

The Effect of Unplanned Pregnancy on Postpartum Depression: A Meta-Analysis

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ABSTRACT

Background: World data shows that depression has a 50% higher percentage to occur in women due to hormonal, genetic, psychosocial and social stress changes. World data also shows that 13% of postpartum women experience depression. In developing countries, postpartum depression was high, which is at 19.8%. One of the risk factors that influence the occurrence of postpartum depression is unplanned pregnancy. This study aims to estimate the magnitude of the effect of unplanned pregnancy on postpartum depression based on a number of previous similar studies.

Subjects and Method: This was a systematic review and meta-analysis. The articles used in this study were obtained from several databases, including PubMed, Google Scholar, and Springer Link. The articles used in this research were articles published from 2005-2020. The article search was carried out by considering the eligibility criteria defined using PICO. The population in this study included postpartum mothers with intervention, namely unplanned pregnancy, the comparison namely planned pregnancy and the outcome was postpartum depression. The keywords to look for articles were: “unplanned Pregnancy” AND “postpartum depression OR“ postnatal depression”

“unplanned pregnancy” AND “postpartum depression” AND “adjusted odds ratio”. The articles included in this study were full text articles with an observational study design. Articles were collected using PRISMA flow diagrams. Articles were analyzed using the Review Manager 5.3 application.

Results: There are 17 articles reviewed in this study. Meta-analysis of 4 cohort studies show that unplanned pregnancy increased the risk of postpartum depression (aOR= 1.27; 95% CI= 1.09 to 1.47; p <0.001). A meta-analysis of 13 cross-sectional studies show that unplanned pregnancy increased the risk of postpartum depression (aOR= 2.28; 95% CI= 1.67 to 3.12; p <0.001).

Conclusion: An unplanned pregnancy increases the risk of postpartum depression.

Keywords: Unplanned pregnancy, postpartum depression, postnatal depression

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BACKGROUND

Depression is a common mental disorder that usually appear with several symptoms including a depressed mood, loss of interest or pleasure, decreased energy, feelings of guilt or low self-esteem, sleep or appetite disorder, decreased concentration and also

often accompanied by anxiety. Depression can become chronic and can interfere with an individual's ability to take care of his/her daily activities/responsibilities. Depression can lead to suicide. Nearly 1 million people are lost each year by suicide.

Depression is a contributor to disease burden, economic burden as well as a cause of disability for the whole world. World data shows that depression has a 50% higher percentage to occur in women (WFMH, 2012).

The latest research on depression in Indonesia was conducted by Peltzerdan Pengpid (2018) who found that 21.8% of study subjects aged > 15 years experienced moderate and severe depression. Of this prevalence, women have a higher percentage of 22.3%.

Albert (2015) states that depression in women is related to hormonal changes that occur during puberty, before menstruation, during pregnancy, after childbirth and premenopause. Other factors that cause depression are genetic, psychosocial and social stressors. Mughal et al. (2020) states that the incidence of depression is quite high, one of which is in the postpartum period.

World data show that 13% of postpartum women experience depression. In developing countries, the condition is higher at 19.8% (WHO, 2018). This condition results from a series of changes both at the biological level (changes in physical fitness and hormonal changes) and at the psychological level (role as new parents and changes in marital and sexual life) so that psychopathological manifestations are more likely than this period (Ferreira et al. 2016).

Globally, depression is one of the leading causes of disease burden for women aged 14-44 years. If it occurs in the mother (maternal), this can have a negative impact on the growth, development, and child care processes with serious health implications in terms of physical, cognitive and emotional well-being during important stages such as the first 1000 days and early childhood. Depressed mothers will be disturbed

in practices related to breastfeeding, health care, baby safety and development (Madlala and Kassier, 2018).

