

The Contextual Effect of Place of Birth Delivery and Biopsychosocial Determinants on Postpartum Depression: A Multilevel Evidence from Yogyakarta

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ABSTRACT

Background: Postpartum depression is a condition that affects 20% women in the first four weeks of the puerperium. Postpartum depression can be affected by biological, psychological, sociocultural, and economic factors. This study aimed to analyze biopsychosocial factors affecting postpartum depression in Sleman, Yogyakarta.

Subjects and Method: This was a cross-sectional study. This study was conducted at 25 delivery places in Sleman, Yogyakarta, in August-September 2019. A sample of 200 postpartum mothers was selected by multistage random sampling. The dependent variable was postpartum depression. The independent variables were traditional treatment, age, education, income, parity, pregnancy status, type of delivery, complication, marital satisfaction, and contextual delivery place. The data were collected by questionnaire and analyzed by a multilevel multiple logistic regression.

Results: The risk of postpartum depression increased with delivery with intervention ($b=3.30$; 95% CI= 1.57 to 5.02; $p<0.001$), delivery with complication ($b=3.77$; 95% CI= 2.25 to 5.28; $p<0.001$), and age ≥ 35 years ($b=0.93$; 95% CI= 0.20 to 2.07; $p=0.109$). The risk of postpartum depression decreased with traditional treatment ($b= -1.33$; 95% CI= -2.51 to -0.15; $p= 0.027$), education \geq Senior high school ($b=-1.98$; 95% CI=

-3.59 to -0.38; $p=0.015$), family income \geq Rp 1,701,000 ($b= -3.55$; 95% CI= -5.08 to -2.02; $p<0.001$), multiparous ($b= -1.25$; 95% CI= -2.45 to -0.04; $p=0.041$), intended pregnancy status ($b= -3.11$; 95% CI= -4.96 to -1.25; $p= 0.001$), and happy marital satisfaction ($b= -1.18$; 95% CI= -2.30 to -0.05; $p= 0.039$). There was strong contextual effect of delivery place on postpartum depression with intra-class correlation (ICC)= 31.6%.

Conclusion: The risk of postpartum depression increases with delivery with intervention, delivery with complication, and age ≥ 35 years. The risk of postpartum depression decreases with traditional treatment, education \geq Senior high school, family income \geq Rp 1,701,000, multiparous, intended pregnancy status, and happy marital satisfaction. There is strong contextual effect of delivery place on postpartum depression.

Keywords: Postpartum depression, determinant, delivery place

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BACKGROUND

The process of psychological adaptation has occurred during pregnancy, before and after delivery. Postpartum depression is a condi-

tion that arises immediately after delivering. It is characterized by sadness feeling, loss of interest in daily activities, feeling useless,

fatigue, and hurting themselves or the babies (Nugroho, 2014). Perinatal depression can increase. It is caused by risk factors such as economic and socio environmental pressures (Gelaye et al., 2016). Mothers who are depressed cannot do their parenting functions properly. Treating post partum mothers with postpartum depression increases the growth and development of new-born. In addition, it reduces the likelihood of diarrhea and malnutrition in children (WHO, 2017).

During pregnancy and puerperium, a mother generally will conduct treatments according to her cultural heritage. These habits are practiced from generation to generation (Mariyati, 2018). Postpartum mothers who use traditional practices show lower rates of postpartum depression than those who do not use traditional practices (Demirel et al., 2018).

In the proportion of delivery place, the majority of delivery assistance was carried out in Independent Practice Midwives (29%), private hospitals (18%), and public hospitals (15%) (Risksdas, 2018). Some mothers who will give birth feel anxious when they are in the hospital or community health center areas. Anxiety can slow down the contractions, thus slowing down the delivery process. Intervention must be conducted, so that the delivery process run smoothly (Hayati, 2018).

