The influence of family function, social support, and infants' health on mothers' postnatal depression in three months after birth

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Abstract: In the postnatal period, mothers face the challenge of adjusting to new roles and responsibilities, which can lead to increased stress and a risk of developing postpartum depression. This study explores the relationship between maternal characteristics, family functioning, social support, infant health, and postpartum depression. Data were obtained through a Family Function (*Fungsi-Ga*) questionnaire, the Multidimensional Scale of Perceived Social Support (MSPSS), and the Edinburgh Postnatal Depression Scale (EPDS) from 150 mothers of three-month-old babies. The analysis was conducted using uses PLS-SEM (Partial Least Squares-Structural Equation Model). The research results show that the model of postnatal depression formed is fit (goodness of fit .252). Social support has direct (β= -.170) and indirect negative effects on postnatal depression through family functioning and babies' health (β= -.186). The family function has a direct negative effect (β= -.395) and an indirect one through babies' health on postnatal depression (β= -.280), while babies' health has a negative effect on such depression (β= -.301). The results of the research imply that education for mothers on social support, family functioning, and how to care for newborns, which helps ensure that babies' health is optimal, is critical in reducing the risk of postnatal depression, especially in the first three postnatal months.

Keywords: family function; infant's health; postnatal depression; postpartum; social support

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Introduction

Birth is a significant event for most families, with the following period known as the postnatal period. During this time, mothers need to make various adjustments and adaptations to accept the presence of a new member in the family. After the birth process, some mothers may feel burdened by their responsibility for their baby and family. If this situation is not treated immediately, it could cause stress and postnatal depression (Mohammad et al., 2021; Sari & Permata, 2021). This period is a vulnerable one for babies, as they are very dependent on the mother as the primary giver of care, affection, social interaction, and nutritional needs to support their accelerated growth and development. However, research has revealed that maternal depression has a significant relationship with the incidence of stunted toddlers (Apriliana et al., 2022).

Postnatal depression indirectly interferes with the mother's parenting practices (Sari & Permata, 2021). It can harm a baby's nutritional needs and linear growth (Farías-Antúnez et al., 2018); disrupt their attachment to their mother, and hinder the development of cognitive, motor, and behavioral skills (Oyetunji & Chandra, 2020). Postnatal depression can affect a mother's sensitive, responsive parenting, meaning they may not recognize and respond to signals given by their babies, thus influencing the child's growth.

Based on data 2022 from a Study of Indonesian Nutritional Status (SINS), the prevalence of stunting in Bogor was 18.7% (Badan Kebijakan Pembangunan Kesehatan, 2022). According to the World Health Organization (WHO), children who suffer from stunting, a growth and development condition, often have low levels of nutrition, suffer frequent illnesses, and receive little psychosocial stimulation (Ruswanti et al., 2021). Such a situation clearly puts the baby at risk of being unable to grow and develop optimally.

The first year of a baby's life is vitally important; during this period, they are still very dependent on their mother as the primary caregiver. According to psychosocial development theory, this first year is critical for developing a sense of trust (Erikson, 1968). If this fails to form, then a sense of mistrust will be embedded in the child (Sunarti et al., 2023). A sense of trust is an essential foundation for a child's psychosocial development to the next stage of their life (Hastuti, 2024). Such trust and mistrust phases will pass well if the baby has a responsive, reliable, consistent caregiver and positive environment. In this way, babies will believe their basic needs are met (Braaten, 2018).

A safe mother-infant relationship facilitates positive social and emotional adaptation throughout the child's life and is essential for their mental health (Mazúchová et al., 2020). The bond between mother and baby develops from the prenatal period up until the birth phase (Karakoça & Ozkanb, 2017). The postnatal phase is a sensitive phase of motherhood in the formation of a strong bond between mother and baby. This corresponds to Bowlby's attachment theory, which emphasizes the importance of close mother-infant relationships from the moment of birth (Hastuti, 2024). Furthermore, in the first month, mothers can improve the quality of their relationship with their baby by smiling, touching, talking, telling stories, listening to music, or using simple games that can build the baby's nerve-brain connections (WHO, 2018).