Postpartum depression is influenced by various factors. One of them is an unplanned pregnancy. Several studies have been conducted to determine the effect of unplanned pregnancy on postpartum depression, including by Koutra et al. (2016), which states that postpartum mothers whose pregnancies are not planned have a 1.25 risk of experiencing postpartum depression compared to mothers whose pregnancies are planned. Qandil et al. (2016), also stated that postpartum mothers whose pregnancies were not planned were 2.34 times more likely to experience postpartum depression than mothers whose pregnancies were planned. Filha et al. (2016), stated that postpartum mothers whose pregnancies were not planned were 1.23 times more likely to experience postpartum depression than mothers whose pregnancies were planned.

The number of primary studies examining the effect of unplanned pregnancy on postpartum depression has prompted researchers to conduct a more comprehensive study of these primary studies. The data obtained were analyzed using a systematic review and meta-analysis by synthesizing the results of studies conducted to reduce bias.

SUBJECTS AND METHOD

1. Study Design

This study uses a systematic review and meta-analysis. The articles used in this study were obtained from several databases including PubMed, Google Scholar, and Springer Link. The keywords used to find the article were as follows: “unplanned Pregnancy” AND “postpartum depression OR” postnatal depression “” unplanned

pregnancy "AND" postpartum depression "AND" adjusted odds ratio".

2. Inclusion Criteria

The articles included in this study are full paper articles with an observational study design and in English. Appropriate articles should mention unplanned pregnancy interventions with the outcome of postpartum depression. Articles should be properly titled with risk factors for postpartum depression. The article used a standardized depression scale with the appropriate population, namely postpartum mothers. The analysis used is the multivariate aOR.

3. Exclusion Criteria

The articles published in this study are articles that have been carried out by meta-analysis. Articles published in other languages and not in English. Articles showed results which were not adjusted Odds Ratio.

4. Operational Definition

The articles were carried out by considering the eligibility criteria defined using PICO model. The population in this study were postpartum mothers with intervention in the form of unplanned pregnancy, comparison of planned pregnancies and postpartum depression outcomes.

Unplanned pregnancy was a pregnancy that can occur in all age groups of women but at unexpected or inaccurate times.

Postpartum depression was a mood disorder characterized by feelings of laziness, loss of interest, enthusiasm, guilt or low self-esteem, sleep disorders, appetite disorders, and poor concentration that occur during the puerperium.

5. Data Analysis

Data processing was performed using the Review Manager (RevMan 5.3) by calcu-

lating the effect size and heterogeneity to determine which research models were combined to form the final meta-analysis result.

RESULTS

The process of searching for articles is by searching through a database with journals which can be seen in Figure 1. Figure 2 shows the areas where articles were taken according to the inclusion criteria. Articles were obtained from 6 continents, namely Asia, Africa, Europe, North America, South America and Australia.

Based on the results of the forest plot (Figure 3) in the cohort study, postpartum mothers with unplanned pregnancies had a 1.27 times risk of experiencing postpartum depression compared to postpartum mothers with planned pregnancies and this was statistically significant ($p < 0.001$). The heterogeneity of the research data shows that $I^2 = 0\%$. Whereas in a cross-sectional study, postpartum mothers with unplanned pregnancies had 2.28 times the risk of experiencing postpartum depression compared to postpartum mothers with planned pregnancies and it was statistically significant ($p < 0.001$). The heterogeneity of the research data showed $I^2 = 86\%$. So that the distribution of data is declared heterogeneous (random effect model).

The funnel plot (Figure 4) does not show any publication bias, indicated by the symmetrical plot on the right and left, where 9 plots are on the left and 8 are on the right. The plot on the left of the graph appears to have a standard error between 0 and 1 and the plot on the right has a standard error between 0 and 0.5.