One of the factors found as a risk of postpartum depression was delivery with a tool or intervention, such as; Caesarea section delivery, the use of general anesthesia, kristelle manoeuvre, third or fourth degree perennial tears, and manual intervention that was carried out to discharge the placenta (Martínez et al., 2019). Indonesian people, especially in the Java Island, are very commonly using postpartum treatment with herbal ingredients. There are no studies in Indonesia that publish the effect of traditional

treatment on mental health, especially postpartum depression.

SUBJECTS AND METHOD

1. Study Design

This study was an analytic study with cross sectional design. This study was conducted at 25 delivery places in Sleman, Yogyakarta, from August to September 2019.

2. Population and Sample

The population of the study was postpartum mothers who were in 2-6 weeks after delivering. The sample of the study was 200 study subjects. The study used multistage random sampling. It was conducted in Sleman Regency, Yogyakarta.

3. Study Variables

The dependent variable was postpartum depression. The independent variables were traditional treatment, age, education, income, parity, delivery complication, pregnancy status, marital satisfaction, and contextual delivery place.

4. Operational Definition of Variables

Postpartum depression was a psychological adaptation disorder characterized by anxiety, inability to concentrate, self-blame, insomnia, sadness, lack of enthusiasm for life in postpartum mothers 2 to 6 weeks as indicated by the score result of Edinburg Postnatal Depression Scale (EPDS). The measurement scale was continuous and transformed into dichotomous.

Traditional treatment was a treatment by consuming herbs or doing massage in certain parts of the body during the puerperium. The data were collected by questionnaire. The measurement scale was continuous and transformed into dichotomous.

Maternal age was the life span of the mother that was calculated from delivery until filling out the questionnaire. The data were collected by questionnaire. The measurement scale was continuous and transformed into dichotomous.

Education was a formal education of the study respondents based on their last diplomas ranging from elementary school, junior high school, senior high school, and college level. The data were collected by questionnaire. The measurement scale was categorical.

Income was the amount of income from the head of the family and mother both permanent and additional occupation for one month in Rupiah with the Minimum Wage of Sleman Regency. The data were collected by questionnaire. The measurement scale was continuous and transformed into dichotomous.

Parity was the number of children born to the study subjects. The data were collected by questionnaire. The measurement scale was continuous and transformed into dichotomous.

Type of delivery was the last delivery history of the study subject with normal delivery or delivery with intervention. The data were collected by maternal and child health book. The measurement scale was categorical.

Delivery complication was a health problem faced by the mother during the last delivery process that could interfere or threaten the maternal and baby health. The data were collected by maternal and child health book. The measurement scale was categorical.

Pregnancy status was a condition of pregnancy planned or unintended by the mother outside the expectation of the mother for a reason whose existence was unintended by either party or other party. The data were

collected by questionnaire. The measurement scale was categorical.

Marital satisfaction was feeling that was felt by the couple. It depended on the satisfaction level where the marriage was in accordance with the needs and expectations indicated by the value of the Dyad Adjustment Scale (DAS). The measurement scale was continuous and transformed into dichotomous.

5. Data Analysis

The univariate data analysis was categorized according to the data scale. The bivariate analysis used the Chi-Square test and the calculation of Odd Ratio (OR) with a 95% confidence level. Multivariate analysis used a multilevel multiple logistic regression run on Stata 13.

6. Research Ethic

Research ethics consisted of informed consent form, anonymity, confidentiality, and ethical clearance. Ethical clearance in this study came from the Health Research Ethics Committee of Dr. Moewardi Hospital, Surakarta, Indonesia. Number: 991/VIII/HREC-/2019.

RESULTS

1. Sample Characteristics

The description of the sample of categorical data sample explained the continuous data of each study variable including age, parity, traditional treatment, marital satisfaction, and postpartum depression.

The analysis results of the description of continuous data sample were shown in table 1.