Postnatal depression has a significant relationship with the incidence of stunted toddlers (Apriliana et al., 2022), having an effect on adverse birth outcomes and malnutrition (Dadi et al., 2022). Another study conducted by Drysdale et al. (2021) found that mothers who experience postnatal depression have higher risk of having children with poor nutritional status. It can also reduce mothers' appetite, meaning that the nutritional intake received by the child through breast milk becomes

inadequate (Astuti et al., 2023). The mental health of mothers and children is an investment in the future of the nation, especially that of mothers who have just given birth.

Globally, one in five women will experience mental health problems during pregnancy and in the first year of raising their child. Data of 2021 also show that five out of 100 mothers will continue to experience serious mental health problems. In fact, around 2-4 per 1000 women who have given birth need to receive hospital treatment for mental health problems. In Bogor in 2018, 29% of pregnant women experienced mental and emotional problems, while 18.6% of mothers suffered from postnatal depression after giving birth (Idaiani et al., 2018). In 2021, the incidence of such depression in Bogor City remained relatively high, at 28% (Handayani & Supliyani, 2021). If the condition is not treated effectively, it can develop into postnatal psychosis (Palupi, 2020; Sari & Permata, 2021). Data from National Scale Research for Cool Indonesian Women also show that 50-70% of mothers in Indonesia experience symptoms of 'baby blues' or depression after giving birth. For this reason, it is essential to assess postnatal depression in mothers so that it can be treated early to reduce the negative impact on the child's development (Farías-Antúnez et al., 2018). Such depression significantly impacts a baby's physical and cognitive development in terms of nutrition, temperament, bonding, and mental health following the initial three-month period.

Previous studies have found that many factors influence postnatal depression, such as family function (Guan et al., 2021; Qin et al., 2022). This refers to the ability of the family to perform multiple tasks to provide conditions for the healthy development of family members. It concerns the usefulness of the family, as demonstrated by the activities it performs at any time throughout family life, thus manifesting the structure and status of the family as the primary and main institution for quality human development and as the foundation of civil society (Sunarti, 2024).

The family has the responsibility to protect itself from changes that occur and to adapt during times of crisis. The inability to adapt to changes can lead to the destruction of the family system itself. The optimal implementation of family activities can support the achievement of human resources and the family unit (Herawati et al., 2020). Family well-being is evident if it can optimize the implementation of its functions.

Another factor that influences postnatal depression is social support. Its effect at the beginning of labor is .22, which tends to increase to .52 six months after giving birth (Milgrom et al., 2019). Social support, including positive support from family and friends, improves parenting skills by providing incentives and resources during role transitions, such as postpartum (Gaspar et al., 2022). Lack of social support during the perinatal period can put mothers at risk of postnatal depression (Recto & Champion, 2020). It includes expressions of empathy, care, and concern for the mother, appreciation, informative support, and instrumental support (Cahyani et al., 2019). Social support may influence postpartum depression and adverse pregnancy outcomes (Barr & Caruso-Mcevoy, 2018).

The effect of depression on birth outcomes and perinatal depression is adverse to infant health outcomes, and so is the opposite effect. Mothers who have depression face the risk of adverse infant health outcomes, such as malnutrition and infant illness (Dadi et al., 2022).

The results of another study showed that the determining factors of postnatal blues were age, salary, education, occupation, type of work, husband's support, pregnancy status, and baby's health (Kurniawati & Septiyono, 2022). This study aims to analyze the factors that have a direct or indirect effect on mothers' postnatal depression in Bogor.

Our study differs from previous research in that it aims to develop an SEM model that can predict the incidence of postnatal depression while also examining the direct and indirect influence of the variables involved. It is hypothesized that there are direct or indirect influences of social support, family function, and babies' health on postnatal depression. Babies' health is a mediating variable between family function and postnatal depression.