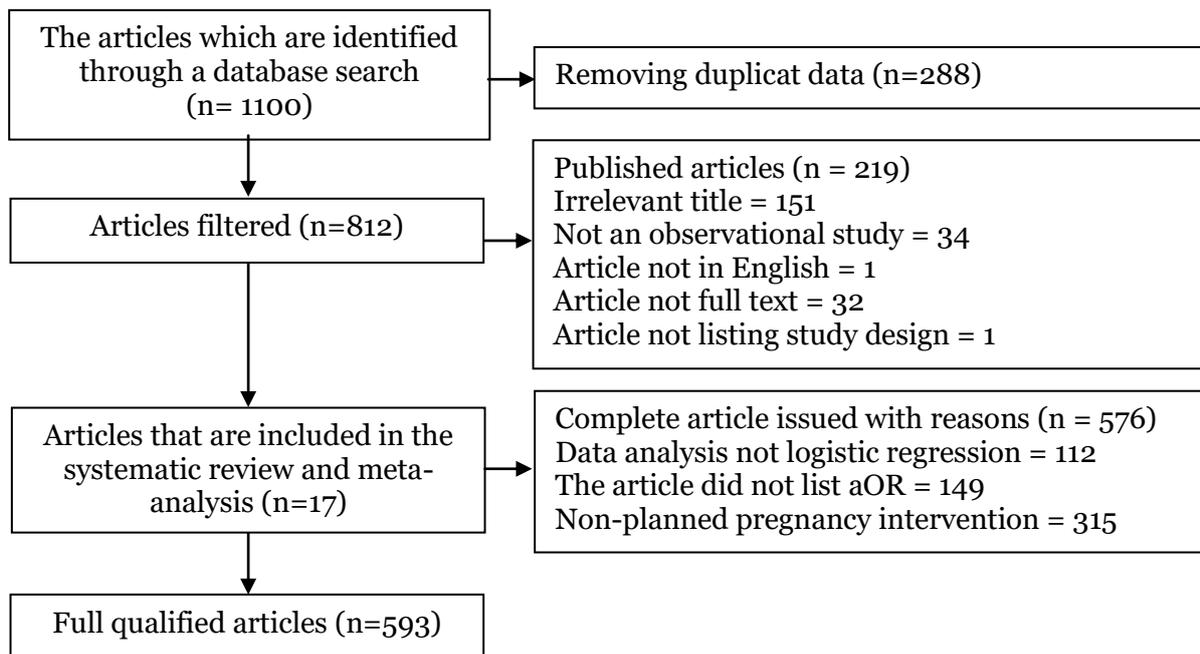


Figure 1. PRISMA flow diagram

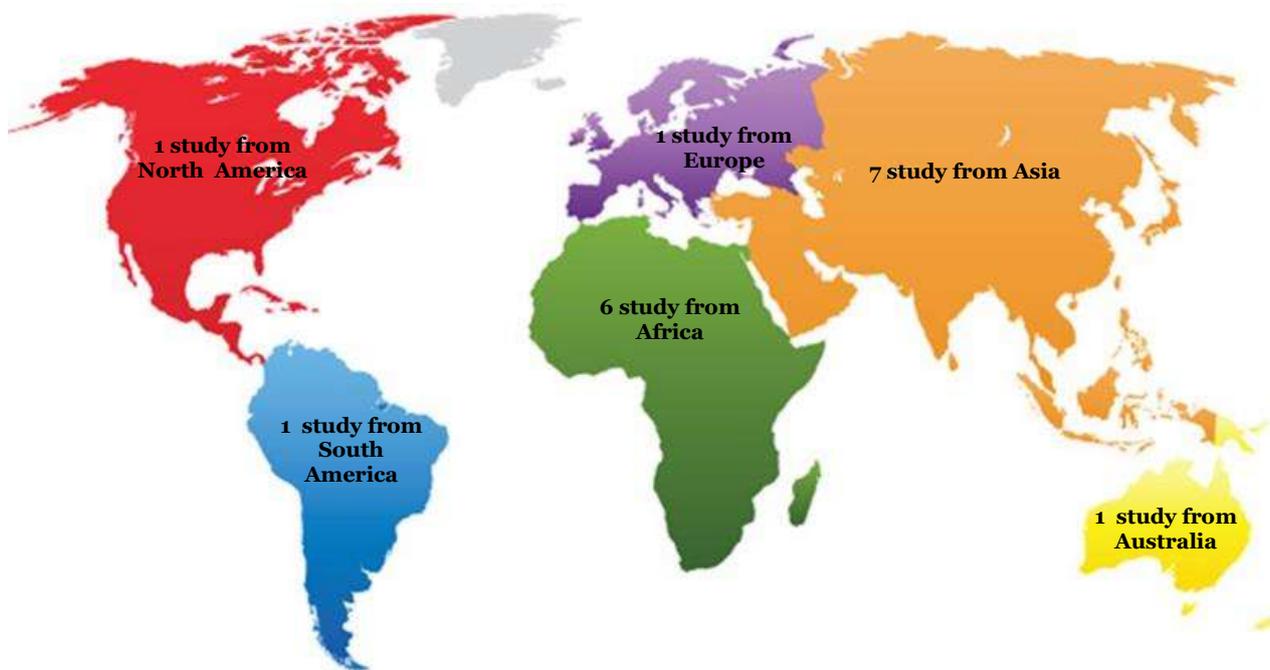


Figure 2. Research Areas Map