Table 1. Sample characteristics with continuous data

Variable	n	Mean	SD	Min.	Max.
Age (year)	200	31.34	6.90	18	45
Parity	200	1.78	0.90	1	5
Traditional treatment	200	6.15	1.85	4	12
Marital satisfaction	200	117.8	13.81	78	146
Postpartum Depression	200	8.58	3.49	2	19

2. Univariate analysis

Table 2 shows that there were 95 postpartum mothers (47.5%) who conducted traditional treatment were and 105 postpartum mothers

(52.5%) who did not conduct traditional treatment. There were 94 postpartum mothers (47%) aged <35 years and 106 postpartum mothers (53%) aged ≥35 years.

Table 2. The description of the study variables with categorical data

No	Variable	n	Percentage %
1	Traditional Treatment		
	Non-traditional treatment (<Mean)	95	47.5
	Traditional treatment (≥ Mean)	105	52.5
2	Age		
	< 35 years	94	47
	≥ 35 years	106	53
3	Education		
	Low (< SHS)	165	82.5
	High (≥ SHS)	35	17.5
4	Family Income		
	Inadequate (< Rp 1,701,000)	127	63.5
	Adequate (≥ Rp 1,701,000)	73	36.5
5	Parity		
	Primipara (child < 2)	96	48
	Multipara (child ≥ 2)	104	52
6	Pregnancy Status		
	Intended	165	82.5
	Unintended	35	17.5
7	Type of delivery		
	Normal	132	66
	With intervention	68	34
8	Delivery complication		
	Non-complication	88	44
	Complication	112	56
9	Marital satisfaction		
	Unhappy (< 115)	87	43.5
	Happy (≥ 115)	113	56.5
10	Postpartum Depression		
	Non-depressed (< 10)	116	58
	Depressed (≥ 10)	84	42

The number of postpartum mothers with inadequate income (<Rp 1,701,000) was 127 people (63.5%) and 73 people (36.5%) with adequate income (≥Rp 1,701,000).

The number of postpartum mothers with multipara was 104 people (52%) and 96 people (48%) with primipara.

The number of postpartum mothers with an intended pregnancy was 165 people (82.5%) and 35 people (17.5%) with unintended pregnancy.

The number of postpartum mothers who gave birth with complications was 112

people (56%) and 88 people (44%) without complication. Postpartum mothers who gave birth normally was 132 people (66%) and 68 people (34%) with intervention.

The number of postpartum mothers who were happy with their marriage was 113 people (56.5%) and 87 people (43.5%) who were unhappy with their marriages.

The number of postpartum mothers who did not experience postpartum depression was 116 people (58%), and 84 people (42%) who experienced postpartum depression.

3. The result of bivariate analysis

Table 3 shows that the women who did not conduct traditional treatment had possibility of experiencing depression by 0.46 times (OR=0.46; p=0.001). The women aged ≥35 years had possibility of experiencing depression by 1.86 times (OR=1.86; p=0.032). The

women with low education had possibility of experiencing postpartum depression by 0.90 times (OR= 0.90; p= 0.792). The women with inadequate income (<Rp 1,701,000) had possibility of experiencing postpartum depression by 0.13 times (≥Rp 1,701,000) (OR= 0.13; p<0.001).

Table 3. The Chi-square test of the effect of traditional treatment and contextual determinant of delivery place on postpartum depression

Independent variables	Non-depressed		Depressed		OR	p
	n= 116	%	n= 84	%		
Traditional treatment						
Non-treatment (< Mean)	46	48.5	49	51.5	0.46	0.009
Treatment (≥Mean)	70	66.7	35	33.3		
Age						
< 35 years	62	65.9	32	34.1	1.86	0.032
≥ 35 years	54	50.9	52	49.1		
Education						
Low (<Senior high school)	95	57.6	70	42.4	0.90	0.792
High (≥Senior high school)	21	60	14	40		
Family income						
Inadequate (< Rp 1,701,000)	54	42.5	73	57.5	0.13	< 0.001
Adequate (≥ Rp 1,701,000)	62	84.9	11	15.1		
Parity						
Primipara (children < 2)	50	52.1	46	47.9	0.62	0.103
Multipara (children ≥ 2)	66	63.5	38	36.5		
Pregnancy status						
Unintended	15	42.9	20	57.1	0.47	0.046
Intended	101	61.3	64	38.7		
Type of delivery						
Normal	93	70.5	39	29.5	4.66	< 0.001
With intervention	23	33.8	45	66.2		
Delivery complication						
Non-complication	77	87.5	11	12.5	13.10	< 0.001
Complication	39	34.8	73	65.2		
Marital satisfaction						
Unhappy (< 115)	41	47.2	46	52.8	0.45	0.006
Happy (≥ 115)	75	66.4	38	33.6		