Methods

Design

The study adopts a cross-sectional design, focusing on Bogor City, Indonesia, specifically the Community Health Center and Independent Midwife Practice. Data collection was conducted from September to December 2023.

Respondents

In data analyzed using structural equation modeling (SEM), if the sample size is too large, then the model will be very sensitive, making it difficult to obtain goodness of fit. Therefore, it is recommended that the sample be 5-10 times the number of latent variables; according to Ghozali & Kusumadewi, the sample for using SEM data analysis should be a minimum of 100 (Ghozali & Kusumadewi, 2023) (see Table 1). This research,

therefore involved 150 mothers with three-month-old babies as respondents.

The sampling technique used was simple random sampling. The inclusion criteria were that the family was intact (complete family member) and the baby was with the mother and family. In contrast, the exclusion criteria were if the mother could not read or write, did not have the MCH (Maternal and Child Health) book, or if the baby had congenital malformations.

Research Instruments

Primary data collection was made using a standardized questionnaire. Instrument testing was conducted, with the results being valid and reliable. Family function was measured using the *Fungsi-Ga*[1] instrument, which measures the intensity of family functioning using a semantic scale of 1-7 (low to high intensity) (Sunarti, 2024). *Fungsi-Ga* has 30 question items consisting of two dimensions, internal and external functions, with a Cronbach's alpha value of .999.

Social support was examined using the Multidimensional Scale of Perceived Social Support (MSPSS) instrument (Zimet et al., 1988), based on a semantic scale of 1-7 (low to high intensity), and consisting of 12 statement items, including dimensions social support of husband, friends, and family. Cronbach's alpha was .956.

Table 1

Research Sampling Frame

Districts of Bogor City	Number of Samples
West Bogor District	41
South Bogor District	34
North Bogor District	34
Tanah Sareal District	41
Total	150

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[1] *Fungsi-Ga = Fungsi Keluarga* (Family Function).

Family function and social support were categorized using the index: an index of .00 - .19 was categorized as very low; one of .20 -.49 as low; of .50 - .79 as sufficient; and an index of .80 - 1.00 categorized as high.

Postnatal depression was measured using the EDPS-Edinburgh postnatal depression scale tool (Cox et al., 1987), with each item given a score of 0-3 depending on the respondent's option selection. It consisted of 10 statements regarding the mother's feelings in the past seven days, with Cronbach's alpha of .878. A total score through below 10 meant the mother was not depressed, while one above 10 indicated that she had postnatal depression.

Respondent characteristics were measured by a separate questionnaire, with infants' health measured by how often the baby had been sick in the previous three months.

Research Procedures

The researchers followed ethical principles and obtained ethical approval from the IPB Ethical Commission, No. 1079/IT3.KEPMSM/SK/2023. Data were obtained from structured interviews using a questionnaire that had been tested for validity and reliability. To ensure the accuracy of the babies' health measurement, the researchers also took data from the MCH (Maternal and Child Health) book, which was compiled when the baby was in contact with health workers and which describes the baby's condition.

Analysis

Data analysis was performed using PLS-SEM (partial least squares-structural equation modeling) to check the model and determine the direct and indirect influence between the variables.

Results

Table 2 shows that the characteristics of the respondents were as follows. The mothers had sufficient family function (31.3%) and high social support (55.3%); 22.7% experienced postnatal depression; and most mothers and fathers' education was to senior high school level. 48.6% were in marriages less than five years old; 84% of the mothers were housewives; 50.7% of the fathers worked freelance; 46.7% of families were below the poverty line; 94% of the last infants were born normally; 88.7% were mature with a birth weight of between 2500-4000 g; 66.7% received breastfeeding exclusively; and most infants had never been sick.

Table 3 shows that mothers who experience postnatal depression have lower levels of education, as do their husbands, lower family functioning and social support, and infants who become sick more often compared to mothers who are not depressed. Moreover, the group of mothers with postnatal depression tended to have a lower family income and a shorter period of exclusive breastfeeding.