1. Unplanned pregnancy against postpartum depression

a. Forest Plot

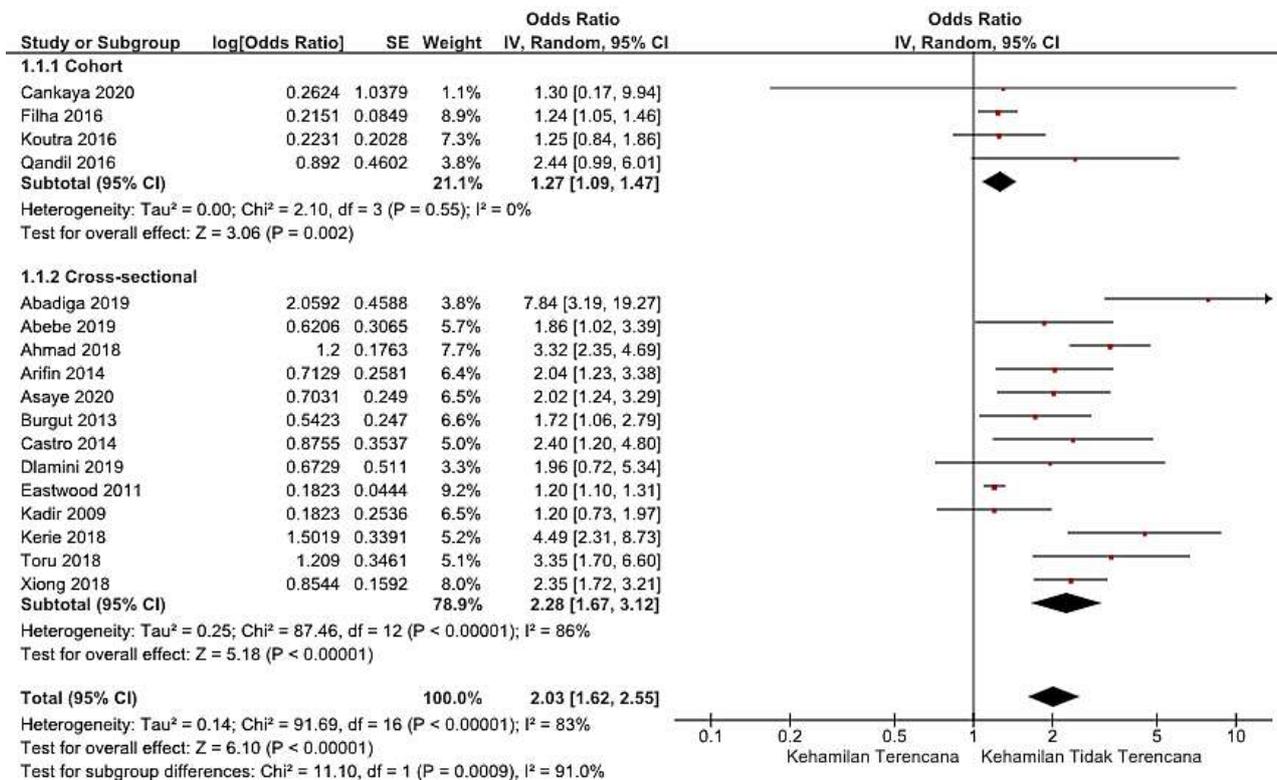


Figure 3. Forest plot of the effect of unplanned pregnancy on postpartum depression