4. The result of multilevel analysis

Table 4 shows that the postpartum mothers who conducted traditional treatment had logood of experiencing postpartum depression 1.33 units lower than women who did not conducted traditional treatment (b= -

1.33; 95% CI= -2.51 to -0.15; p=0.027). There was an effect of age (≥35 years) on postpartum depression, but it was statistically non-significant (b= 0.93; 95% CI= -0.20 to 2.07; p=0.109). Women with education ≥Senior high school had logood of experiencing post-

partum depression 1.98 units lower than those with education <Senior high school (b= -1.98; 95% CI= -3.59 to -0.38; p=0.015).

Postpartum mothers with family income ≥Rp 1,701,000 had logodd of experiencing postpartum depression 3.55 units lower than those with income <Rp 1,701,000 (b= -3.55; 95% CI= -5.08 to -2.02; p<0.001).

Multiparous women had logodd of experiencing postpartum depression 1.25 units lower than primiparous (b= -1.25; 95% CI= -2.45 to -0.04; p=0.041).

Women with intended pregnancy status had logodd of experiencing postpartum depression 3.77 units lower than those with unintended pregnancy (b= -3.11; 95% CI= -4.96 to -1.25; p= 0.001). Women who delive-

red with intervention had logodd of experiencing postpartum depression 3.30 units higher than the women who delivered normally (b= 3.30; 95% CI= 1.57 to 5.02; p<0.001). Women who delivered with complication had logodd of experiencing postpartum depression 3.77 units higher than the women who delivered normally (b= 3.77; 95% CI= 2.25 to 5.28; p<0.001).

Women with happy marriage had log-odd of experiencing postpartum depression 1.18 units lower than the mothers with unhappy marriage (b= -1.18; 95% CI= -2.30 to -0.05; p= 0.039). Delivery place had strong contextual effect on postpartum depression with ICC= 31.6%.

Table 4. The result of multilevel logistic regression analysis of the effect of traditional treatment and contextual determinant of delivery place on postpartum depression

Independent Variable	b	95% CI		p
		Lower Limit	Upper Limit	
Fixed effect				
Traditional treatment (Yes)	-1.33	-2.51	-0.15	0.027
Age (≥ 35 years)	0.93	-0.20	2.07	0.109
Education (≥ SHS)	-1.98	-3.59	-0.38	0.015
Income (≥ Rp 1,701,00)	-3.55	-5.08	-2.02	<0.001
Parity (≥ 2)	-1.25	-2.45	-0.04	0.041
Pregnancy status (Intended)	-3.11	-4.96	-1.25	0.001
Complication (Yes)	3.77	2.25	5.28	<0.001
Type of delivery (Intervention)	3.30	1.57	5.02	<0.001
Marital satisfaction (Happy)	-1.18	-2.30	-0.05	0.039
Random effect				
Delivery place				
Var (Constant)	1.52	0.31	7.28	
N= 200				
Log likelihood= -61.18				
LR Test vs linier regression, p= 0.014				
Intraclass Correlation (ICC)= 31.6%				

DISCUSSION

1. The effect of traditional treatment on postpartum depression

The result of the analysis showed that the postpartum mothers who conducted traditional treatment had the lower risk of expe-

riencing postpartum depression compared to the mothers who did not conduct traditional treatment.