In Table 4, it can be seen that three variables significantly affected postnatal depression: mother education, p= .029; exclusive breastfeeding, p= .021; and infant's health, p= .006.

Model Fit Test

To validate the fitness model, goodness of fit was used to evaluate the measurement and structural models, which is a simple measurement for model predictions. Based on the SRMR criteria < .10; d_ULS and d_G values .127-.101; Chi-square > .05; NFI > .90 and RMS Theta < .102. However, the NFI value can be categorized using the GoF value criterion, namely .10 (GoF small), .25 (GoF medium) and .36 (GoF large). In this study, the convergent validity test value of the model is seen from AVE and Communality, with a value of > .5; cross loading value > .5, composite reliability > .7; Cronbach's alpha > .6; standardized root mean square residual (SRMR) .059; and normed fit index (NFI) .905.

Figure 1 shows the SEM model, which was fit, with a goodness of fit value of .252 (good fit). The

figure also shows the path coefficient value between the variables. The significant path values are the correlation between family function and postnatal depression; infant health and postnatal depression; and social support and postnatal depression. For more detailed directions of influence, see Table 5.

Table 2

Respondent Characteristics (N=150)

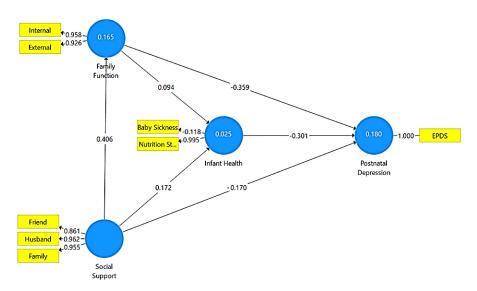| No		Variable	N	%
1	Mother's Education	Elementary School	40	26.7
		Junior High School	33	22
		High school	49	32.7
		College	28	18.7
2	Father's Education	Elementary School	34	22.7
		Junior High School	20	13.3
		High school	68	45.3
		College	28	18.7
3	Length of Marriage	=<5 years	73	48.6
		6-10 years	42	28
		> 10 years	35	23.3
4	Mother's Occupation	Housewife	126	84
		Working	24	16
5	Father's Occupation	Freelance	76	50.7
		Private Sector	51	34
		Government employee	6	4
		Businessman	17	11.3
6	Family Income	Below the poverty line	70	46.7
		Above the poverty line	80	53.3
7	Type of Childbirth	Caesarian section	63	42
		Normal	87	58
8	Infant's Maturity	Premature	7	4.7
		Postmature	2	1.3
		Mature	141	94
9	Infant's Birth Weight	BBLR	14	9.3
		Normal	133	88.7
		Makrosomia	3	2
10	Breastfeeding	Non-Exclusive	50	33.3
		Exclusive	100	66.7
11	Family Function	Low	28	18.7
		Sufficient	47	31.3
		Hight	75	50
12	Social Support	Very Low	2	1.3
		Low	26	17.3
		Sufficient	39	26
		High	83	55.3
13	Infant's Health	Sick more than three times	5	3.3
		Sick two or three times	19	12.7
		Sick once	55	36.7
		Never sick	71	47.3
14	Postnatal Depression	Normal	116	77.3
		Depression Risk	34	22.7