b. Funnel Plot

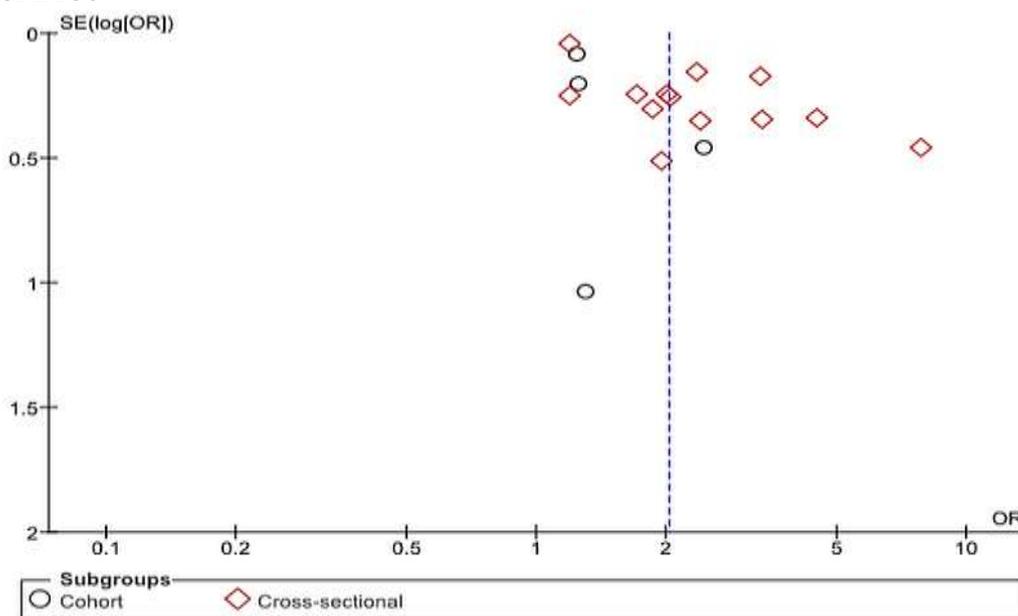


Figure 4. Funnel plot of the effect of unplanned pregnancy against postpartum depression

Table 1. Critical Appraisal Skills Programme (CASP) for Cohort Study

Checklists Questions	Publication Author and Year			
	Qandil et al. (2016)	Filha et al. (2016)	Cankaya et al. (2020)	Koutra et al. (2020)
	Does the research address clearly focused issues?	1	1	1
Was the group included in an acceptable way?	1	1	1	1
Is exposure measured accurately to minimize bias?	1	1	1	1
Are the results measured accurately to minimize bias?	1	1	1	1
Have the authors identified all the important confounding factors?	1	1	1	1
Was the subject follow-up of the study complete?	0	1	0	0
What are the results of this study?	1	1	1	1
How precise is the result?	1	1	1	1
Do you believe in the results?	1	1	1	1
Can the results be applied to the local population?	0	1	1	1
Are the results of this study consistent with other available evidence?	1	1	1	1
What are the implications of this study for practice?	1	1	1	1
Total	10	11	11	11

Table 2. Critical appraisal checklist for cross-sectional study

Checklists Questions	Publication Author and Year						
	Qandil et al. (2016)	Filha et al. (2016)	Cankaya et al. (2020)	Koutra et al. (2020)	Castro et al. (2014)	Abebe et al. (2019)	Asaye et al. (2020)
	Does this research address clearly focused issues?	1	1	1	1	1	1
Are the groups entered in an acceptable manner?	1	1	1	1	1	1	1
Are the exposures measured accurately to minimize bias?	1	1	1	1	1	1	1
Are the results accurately assessed to minimize bias?	1	1	1	1	1	0	0
Has the author identified all the important confounding factors?	1	1	1	1	1	1	1
Was the follow-up subject of this research complete?	0	1	0	0	0	0	0