The postpartum mothers who used traditional practice showed lower rate of postpartum depression compared to those

who did not use traditional practice (Demirel et al., 2018). Various types of plants were traditionally used for treatment by postpartum mothers (Jamal et al., 2011). Herbal and pilis usually consist of several herbal plants such as; turmeric, meniran, liquorice, lempuyang, temulawak, bangle, and binahong. Pilis is used outside the body (Aziz, 2017). Those plants are important sources of phenolic compounds such as flavonoids which have role as antioxidants (Fitriana et al., 2018). Stagen is used as a reason for culture or hereditary habits. The benefits are good for the body, such as making the body look slim, reducing back pain, and making the body feel comfortable (Rahayu, 2018). Doing massage treatment after delivery is one of the therapies that can be applied in postpartum care because it can increase relaxation, reduce stress, and accelerate hormonal balance after delivery.

The practice of appropriate traditional body massage allows for accelerating the recovery of the puerperium (Aizar, 2018). Providing assistance from families in using various traditional treatments is a form of support that will increase maternal self-confidence and psychology during puerperium.

2. The effect of age on postpartum depression

The result of the study showed that there was an effect of age on postpartum depression, but it was statically non-significant.

At any age, a woman who gave birth is not at risk of experiencing postpartum depression, both at the reproductive and risky age (Wahyuni, 2014). The result of this study is in line with a study that states that maternal age and marital status were not associated with postpartum depression (Pham et al., 2017). Age does not affect the incidence of postpartum depression. However, other researcher argues that there was a significant association between age and the incidence of post-

partum depression (Kim, 2018). Giving birth at the risky age is very vulnerable of causing postpartum depression. However, other factors that can affect the incidence of postpartum depression need to be considered, such as pregnancy status, complications during labor, and type of delivery.

3. The effect of education on postpartum depression

The result of the study showed that the women with high education had lower risk of experiencing postpartum depression compared to the women with low education.

Education could be associated with the incidence of postpartum depression (Kim, 2018). Education could affect a person's subjective experience and acceptance of depressive symptoms. Therefore, it could postpone the occurrence of symptoms of psychiatric disorder (Pham et al., 2017). Women with low educational status could not think logically and make decisions both emotionally and economically (Gupta et al., 2013). Higher education will encourage a mother to get a lot of information related to problems faced during puerperium. Mothers with higher education usually have prepared everything before pregnancy to delivery (Kurniasari, 2015).

4. The effect of income on postpartum depression

The result of this study showed that the postpartum mothers with adequate family income (\geq Rp 1,701,000) had lower risk of experiencing postpartum depression compared to the postpartum mothers with inadequate income ($<$ Rp 1,701,000). Based on the result of a systematic review of a study, one of the risk factors for postpartum depression was financial and socio-environmental pressure (Gelaye et al., 2016). Families who have new family member will be burdened in meeting their daily needs. It could cause stress, thus affecting the behavior of parents.

As a result, they were difficult to carry out their new roles (Putriarsih, 2017).

Regarding income, it is possible for a woman to work in meeting the family needs. A woman who worked more than 7 hours per day was most likely to have depression during puerperium (Hahnholbrook, 2018). It shows that family income will affect the number of needs of each family member.

5. The effect of parity on postpartum depression

The result of the study showed that multiparous women had lower risk of experiencing postpartum depression compared to primiparous women.

Mothers with multiparous status could reduce 2.59 times the incidence of postpartum depression compared to mother with primiparous status (Jannah, 2019). Other causes of depression can arise from a woman who has an unplanned pregnancy, thus burdening herself due to her pregnancy. In addition, the risk factor for postpartum depression was greater (Wijayanti et al, 2013).

6. The effect of pregnancy status on postpartum depression

The result of the study showed that there was a negative effect of complication on postpartum depression. The result was statistically significant. The women with intended pregnancy status had lower risk of experiencing postpartum depression compared to the women with unintended pregnancy status. Unintended pregnancy had higher possibility of experiencing postpartum depression by 1.69 units compared to intended pregnancy (Turkcapar et al., 2015).

