

Article

## Does Cesarean Section Increase the Risk of Postpartum Depression? A Systematic Literature Review

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### A B S T R A C T

**Background:** Postpartum depression (PPD) is a psychological disorder experienced by mothers at 4 weeks to 6 months postpartum. One of the risk factors for postpartum depression is the type of delivery. The mode of delivery in its effect on postpartum depression has been studied extensively with conflicting results whether vaginal delivery or cesarean section (CS) that can affect postpartum depression (Rauh et al., 2012). **Methods:** This is a systematic literature review with a research question using PICO standard namely "What is the correlation between mode of delivery and postpartum depression?". 325 literature were obtained from five different databases. The screening was carried out according to PRISMA flowchart and bringing in a total of 21 literature to be reviewed. **Results:** Most of the literature reported that mothers with CS have higher EPDS scores than mothers with vaginal delivery. One literature stated that mothers with CS were more protected and less prone to PPD, and other studies stated that the method of delivery was not associated with PPD. **Conclusion:** Delivery mode is associated with postpartum depression in most studies. Mothers with CS are more at risk of exposure to PPD than mothers with vaginal delivery

## I. INTRODUCTION

Becoming a mother is a historical moment for every woman. The transition from pregnancy to the postpartum period involving the delivery process leaving an alteration in physiologic, emotional, and social behaviour. Rubin in Padila (2014) stated three postpartum phases as taking in, taking hold, and letting go. Women who weren't able to pass those phases are at high risk for mental health disorders such as postpartum depression (PPD).

Diagnostic and Statistical Manual for Mental Disorders describes postpartum depression as a major depression experienced by mothers beginning at 4 weeks after delivery. PPD was found in 1,9%-82,1% of females in high-income countries and 5,2%-74,0% in lower-middle-income countries (Norhayati et al., 2015). A study in Puskesmas Morokrembangan Surabaya reported more than half (53%) of postpartum mothers are having mild depression (Indriasari, 2017). A similar thing happens in Puskesmas Lubuk Alung and Puskesmas Andalas Padang where 62,5% of depressive symptoms were occurred in multiparas and 60% in primiparas. (Syafrianti, 2018)

There are several risk factors related to PPD, one of those is stated by Mansur (2009) as obstetric factors including pregnancy experience and mode of delivery. The role of the delivery mode on the development of postpartum depression has been studied extensively with conflicting results on whether vaginal delivery (VD) or cesarean section (CS) can affect postpartum depression (Rauh et al., 2012).

This study aims to determine the correlation between mode of delivery and postpartum depression based on the study of several literary representations. Hopefully, this research will be useful for scientific information in developing midwifery knowledge especially in terms of postpartum care.

## II. METHODS

A systematic literature review was performed to provide relevant studies regarding mode of delivery and postpartum depression. Exploring the research question using PICO standard namely "What is the correlation between mode of delivery and postpartum depression?", five databases (PubMed, Science Direct, SCOPUS, SAGE, and Google Scholar) were used and Medical Subject Heading (MeSH) strategy (Table 1) was applied for keyword search. Full text and open access literature that explain the association between mode of delivery and postpartum depression in English and Indonesian range from 2011 to 2021 are collected. Non-research studies, interventional, qualitative, and systematic review studies were excluded.

Articles were screened and reported according to the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-analyses) flowchart and will be assessed using Quality Assessment Tool for Quantitative Studies from the Effective Public Health Practice Project (EPHPP).