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What are the results of this research?	1	1	1	1	1	1	1
How successful has it been?	1	1	1	1	1	1	1
Do you believe in the results?	1	1	1	1	1	1	1
Can the results be applied to local populations?	0	1	1	1	1	1	1
Do the results of this study match other available evidence?	1	1	1	1	0	0	0
What are the implications of this study for practice?	1	1	1	1	1	1	1
Total	10	11	11	11	10	9	9

Note: Yes = 1, No= 0

Table 3. Critical appraisal checklist for cross-sectional study

Checklists Questions	Publication (Author and Year)					
	Dlamini et al. (2019)	Arifin et al. (2014)	Xiong et al. (2018)	Ahmad et al. (2018)	Kadir et al. (2009)	Eastwood et al. (2011)
Does this objective clearly address the focus / research problem?	1	1	1	1	1	1
Is the cross-sectional research method suitable for answering research questions?	1	1	1	1	1	1
Is the method of selecting research subjects clearly written?	1	1	1	1	1	1
Does the sampling method create bias (selection)?	1	1	1	1	1	1
Does the research sample taken represent the designated population?	1	1	1	1	1	1
Was the sample size based on pre-study considerations?	0	0	0	0	0	0
Was a satisfactory response achieved?	1	1	1	1	1	1
Are the research instruments valid and reliable?	1	1	1	1	1	1
Is statistical significance assessed?	1	1	1	1	1	1
Are confidence intervals given for the	1	1	1	1	1	1

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main outcome?						
Are there any confounding factors that have not been taken into account?	0	0	0	0	0	0
Are the results applicable to your research?	1	1	1	1	1	1
Total	10	10	10	10	10	10

Note: Yes = 1, No= 0

Table 4. Primary study descriptions were included in the meta-analysis

Author (year)	Country	Study Design	Sample	P Population	I Intervention	C Comparison	O Outcome and scale
Koutra et al. (2016)	Yunani	Kohor	1,037	Postpartum mothers	Unplanned pregnancy*, doing a pregnancy program, hypertension / pre-eclampsia, smoking during pregnancy, alcohol consumption during pregnancy, weight gain, lack of sleep, caesarean delivery, difficulty breastfeeding	Pregnancy planned, get pregnant soon, no hypertension/pre-eclampsia, no smoking, no alcohol consumption, no weight gain, no sleep deprivation, normal delivery, can breastfeed	Postpartum depression, EPDS ≥ 13
Qandil et al. (2016)	Palestina	Kohor	101	Postpartum mothers	Place of delivery in hospital, cesarean delivery, unplanned pregnancy*, gender of girl, gender of child is unwanted,	Place of birth at home, normal child-birth, planned pregnancy, gender of boy, gender of child desired	Postpartum depression, EPDS ≥11
Filha et al. (2016)	Brazil	Kohor	23,894	Postpartum mothers	Brown skin color, low economic status, history of chronic illness, alcohol consumption, parity ≥3, unplanned pregnancy*, poor newborn care	White skin color, high economic status, no history of chronic disease, no alcohol consumption, 1-2 parity, good newborn care	Postpartum depression, EPDS ≥ 13
Çankaya (2020)	Turki	Kohor	245	Postpartum mothers	ANC was not routine, pregnancy was not planned*, husband did not want pregnancy, experienced violence, there was a history of family psychological problems, smoking during pregnancy, there was a history of abortion, hyperemesis, dissatisfaction with the gender of the baby	Routine ANC, planned pregnancy, husband wants a pregnancy, does not experience violence, no family history of psychological problems, does not smoke during pregnancy, no history of abortion, no hyperemesis, satisfied with the gender of the baby	Postpartum depression, EPDS ≥13
Abadiga (2019)	Ethiopia	Cross-sectional	295	Postpartum mothers	Maternal age 15-24 years, single status, daily labor, income <500 EB, unplanned pregnancy*, premature or fetal death, parity 1, cesarean delivery, history of abortion, chronic illness,	Maternal age > 25 years, married status, government employee occupation, income >500 EB, planned pregnancy, not premature, parity >2, normal delivery, no history of abort-	Postpartum depression, EPDS ≥10