Table 3

Distribution of Respondents Based on Postnatal Depression

No	Variable		Postnatal Depression	
			Depression	Normal
1	Mother's Education	Min-Max	6-16	6-16
		Mean ± Standard Deviation	9.35±4.898	10.85±3.391
2	Father's Education	Min-Max	6-16	6-16
		Mean ± Standard Deviation	10.06±3.348	11.26±3.350
3	Length of Marriage	Min-Max	1-16	1-16
		Mean ± Standard Deviation	5.35±4.898	3±3.391
4	Family Income	Min-Max	120.000-5.166.667	120.000-5.500.000
		Mean ± Standard Deviation	769.453±1.005.793	925.465±924.395
5	Infant's Maturity	Min-Max	34-42	36-42
		Mean ± Standard Deviation	38.47±1,813	38.78±1.141
6	Baby's Birth Weight	Min-Max	1900-4100	2500-4000
		Mean ± Standard Deviation	2400±1530	3246±1830
7	Breastfeeding	Min-Max	0-3	0-3
		Mean ± Standard Deviation	2.03±1.114	2.49±.98
8	Family Function	Min-Max	0.29-1	0.27-1
		Mean ± Standard Deviation	.77±.221	.78±.197
9	Social Support	Min-Max	0.5-1	0.6-1
		Mean ± Standard Deviation	.35±.489	.85±.291
10	Infant's Health	Min-Max	0-3	0-3
		Mean ± Standard Deviation	1.94±.919	.69±.817

Table 4

Influence of Respondents' Characteristics on Postnatal Depression Risk

No.	Variable		Postnatal Depression				Total		P
			Depression		Normal				
			N	%	n	%	N	%	
1	Mother's Education	Elementary School	16	47.1	24	20.7	40	26.7	
		Junior High School	6	17.6	27	23.3	33	22.0	.029
		High school	7	20.6	42	36.2	49	32.7	
		College	5	14.7	23	19.8	28	18.7	
2	Father's Education	Elementary School	12	35.3	22	19.0	34	22.7	
		Junior High School	2	5.9	18	15.5	20	13.3	.078
		High school	17	50.0	51	44.0	68	45.3	
		College	3	8.8	25	21.6	28	18.7	
3	Length of Marriage	=<5 years	16	47.0	57	49.1	73	48.6	
		6-10 years	6	17.6	36	31.0	42	28.0	.120
		> 10 years	12	35.2	23	19.8	35	23.3	
4	Mother's Occupation	Housewife	32	94.1	94	81.0	126	84.0	
		Working	2	5.9	22	19.0	24	16.0	.085
5	Family Poverty	Poverty	17	50.0	53	45.7	70	46.7	
		Non-Poverty	17	50.0	63	54.3	80	53.3	.113
6	Type of Childbirth	Caesarean section	18	52.9	45	38.8	63	42,0	
		Normal	16	47.1	71	61.2	87	58,0	.144
7	Infant's Maturity	Premature	4	11.8	3	2.6	7	4.7	
		Postmature	1	2.9	1	0.9	2	1.3	.081
		Mature	29	85.3	112	96.6	141	94.0	
8	Baby Birth Weight	BBLR	6	17.6	8	6.9	14	9.3	
		Normal	28	82.4	105	90.5	133	88.7	.205
		Makrosomia	0	0.0	3	2.6	3	2.0	
9	Exclusive Breastfeeding	Non-Exclusive	17	50.0	33	28.4	50	33.3	
		Exclusive	17	50.0	83	71.6	100	66.7	.021
10	Infant's Health	Sick more than three times	0	0,0	5	4,3	5	3,3	
		Sick two or three times	11	32,4	8	6,9	19	12,7	.006
		Sick once	9	26,5	46	39,7	55	36,7	
		Never sick	14	41,2	57	49,1	71	47,3	
		Total	34	22.7	116	77.3	150		

Figure 1

SEM Measurement Results

Note. Latent variables meet the requirements for an AVE (average variance extracted) of > .5; composite reliability > .6; SRMSR (standardized root mean square residual) < .08; outer loading > .5; and GoF (goodness of fit) .252.

Table 5

Direction of Influences

Direction of Influence	Direct effect	Indirect effect	Total Effect
Family Function → Infant Health	.094	-	.094
Family Function →Postnatal Depression	-.359*	-.280*	-.331*
Infant Health → Postnatal Depression	-.301*	-	-.301*
Social Support → Family Function	.406*	-	.406*
Social Support → Infant Health	.172	.038	.134
Social Support →Postnatal Depression	-.170*	-.186*	-.016

Note. *) Sig, p < .05*, analyzed by PLS-SEM, confidence interval 95%. Direct effect: direct influence between variables. Indirect effect: the influence of a variable indirectly through other variables. Total effect: the combined influence of direct and indirect effects.