**Table 1. Keyword search**

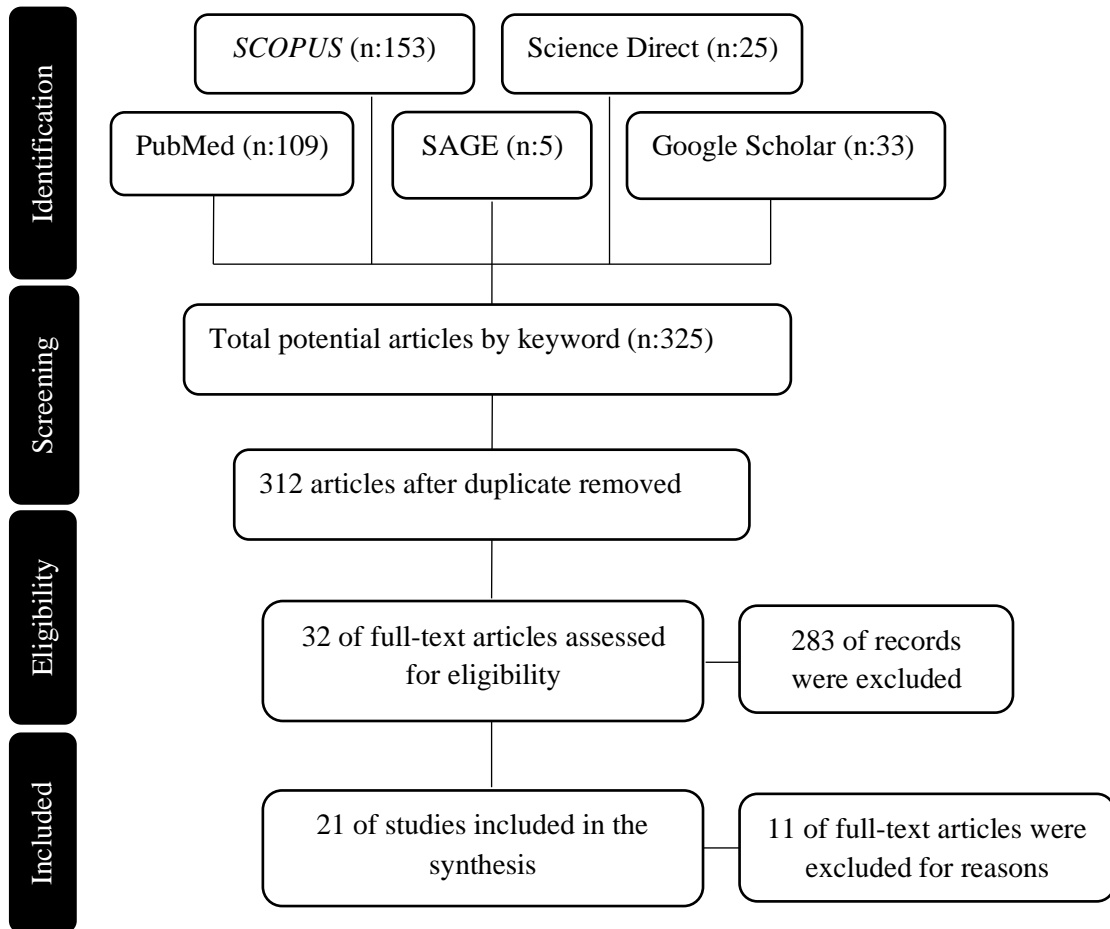
<b>Association</b>	<b>Postpartum Depression</b>	<b>Delivery Mode</b>
Association	Postpartum Depression	Delivery Mode
OR	OR	OR
Relationship	Postnatal Depression	Mode of Delivery
OR		OR

Correlation

Vaginal Delivery  
OR  
Cesarean section

### III. RESULT

A total of 325 articles were identified, duplicate articles were excluded and 312 articles were screened for title and abstract generating 21 eligible articles that met the inclusion and exclusion criteria. (Figure 1). The 21 included studies consist of eight articles with a final rating strong and 13 moderate articles from the Effective Public Health Practice Project (EPHPP) Quality Assessment Tool.



**Figure 1. PRISMA flowchart of the screening process**

There are 28.933 women investigated from Asia, Europe, America, South America, and Africa. Socio-demographic characteristics such as age, education, parity, and mode of delivery are reviewed. The average age of women is in the range of 17-42 years. Education levels are diverse from middle to high school up to university graduates and higher. Most women are high school graduates or below and multipara. 62% of women gave birth with vaginal delivery and 38% are cesarean section. Summary details of the studies are presented in Table 2.

