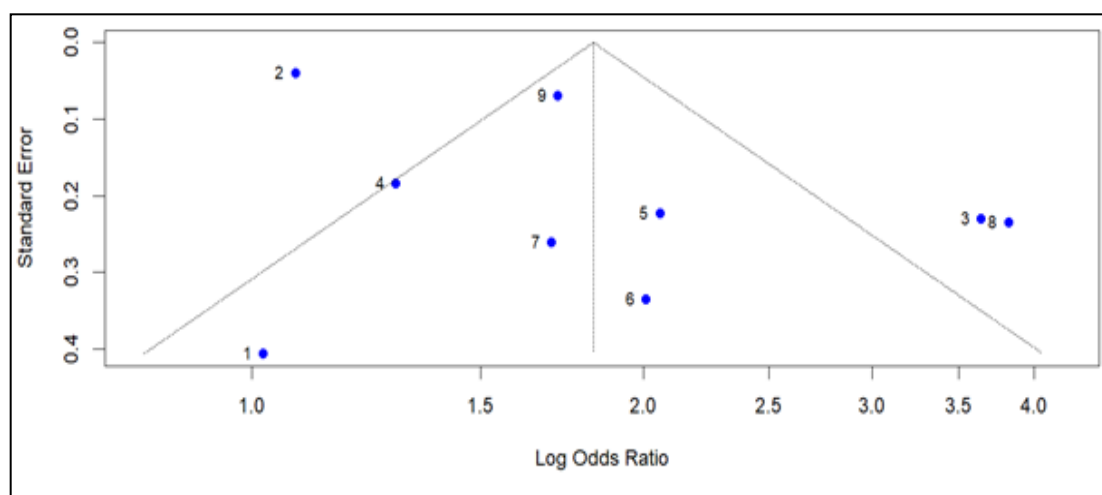on Pregnancy Intention and Mental Health**

**Figure 6. Funnel plot cross-sectional Studies
on Pregnancy Intention and Mental Health**

Based on Figure 4 (Funnel plot cohort study) and Figure 5 (Funnel plot cross-sectional study), there are indications of publication bias and heterogeneity between studies. In the funnel plot of the cohort study, the dots tend to be asymmetrically distributed with most of them on the right side of the center line, indicating potential publication bias. Some studies with RR between 1.50 and 5.00 had standard errors (SE) greater than 0.20, indicating that studies with small sample sizes are more likely to report larger effects. Meanwhile, funnel plots of cross-sectional studies showed a wider spread with some points located far from the center line, particularly at aORs between 2.00 and 10.00 with SEs above 0.30, which may reflect high variability or selection bias. The more pronounced asymmetry in the funnel plot of cross-sectional studies compared to cohort studies indicates the possibility of more significant reporting bias. Therefore, the results of the data synthesis in this review need to be interpreted with caution due to potential publication bias and heterogeneity between studies that may affect the overall conclusions.

Based on critical appraisal using CASP Checklists (Critical Appraisal Skills Program), the certainty of evidence in these studies was moderate to high, despite some limitations. The studies included in the meta-analysis generally had strong methodology, with research designs that included cohort and cross-sectional studies, as well as the use of the validated WHO SRQ-20 instrument. However, some studies showed a risk of selection and reporting bias, which may affect the interpretation of results. Heterogeneity between studies was high (I^2 = 89% and 91%), suggesting variations in study design and population studied.

DISCUSSION

The results of this meta-analysis show that unintended pregnancy is significantly associated with an increased risk of CMHD in women during pregnancy and postpartum. In cohort studies, the risk of CMHD increased by 49% (HR: 1.49; CI95%= 1.03 to 2.15), while in cross-sectional studies, the risk increased by 83% (OR: 1.83; CI95% CI= 1.35 to 2.47). Although these hazard ratio and odds ratio values are moderate, the public health and service planning implications could be substantial (Lu et al., 2023). Based on the results, an increased risk of this magnitude is significant enough to consider routine psychological screening for women with unwanted pregnancies as part of ante-

natal care (Herd et al., 2016a; Winter et al., 2024).

The consistency of findings from the 12 studies analyzed reinforces the pattern that women with unwanted pregnancies are at higher risk of experiencing CMHD during the perinatal and postnatal periods. Hajizadeh and Nghiem (2020) found that women with unwanted pregnancies had an average SRQ-20 score 2.4 points higher than the control group (Hajizadeh and Nghiem, 2020a). Other studies (Abbasi et al., 2013; Muskens et al., 2022a) indicate that the prevalence of postnatal depression can be 1.5 to 2 times higher in this group. The perinatal period is a critical time for mental health due to significant physiological, emotional, and social changes.

According to the stress-diathesis model theory, mental health outcomes arise from the interaction between biological/ psychological vulnerability and environmental stressors (Georgiades et al., 2023). Unplanned pregnancy is a significant stressor that interacts with individual vulnerability, directly increasing the risk of depression, anxiety, and PTSD during the antenatal period (Kurbi et al., 2025). The psychological burden of an unwanted pregnancy can be compounded by social stigma (Smith et al., 2016), lack of support (Muskens et al., 2022b; Smith et al., 2016), and financial pressure (Marcil et al., 2020). In addition, women with unintended pregnancies tend to have concerns about their ability to care for a child, a strained relationship with their partner, or fear of judgment from family and society (Ermiati et al., 2021; Herd et al., 2016b). All of these conditions can trigger CMHD, which may continue into the postpartum period. Furthermore, limited access to mental health services further exacerbates this condition, leaving many women without the necessary support.

These findings highlight the need for reproductive health and maternity care policies that are more responsive to mental health issues. Strategies such as early mental health screening for women with unwanted pregnancies, as well as increased access to contraception and counseling services, are important steps to mitigate the negative psychological impact on mothers and children. On the other hand, the main limitation of this meta-analysis is the high level of heterogeneity ($I^2 > 80\%$), indicating significant variation among the included studies. Differences in CMHD measurement methods, population characteristics, and sociocultural backgrounds across countries are the primary causes of this variability. Therefore, the interpretation of findings should be done with caution, and further research with longitudinal designs and more standardized methods is needed to enhance the validity of conclusions.

The relationship between unintended pregnancy and CMHD is complex and multidimensional. Addressing this issue requires an intersectoral and multisystem approach involving reproductive health, mental health services, and comprehensive social support. Planned, evidence-based interventions can help reduce the long-term impact of CMHD and improve the quality of life for mothers and children in the future.

AUTHOR CONTRIBUTION

M.Z.S. contributed to the study conception and design, data analysis, and drafting of the manuscript. A.A. participated in the methodology development, data interpretation, and critical revision of the manuscript. R.W.W. assisted in literature review, data extraction, and manuscript editing. M.T.A.A. contributed to the statistical review and technical guidance. R.W.B. provided supervision, validation of the final draft, and intellectual input. R.Y. contributed to the conceptual

framework and overall review of the manuscript. All authors read and approved the final version of the manuscript

ACKNOWLEDGMENT

CONFLICT OF INTEREST
All authors disclose no competing interests.

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