Table 5 indicates that social support has a significant negative effect on postnatal depression through family function and infant health of -.186. The greater the social support the mother receives, the healthier the baby will be and the lower the levels of postnatal depression. Family function also has a significant negative effect on postnatal depression of -.280 through infant health. It has direct, indirect, and total effects on postnatal depression, with the most significant influence being the direct effect (β= -.359, p= .000). Direct and indirect social support has a significant negative influence on postnatal depression of (β= .170, p= .016) and (β= -.186, p= .001); the greater the social support the mother receives, the higher the reduction in the rate of postnatal depression. Infant health also has a significant negative effect on postnatal depression. The healthier the baby, as

evidenced by nutritional status and frequency of illness, the lower the possibility of depression.

Direct effects are the direct influence of a construct or exogenous latent variable on an endogenous latent variable. On the other hand, indirect effects are the indirect influence of a construct or exogenous latent variable on an endogenous latent variable through an endogenous intermediary variable. Total effects are the total influence, which results from adding together direct and indirect influences (Ghozali & Kusumadewi, 2023).

Discussion

In the study, the condition of postnatal maternal depression was shown to be influenced by family function. The results are also in line with those of the National Adolescent Mental Health Survey (I-NAMHS), which found that the majority (64.7%) of mental health disorder domains originate from the family (Wahdi et al., 2022).

The family is the closest environment to an individual and the primary institution for human development because it is within it that the main activities of an individual's life take place. Consequently, the functioning, resilience, and welfare of the family will determine the quality of an individual (Sunarti et al., 2023). The fulfillment of basic and family development tasks demonstrates family function. A successful family will function optimally to accommodate its members' basic needs and help them cope with and adjust to the environment (Dewi & Ginanjar, 2019). Family functions that parents perform well can influence other family members, especially children (Herawati et al., 2020).

Optimal implementation of family functions can support the realization of quality human and family resources. Family dysfunction and poverty can mean children may lose their fundamental rights, such as the best care from their parents, education, and access to health services (Anjarsari & Hartini, 2018). Family function significantly contributes to children's growth and development (Damanhur et al., 2022).

Herawati's research in 2020, which analyzed the influence of socio-economic characteristics and access to information on the implementation of eight family functions in Indonesia, shows that the religious, socio-cultural, compassionate, protective, socialization, and educational functions implemented, together with environmental development aspects, were categorized as good. Only the implementation of aspects of economic functions and reproduction were considered to be moderate, which suggests that families do not often perform these functions (Damanhur et al., 2022). Factors that significantly influence the implementation of family functioning are age, marital status, employment status, level of education, knowledge of family functions, and access to information. A family function that remains very minimal is the reproductive function (Herawati et al., 2020).

This function is related to the function of the family, which regulates healthy and planned reproduction so that the children born become the best quality future generations (BKKBN, 2017). According to Sunarti (2024), components related to reproductive functioning include flexible roles and tasks between husband and wife when the wife is pregnant, giving birth and breastfeeding; preparing support from the extended family if needed when the baby is delivered; and enjoying pregnancy, birth and breastfeeding happiness (Sunarti et al., 2023).

The results of the research also show that social support affects postnatal depression. The experience of becoming a parent, especially becoming a mother, is not always pleasant for families. The realization of the responsibilities as a mother after giving birth often creates stress for them (Palupi, 2020) and can be a risk factor in the occurrence of emotional, mental and behavioral problems. Some mothers are unable to adapt and suffer from psychological disorders and various

symptoms and diseases, referred to as postnatal depression by researchers and doctors. Lack of social support from family and friends, especially from the husband, during childbirth is strongly suspected as the cause of such depression (Sari & Permata, 2021).