**Table 2. Summary of literature**

<b>Author and year of publication</b>	<b>Instrument and analysis</b>	<b>Method and sample size</b>	<b>Key findings</b>	<b>Rate of quality</b>
(Xie et al., 2011)	Edinburgh Postnatal Depression Scale (EPDS) and Multiple logistic regression	Prospective cohort study, 534 mothers at 2 weeks postpartum in Changsha, Hunan, China	Cesarean section is associated with increased risk of postpartum depression in Chinese women with high rate of cesarean section delivery	Strong
(Smorti et al., 2019)	EPDS and Linear regression analyses	Cohort longitudinal study and 161 nulliparous mothers in Italy	Cesarean delivery and epidural analgesia individually affect the severity of postpartum depression	Strong
(Yokoyama et al., 2021)	A self administered questionnaire, EPDS, and Multivariate logistic regression	Prospective cohort study and 1310 mothers at 3-4 months postpartum in Japan	Cesarean section individually associated with increased risk of postpartum depressive symptoms	Strong
(Nelson et al., 2013)	EPDS and Student's t-test, Multiple logistic regression	Cohort study and 17.648 mothers at 6-8 weeks postpartum in Dallas County, Texas	The white race, advanced parity, malformation, and cesarean section respectively correlates to postpartum depression	Strong
(Alharbi et al., 2014)	EPDS and Multivariate binary logistic regression	Observational case-control study and 352 mothers at 8-12 weeks postpartum in Saudi Arabia	Mode of delivery, age, education, and occupation are not associated with postpartum depression	Strong
(Suhitaran et al., 2019)	EPDS and Univariate logistic regression	Case-control study and 479 postpartum mothers in Singapore	Mode of delivery, both vaginal delivery and cesarean delivery are not associated with increased risk of postpartum depression	Strong
(Eckerdal et al., 2018)	EPDS and Logistic regression model and path analysis	Longitudinal cohort study and 3888 pregnant women that are followed up to the postpartum period in Sweden	The delivery mode has no direct effect on postpartum depression	Strong

(Ariyanti et al., 2016)	EPDS and Chi-Square, logistic regression model	Retrospective cohort and 110 mothers at 7-14 days postpartum in Yogyakarta, Indonesia	Mode of delivery has a significant effect on increasing the risk of postpartum depression	Strong
(Sylvén et al., 2017)	EPDS and Univariate logistic regression and path analysis	Population-based cohort study and 530 postpartum mothers in Uppsala, Sweden	Cesarean section and assisted vaginal delivery are associated with lower depressive symptoms at 6 weeks postpartum	Moderate
(Duma et al., 2020)	EPDS and Multiple logistic regression	Cross-sectional and 276 mothers at 4-6 weeks postpartum in Ixopo, South Africa	There is no relationship between postpartum depression and mode of delivery but the emergency cesarean section is individually associated with postpartum depression	Moderate
(Sadat et al., 2014)	EPDS and $\chi^2$ -test, multiple logistic regression model	A prospective study and 300 postpartum mothers in Khasan, Iran	Mode of delivery is not associated with postpartum depression at 2 and 4 weeks postpartum, but mothers with vaginal delivery have a lower EPDS score	Moderate
(Deng et al., 2014)	EPDS and Student's t-test, multiple logistic regression	Descriptive cross sectional study and 1.823 postpartum mothers in Guangzhou, China	Mode of delivery is significantly associated with postpartum depression	Moderate
(Taherifad et al., 2013)	EPDS and Multiple logistic regression	Descriptive cross-sectional study and 197 postpartum mothers in Western Iran	Mode of delivery along with low economic status and level of education is significantly associated with postpartum depression	Moderate
(Cirik et al., 2016)	EPDS, Hospital Anxiety and Depression Scale (HADS) and Spearman-test	Preliminary study and 149 postpartum mothers in Ankara, Turkey	Mode of delivery, both vaginal delivery and cesarean section, are not associated with postpartum depression	Moderate
(Al Nasr et al., 2020)	EPDS and Logistic regression analysis	Population-based cohort study and 174 postpartum mothers in Riyadh, Saudi Arabia	Mode of delivery is the associative key in increasing the risk of postpartum depression especially in mothers cesarean section has a higher possibility	Moderate