Author (year)	Country	Study Design	Sample	P Population	I Intervention	C Comparison	O Outcome and scale
					history of depression, domestic violence , low social support.	ion, no chronic disease, no history of depression, no internal violence household, good social support	
Kerie et al. (2018)	Ethiopia	Cross-sectional	422	Postpartum mothers	Maternal age >30 years, unplanned pregnancy*, chronic illness, history of depression, fetal death, marital problems	Maternal age 15-24 years, planned pregnancy, no chronic illness, no history of depression, no fetal death, no marital problems	Postpartum depression, EPDS ≥10
Toru T et al. (2018)	Ethiopia	Cross-sectional	460	Postpartum mothers	Age 18-23 years, unplanned pregnancy*, domestic violence, marital dissatisfaction, poor social support, history of depression	Age > 24 years, planned pregnancy, no domestic violence, satisfied in marriage, good social support, no history of depression	Postpartum depression, PHQ-9 ≥10
Burgut et al. (2013)	Qatar	Cross-sectional	1,379	Postpartum mothers	Age <25 years, education level <secondary, housewife work, income <10,000 QR, unplanned pregnancy*, caesarean delivery, using formula milk	Age >25 years, education level ≥secondary, work outside the home, income ≥10,000 QR, planned pregnancy, normal delivery, breastfeeding.	Postpartum depression, EPDS ≥12
Castro et al. (2014)	Meksiko	Cross-sectional	604	Postpartum mothers	Maternal age <20 years, single status, ≤ basic level of education, low social support, history of depression, unplanned pregnancy*, experiencing domestic violence	Maternal age ≥20 years, married status, education level >basic, high social support, no history of depression, planned pregnancy, no domestic violence	Postnatal depression, EPDS ≥12
Abebe et al. (2019)	Ethiopia	Cross-sectional	511	Postpartum mothers	No decision making rights, unplanned pregnancy*, domestic violence, history of depression	Decision-making rights, planned pregnancy, no domestic violence, no history of depression	Postpartum depression, EPDS ≥ 13
Asaye et al. (2020)	Ethiopia	Cross-sectional	526	Postpartum mothers	Child alive ≥2, history of abortion, unplanned pregnancy*, pregnancy complications, ANC visits, PNC visits	Child alive <2, no history of abortion, planned pregnancy, no pregnancy complications, no ANC visit, no PNC visit	Postpartum depression, EPDS ≥ 13
Xiong et al. (2018)	Cina	Cross-sectional	468	Postpartum mothers	Unplanned pregnancy*, poor relationship with in-laws, lack of family support, parity 1	Pregnancy planned, good relationship with in-laws, always receive family support, parity > 1	Postpartum depression, EPDS ≥ 10
Ahmad et al. (2018)	Malaysia	Cross-sectional	5,727	Postpartum mothers	Experiencing domestic violence, experiencing emotional violence, unplanned pregnancy*, lack of family support, income <1500 RM	Not experiencing domestic violence, not experiencing emotional violence, planned pregnancy, good family support, income ≥1500 RM	Postnatal depression, EPDS ≥ 12
Dlamini et al. (2019)	Eswatini	Cross-sectional	114	Postpartum mothers	Not working, unplanned pregnancy*, poor husband support, history of gender based violence, presence of ANC <4 times	Work, planned pregnancy, husband support, no history of gender-based violence, presence of ANC ≥4 times	Postpartum depression, EPDS ≥ 13