Inappropriate social support received by mothers can be a risk factor for postnatal depression (Amna & Khairani, 2024), specifically, such support from the husband (p = .003) (Kurniawati & Septiyono, 2022). Women who have given birth benefit greatly from social support (Mohammad et al., 2021), but those with moderate or low social support are more likely to suffer from postnatal depression (OR = 1.78, 95% CI = 1.26–2.53; OR = 2.76, 95% CI = 1.56– 4.89) (Cho et al., 2022).

Such social support includes expressions of empathy, care, and concern for the person concerned, as well as appreciation, information, and instrumental support (Cahyani et al., 2019). It has been shown that it may influence postnatal depression and adverse pregnancy outcomes in low-income African American women (Barr & Caruso-Mcevoy, 2018).

The analysis findings indicate that a baby's health influences the mother's postnatal depression. The findings of this study align with Hermalinda et al.'s research, which shows a connection between parental anxiety and children's conditions (Herman et al., 2019). It also aligns with the results of Min et al.'s research, which show that infant illness is an essential factor in the risk of postnatal depression (Min et al., 2020).

Parents frequently encounter difficult situations in the course of their work, which can exacerbate anxiety, such as when a child is ill. Furthermore, when a family member is ill, they must perform a crucial duty somewhere else (Herman et al., 2019), mainly if this occurs with babies. It confirms Vishal et al's research findings, which indicate a 13-fold increased risk of postnatal depression in mothers whose newborns are ill

after delivery (Vishal et al., 2022). Therefore, it is essential to provide education about childcare to ensure that all requirements are met, that the baby can thrive and that the mothers' levels of depression are lowered. Postnatal depression was higher among women with a history of adverse birth and infant health outcomes (Dadi et al., 2020).

Knowing about the health and care of infants is important for the mother, for they can manage the symptoms of diseases that occur most often in babies and reduce the confusion and stress that mothers experience when faced with such problems. It will consequently help reduce the risk of postnatal depression. Therefore, there is a need for strategies to improve maternal health education, for example by trained community health workers, so that mothers can recognize and manage infant illness and behavior during the postnatal period (Min et al., 2020).

In this study, 22.7 percent of respondents experienced some form of postnatal depression. This percentage is in line with the prevalence of postnatal depression globally; around one in five women experience mental health problems during pregnancy and also in the first year of their baby's life. This prevalence is relatively high and can have an impact in various ways. Depression has also been shown to have detrimental effects on the health and well-being of all family members (Åberg Petersson et al., 2025).

Postnatal depression begins with the mother's stress after birth, then continues and cannot be affected positively by the mother. Based on the Diagnostic and Statistical Manual of Mental Disorders, such depression is categorized as a major depressive disorder whose symptoms can be measured during pregnancy and up to 4 weeks postnatally. Other studies have shown that the symptoms occur 6-14 months after delivery and include changes in mood, lack of appetite, changes in sleep patterns, and difficulty concentrating (Jones et al., 2019).

The risk of depression increases in the perinatal period. Depressed mothers at three months postnatal have been shown to be more likely to exhibit an anxiety disorder than nondepressed mothers at six months postnatal (Slomian et al., 2019). Untreated postnatal depression can have negative consequences on a child's development as well as interfering with mother-baby interactions. In their contact with their children, depressed mothers tend to react more negatively, which may harm the infant's language development and social and emotional growth during the first year of life, leading to insecure attachment by the time the child is 18 months old. Though its effects can differ, any postnatal depression substantially impacts the baby's physical and cognitive development, nutrition, bonding, temperament, and mental health following the initial three-month period (Oyetunji & Chandra, 2020).

The study findings indicate that mothers experiencing postnatal depression have adverse birth and infant health outcomes it is follow Dadi et al. research result (Dadi et al., 2020). Maternal knowledge about infant health plays a significant role in moderating the impact of maternal and infant illnesses on the risk of postnatal depression. Min et al.'s study shows that infant illness emerges as a crucial factor contributing to the risk of postnatal depression (Min et al., 2020).