(Meky et al., 2020)	Arabic version of EPDS and Mann-Whitney test	Cross-sectional and 370 postpartum mothers with a single pregnancy in Ismailia, Egypt	There is a strong relationship between mode of delivery and postpartum depression. Mothers with emergency cesarean section show a greater relationship	Moderate
(Kim & Dee, 2018)	EPDS and Chi-square, Logistic regression	Cross-sectional and 223 mothers with a child age under 12 months in California	Cesarean section, low education level, no occupation, and multiparity are significantly associated with the risk of postpartum depression	Moderate
(Jadoon et al., 2020)	EPDS and Chi-square	Cross-sectional study and 200 mothers at 1-8 weeks postpartum in Karachi, Pakistan	A significant relationship is found between delivery mode and postpartum depression	Moderate
(Kaya et al., 2019)	EPDS and Pearson chi-square	Correlational study and 244 primipara women in city of Batman, Turkey	Both planned and performed mode of delivery are not associated with EPDS score	Moderate
(Habibzadeh et al., 2016)	EPDS and T -test	Survey-research and 120 mothers at 4 weeks postpartum in Qom, Iran	Nullipara, pluripara, and delivery mode have no effect on increasing depression in postpartum mother	Moderate
(Mathisen et al., 2013)	EPDS and Pearson's correlation	Cross-sectional and 86 postpartum mothers in Argentina	Postpartum depressive symptoms are associated with cesarean section, multipara, complications during pregnancy and delivery, and incomplete breastfeeding.	Moderate

#### IV. DISCUSSION

Analysis of the relationship between the method of delivery and postpartum depression was obtained from 21 literatures that have been reviewed. 13 literatures stated that the delivery method is significantly related to the incidence of postpartum depression (Xie et al., 2011; Smorti et al., 2019; Yokoyama et al., 2021; Nelson et al., 2013; Sylvén et al., 2017; Deng et al., 2014; Taherifad et al., 2013; Al Nasr et al., 2020; Meky et al., 2020; Kim & Dee, 2018; Jadoon et al., 2020; Mathisen et al., 2013; Ariyanti et al., 2016), while eight other literatures state that delivery method is not associated with the incidence of postpartum depression (Alharbi et al., 2014; Suhitaran et al., 2019; Eckerdal et al., 2018; Duma et al., 2020; Sadat et al., 2014; Cirik et al., 2016; Kaya et al., 2019; Habibzadeh et al., 2016).

##### **Correlation between Mode of Delivery and Postpartum Depression**

Seven out of 13 literature specifically reported that cesarean section (CS) is associated with postpartum depression. The EPDS score, which refers to symptoms of postpartum depression, was found higher in mothers who delivered with cesarean section than those with vaginal delivery (VD) (Al Nasr et al., 2020; Kim & Dee, 2018; Mathisen et al., 2013; Yokoyama et al., 2021; Nelson et al., 2013). The level of stress experienced by mothers with CS delivery is more likely to cause postpartum depression in mild to severe levels than mothers with VD. This is due to the high release of the hormone cortisol which triggers stress during the procedure of CS. A mother who deliver with CS also suffers pain from its surgery that is more intense compared to mothers with VD who tend to felt mild to moderate intensity of perineal/pelvic pain. Thus, can inhibit mother's daily activities and add more stress that can trigger postpartum depression (Meky et al., 2019; Al Nasr et al., 2020).

Mothers who give birth with CS are also more prone to complications during surgical procedures, postoperative infections, bleeding, and pelvic inflammation which is also exacerbated by wound care, longer postnatal care, and a less cooperative environment at birthplace (Al Nasr et al., 2020; Meky et al., 2019). Jadoon et al., (2020) added that prolonged labor and poor pregnancy outcomes can leave a big imprint on mother's memory and affect her psychology. In addition, there are also feelings of failure, low self-esteem, and disappointment in the mother who gave birth with CS. Mothers who have undergone CS with preterm delivery tend to be more depressed by anxiety about their babies needing to be incubated caused by prematurity. Some of these things play an important role in increasing the risk of postpartum depression.

Sylvén et al., (2017) in their research showed different results with a negative correlation between delivery method and postpartum depression. The study involved primiparous women without a history of psychiatric contact and divided the method of delivery into two variables, spontaneous vaginal delivery, and cesarean section or assisted vaginal delivery. The results showed that mothers who gave birth with CS or assisted VD were more protected and not susceptible to postpartum depression symptoms since they receive a lot more moral support from close relatives during early days after surgery. The EPDS score was assessed twice at 5 days postpartum and 6 weeks postpartum so that it allows to detect greater social support from close relatives during early postpartum period.