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Author (year)	Country	Study Design	Sample	P Population	I Intervention	C Comparison	O Outcome and scale
Arifin et al.(2014)	Malaysia	Cross-sectional	347	Postpartum mothers	Housewives, experience of giving birth, LAS score ≤ 100 , unplanned pregnancy *	Work, delivery experience, LAS score >100 , planned pregnancy	Postpartum depression, EPDS ≥ 11
Kadir et al. (2009)	Malaysia	Cross sectional	293	Postpartum mothers	Parity >5 , there is a history of abortion, childbirth with tools, pregnancy complications, postnatal complications, unplanned pregnancy *	Parity <5 , no history of abortion, cesarean delivery, no pregnancy complications, no postnatal complications, planned pregnancy	Postnatal depression, EPDS ≥ 12
Eastwood et al. (2011)	Australia	cross-sectional	25,455	Postpartum mothers	Childbirth in a country other than Australia, financial hardship, uneducated mother, single status, not breastfeeding, poor self-care, unplanned pregnancy*, poor child care	Give birth in Australia, good financial, highly educated mother, married status, breastfeeding, good self-care, planned pregnancy, good child care	Postnatal depression, EPDS ≥ 9

*variables were included in the meta-analysis study

DISCUSSION

This research is a systematic study and meta-analysis that raises the theme of the effect of unplanned pregnancy on postpartum depression. This study discusses data on postpartum depression due to mental health which is an important but often neglected component of reproductive health (Humayun et al. 2013).

This systematic study and meta-analysis used research that controlled for confounding factors which could be seen from the study inclusion requirements, namely multivariate analysis, and the statistical result reported was the adjusted odds ratio (aOR).

Estimates of the combined effect of unplanned pregnancy and postpartum depression were processed using the RevMan 5.3 application with the generic inverse variance method.

The results of the systematic study and meta-analysis are presented in the form of a forest plot and a funnel plot. Forest plots provide an overview of information from each of the studies examined in the meta-analysis, and estimates of the overall results (Murthi, 2018).

The funnel plot shows visually the amount of variation (heterogeneity) (Akobeng, 2005 in Murthi, 2018). The funnel plot shows the relationship between the effect size of the study and the sample size of the various studies studied, which can be measured in a number of different ways (Murthi, 2018).

Unplanned pregnancy against postpartum depression

The results of the forest plot in the cohort study showed that postpartum mothers with unplanned pregnancies had 1.27 times the risk of experiencing postpartum depression compared to postpartum mothers with planned pregnancies. Meanwhile, a research article with a cross-sectional study

showed that postpartum mothers with unplanned pregnancies were 2.17 times more likely to experience postpartum depression than postpartum mothers with planned pregnancies.

Kozinszky et al. (2011) in their study stated that postpartum mothers with unplanned pregnancies had 1.71 times the risk of experiencing postpartum depression compared to postpartum mothers with planned pregnancies and were statistically significant (aOR= 1.71; 95% CI= 1.13 to 2.32; $p < 0.001$).

In line with these studies, Adama et al. (2015) in their research stated that postpartum mothers with unplanned pregnancies had a 1.08 times risk of experiencing postpartum depression (aOR= 1.08; 95% CI = 0.27-4.35; $p = 0.91$).

Chen et al. (2018) also stated that postpartum mothers with unplanned pregnancies had 2.21 times the risk of experiencing postpartum depression compared to postpartum mothers whose pregnancies were planned (aOR= 2.21; 95% CI= 1.34-2.75; $p < 0.001$).

A study by Lara et al. (2016), also stated that postpartum mothers with unplanned pregnancies had a 2.81 times risk of experiencing postpartum depression (aOR= 2.81; 95% CI= 1.36 to 4.82). Postpartum mothers with unplanned pregnancies who experience postpartum depression are more likely to occur in low- and lower-middle income countries and minorities who are affected by other social disadvantages than are women who enjoy better socio-economic conditions.

This is different from the study of Hanlon and Beckman (2015), which states that postpartum mothers with unplanned pregnancies decreased the incidence of postpartum depression by 46% compared to postpartum mothers with planned pregnancies (aOR = 0.54, 95% CI = 0.29–0.97;

$p= 0.038$). This can happen because even though the postpartum mother has an unplanned pregnancy, she gets good support from her husband.

AUTHOR CONTRIBUTION

Dinda is the principal researcher who selects topics, explores and collects data. Hanung Prasetya and Bhisma Murti played a role in analyzing data and reviewing research documents

CONFLICT OF INTEREST

There is no conflict of interest in this study.

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