This study is in line with the result of the study (Ria, 2018). It could be caused by many factors, including pre-pregnancy depression condition, marital status, poverty, and low social support (Abbasi et al., 2013). Psychologically, women who deliver with intended pregnancy status will help and in-

crease the confidence to carry out their role as parents.

7. The effect of type of delivery on postpartum depression

The result of the study showed that there was a positive effect of type of delivery on postpartum depression. The result was statistically significant. The women who delivered with intervention had higher risk of experiencing postpartum depression compared to the women who delivered normally.

One of the factors found as a risk of postpartum depression was delivery with a tool or intervention, such as; cesarean section delivery, the use of general anesthesia, kristeller maneuver, third or fourth degree perennial tears, and manual intervention that was carried out to discharge the placenta (Martínez et al., 2019).

Postpartum depression occurred in the majority of study subjects who had cesarean section delivery compared to those who delivered by vaginal delivery (Kim, 2018). Section cesarean and cesarean emergency section could increase the risk of postpartum depression (Xu et al., 2017).

On the average, mother who delivered with intervention would feel pain for some time. The pain and discomfort after delivery would inhibit the mother's activities, so that the mother could not take care of herself or her baby optimally.

8. The effect of delivery complication on postpartum depression

The result of this study indicated that there was a positive effect of complication on postpartum depression. The result was statistically significant. The women who delivered with complication had higher risk of experiencing postpartum depression compared to the women who delivered normally. Various kinds of complications can occur in the mother during delivery process. A study stated that peripartum hysterectomy, premature birth, solutio placentae, pre-eclampsia, can

increase the likelihood of postpartum depression (Youn et al., 2017).

Women who had a complication history during delivery were 10.7 times more likely to have postpartum depression (Agarwala et al., 2018). Mothers who experienced premature rupture of membranes had 6 times higher risk and obstructed labor had 5.7 times higher risk of experiencing postpartum depression (Idaiani, 2012). The complication during delivery process will be an experience that will always be remembered and imprinted on a woman's psychic.

9. The effect of marital satisfaction on postpartum depression

The result of the study showed that there was a negative effect of the marital satisfaction on postpartum depression. The result was statistically significant. The women who had happy marriage had lower risk of experiencing postpartum depression compared to mothers who had unhappy marriage.

Depressed women reported their poor marital relationship status. This was a strong cause for the incidence of postpartum depression (Kirpinar et al., 2010). In line with the study, the women who had a bad relationship with their spouses had risk of experiencing postpartum depression by 2 times higher than the women who had a good relationship with their spouses (Bhusal, 2018).

Poor quality of marital life was the same as marital dissatisfaction (Nurbaeti et al., 2019). A good relationship with a spouse would inhibit the negative effects that caused stress and increased the sense of life satisfaction after delivery (Gebuza et al., 2016). Having problem with other family members is one of the factors in marital dissatisfaction. Women who lived with their mothers' in-law were more likely to experience depression compared to women who lived only with their husbands (Wang et al., 2017).

10. The contextual effect of delivery place on postpartum depression

The result of the study showed that there was a variety of score in each delivery place. Sleman Regency has 7 public hospitals, 21 private hospitals, 25 community health centers (10 of them are equipped with inpatient facilities), and 74 places of Independent Practice Midwives (Sleman Health Office, 2018). The large number of health facilities make it possible to provide the best services in every health service place. As a result, patients feel comfortable and safe while in the facility.

The diagnosis of depression is often missed in the practice of primary care. One of the reasons was from low screening (Hackley et al., 2010). Women who had negative interaction with health workers and or felt insecure during their labor had higher risk of experiencing postpartum depression (Pham et al., 2017).

AUTHOR CONTRIBUTION

Selvia Febrianti was the main author who conducted the study, formulated the article of the study, and processed the data. Didik Gunawan played a role in the method and result of the study. Uki Retno Budihastuti played a role in the background and discussion of the study.

CONFLICT OF INTEREST

There was no conflict of interest.

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