Eight literatures reported that delivery method is not associated with postpartum depression (Alharbi et al., 2014; Suhitaran et al., 2019; Eckerdal et al., 2018; Duma et al., 2020; Sadat et al., 2014; Cirik et al., 2016; Kaya et al., 2019; Habibzadeh et al., 2016). This because mode of delivery does not directly affect postpartum depression but there are other psychological

factors from the mother such as a history of depression, depression during pregnancy, and a family history of depression that actually has an impact on postpartum depression. (Suhitarian et al., 2019). Three out of eight literatures, which stated that the method of delivery was not associated with postpartum depression, found that emergency cesarean section (emSC) is individually had a role in increasing the risk of postpartum depression. Eckerdal et al. (2018) stated that negative delivery experience, complications, and physical symptoms of depression were the mediating variables that bridged the relationship between emSC and vaginal delivery with postpartum depression.

Duma et al., (2020) based on the logistic multiple regression analysis, reported that there is no relationship between the method of delivery and postpartum depression, but the emSC individually is a risk factor of postpartum depression. Cirik et al. (2016) stated the same thing that mode of delivery and postpartum depression was not significantly related, but mothers with a history of depression and suspected fetal distress so that they had to go through an emergency cesarean section significantly increased the risk of postpartum depression.

### **Effect of Elective Cesarean Section and Emergency Cesarean Section on the Incidence of Postpartum Depression**

Seven literatures specifically divide cesarean sections into elective cesarean sections (eICS) and emergency cesarean sections (emCS). Six of the seven literatures stated that the emCS had an effect on postpartum depression and one other literature stated that the eICS had an effect on postpartum depression. Xie et al., (2011) describes elective cesarean section as a planned cesarean section with medical or social indications. In this study, it was found that most of the deliveries were done under social indications. Mothers with an indication of a history of depression, fear of childbirth, and socioeconomic vulnerability (low education, not working, history of domestic violence) are associated with postpartum depression because these variables act as triggers for mothers to choose eICS delivery. In the other hand, EICS is also associated with a positive birth experience because there was satisfaction felt by mother because she has successfully delivered with the mode of delivery that she wanted (Eckerdal et al., 2018).

Mothers who gave birth by emCS had a higher risk of developing postpartum depression compared to those who gave birth by eICS and spontaneous vaginal delivery. EmCS is performed on mothers who experience obstetrical distress and threaten the lives of mothers their baby. This can leaves an impression as a negative experience for those who are not familiar to the cesarean section surgical procedure (Meky et al., 2019; Duma et al., 2020; Eckerdal et al., 2018).

Yokoyama et al. (2021) explained that cesarean section can be a traumatic experience for mothers, especially for mothers who undergo an emCS. This is due to the emergence of medical indications or severe complications at the last moment before delivery such as hypertension, placenta previa, fetal distress, to preterm labor which causes the mother to have to go through a cesarean section and affect their psychological conditions that can also increase the risk of postpartum depression. Cirik et al. (2016) supported this statement and explained that mothers who received news that an emergency SC should be taken due to fetal distress experienced excessive anxiety and were afraid of losing their baby.

Smorti et al. (2019) stated that nulliparous women with psychological changes and transition to motherhood while during their pregnancy they had a strong desire to give birth vaginally

but had to give birth by cesarean section because obstetric emergencies were more susceptible



to the risk of postpartum depression.

## V. CONCLUSION

Most studies reported that mode of delivery is associated with postpartum depression and more specific in mothers who gave birth with CS than VD. Emergency CS that was performed during an obstetric emergency and might violate mother's preference of delivery in pregnancy days, can lead to a negative and traumatic experiences. On the other hand, if an elective CS was performed as it has been planned before thus gives mothers satisfaction and a positive impression. One study stated that mothers with CS are less prone and more protected from postpartum depression due to generous support from family during early postpartum days.

Midwives need to provide holistic care since pre-pregnancy days and making sure mothers have prepared for their pregnancy, delivery, and postpartum period well so that any adverse physical and psychological can be avoided. Selecting the mode of delivery is an important thing as midwives are obligated to educate mothers regarding every type of delivery and respect their choice in hope to create a perfect bonding.

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