However, regardless of the model developed, the results of the research indicate that one of the characteristics that influence postnatal depression is education. It aligns with other research, which has found that education has a significant effect on the incidence of postnatal depression, especially for mothers with a low level. Education influences knowledge and is crucial in shaping one's actions. A low education level is one factor that can increase postnatal depression because the absorption of related information during the postnatal period is also low (Kurniawati & Septiyono, 2022; Wang et al., 2011). It is reasonable to presume that a mother's knowledge and education correspond, with her level of education increasing with her level of knowledge. In this study, postnatal stress and depression are shown to be predicted by schooling. Given that, according to Nurfurqoni et al.'s research, education affects health behavior, this depression could arise because of how a mother thinks (Nurfurqoni et al., 2023).

The resulting research shows that another variable that influences postnatal depression and infant health is breastfeeding. Research shows that non-exclusive breastfeeding at three months is associated with postnatal maternal depression at 12 months (Farías-Antúnez et al., 2018). The physical and mental benefits of breastfeeding include reduced risk of disease transmission and improved cognitive and motor functioning, while drawbacks include obesity, respiratory illnesses, sudden infant death syndrome, necrotizing enterocolitis, and hypertension for the mother (Rahayuwati et al., 2020; Uwiringiyimana et al., 2019).

The relationship between postnatal depression and breastfeeding may be bidirectional. Such depression causes pain in the nipples, and less-than-optimal breastfeeding behavior by the seventh day causes postnatal depression to become worse. Farías-Antúnez et al.'s research results show that maternal mood symptoms during pregnancy are associated with non-exclusive breastfeeding at three months of age, which in turn is associated with postnatal maternal depression at 12 months of age (Farías-Antúnez et al., 2020).

The findings of this study underscore the critical importance of family function education in our society. Integrating such education into premarital programs is essential for building strong family foundations. Furthermore, equipping new mothers with knowledge about the care of their newborn baby is vital, not only for the healthy development of the infant but also for mitigating the risk of postnatal depression.

This study has a limitation in relying on the Edinburgh Postnatal Depression Scale (EPDS) to

assess postnatal depression risk, as it can't provide a final diagnosis. A full evaluation by a psychiatrist is needed for a clear diagnosis. The cross-sectional design also limits our ability to link infant health directly to maternal depression.

The study highlights the need for strong family support for mothers after birth, with health professionals providing education on infant care and first aid to reduce stress. Future research should involve closer collaboration with psychiatrists to ensure accurate diagnoses of depression in mothers.

Conclusion

This research offers valuable insights into the relationships between family functioning, social support, infant health, and postnatal depression three months after birth in Bogor City, Indonesia. A key finding of the study is the direct negative impact that an infant's health has on postnatal depression. It contrasts with previous research, which has generally indicated that postnatal depression adversely affects infant outcomes, including growth, development, and health.

The study conclusions are based on a goodness of fit partial least squares-structural equation modeling (PLS-SEM) model for assessing postnatal depression three months after the birth of a child. It was found that social support negatively affects postnatal depression, both directly and indirectly through family functioning and infant health.

Additionally, family functioning directly and indirectly negatively affects both infant health and postnatal depression. A healthier infant corresponds to a lower likelihood of experiencing depression. The research enhances our understanding of postnatal depression and details the development of interventions that focus on family dynamics, social support, and infant care, particularly during the first three months after birth.[]

Author Contribution Statement

Fuadah Ashri Nurfurqoni: Conceptualization; Data Curation; Investigation; Methodology; Project Administration; Resources; Writing Original Draft. **Dwi Hastuti:** Conceptualization; Formal Analysis; Investigation; Methodology; Validation; Review & Editing; Supervisor. **Euis Sunarti:** Conceptualization; Investigation; Methodology; Validation; Review & Editing; Supervisor. **Yulina Eva Riany:** Conceptualization; Investigation; Methodology; Validation; Review & Editing; Supervisor.

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