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HEMOGLOBIN, BODY MASS INDEX, AND POSTPARTUM BLUES BASED ON EPDS SCORES: A CLINICAL OBSERVATIONAL STUDY

Hemoglobin, Indeks Massa Tubuh, dan Postpartum Berdasarkan Skor EPDS: Studi Observasional Klinis

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ABSTRAK

Postpartum blues adalah masalah kesehatan mental yang umum dialami oleh ibu setelah melahirkan, ditandai dengan perubahan suasana hati, perasaan sedih, dan gejala depresi.Penelitian ini menganalisis pengaruh kadar hemoglobin (Hb) dan indeks massa tubuh (IMT) terhadap risiko postpartum blues pada ibu postpartum kondisi ini jika tidak dikenali dan ditangani dapat berkembang menjadi gangguan depresi postpartum yang lebih berat. Penelitian kuantitatif observasional ini dilakukan di BPM Ida Susila Lamongan. Populasi dalam penelitian ini adalah seluruh ibu postpartum yang datang kontrol 1–2 minggu pasca persalinan. Sampel terdiri dari 30 orang yang diambil menggunakan teknik purposive sampling. Kriteria inklusi mencakup ibu postpartum usia kehamilan cukup bulan (≥37 minggu), bersalin spontan, tidak memiliki riwayat gangguan mental, dan bersedia menjadi responden. Kriteria eksklusi mencakup ibu yang sedang menggunakan obat psikotropika atau memiliki komplikasi medis berat. Data dikumpulkan melalui kuesioner Edinburgh Postnatal Depression Scale (EPDS) dan rekam medis pasien, termasuk kadar Hb dan IMT.Hasil: Korelasi Pearson menunjukkan hubungan negatif yang kuat antara kadar Hb dan skor EPDS ($r = -0,781$, $p < 0,05$). Regresi linier menunjukkan bahwa Hb dan IMT secara signifikan mempengaruhi skor EPDS, dengan Hb memiliki pengaruh yang lebih besar.Korelasi Pearson antara BMI dan EPDS menunjukkan hubungan positif sedang ($r = 0.573$, $p < 0.05$).Kesimpulan: Tingkat Hb yang rendah dan BMI yang tinggi adalah faktor risiko untuk postpartum blues.Studi ini menekankan pentingnya menjaga kadar Hb dan BMI yang sehat untuk mencegah postpartum blues.

Kata kunci: *faktor risiko, indeks massa tubuh, kadar hemoglobin, postpartum blues, skor EPDS*

ABSTRACT

Postpartum blues was a common mental health issue experienced by mothers after childbirth, characterized by mood swings, feelings of sadness, and depressive symptoms. This study analyzes the influence of hemoglobin (Hb) levels and body mass index (BMI) on the risk of postpartum blues in postpartum mothers. If this condition is not recognized and addressed, it can develop into more severe postpartum depression. This

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observational quantitative study was conducted at BPM Ida Susila Lamongan. The population in this study consists of all postpartum mothers who come for a check-up 1–2 weeks after delivery. The sample consists of 30 individuals selected using a purposive sampling technique. Inclusion criteria include postpartum mothers with a term pregnancy (≥37 weeks), spontaneous delivery, no history of mental disorders, and willingness to participate as respondents. Exclusion criteria include mothers who are currently using psychotropic drugs or have severe medical complications. Data were collected through the Edinburgh Postnatal Depression Scale (EPDS) questionnaire and patient medical records, including Hb levels and BMI. Results: Pearson correlation showed a strong negative relationship between Hb levels and EPDS scores ($r = -0.781$, $p < 0.05$). Linear regression indicated that Hb and BMI significantly affect EPDS scores, with Hb having a greater influence. Pearson correlation between BMI and EPDS showed a moderate positive relationship ($r = 0.573$, $p < 0.05$). Conclusion: Low Hb levels and high BMI are risk factors for postpartum blues. This study emphasizes the importance of maintaining healthy Hb and BMI levels to prevent postpartum blues.

Keywords: *Body Mass Index, EPDS score, hemoglobin levels, postpartum blues, risk factor*

INTRODUCTION

The postpartum period is a critical phase for mothers after childbirth, marked by various physiological, psychological, and social changes[1]. One of the emotional disturbances that often occurs in mothers after childbirth is postpartum blues, a temporary condition characterized by mood swings, easy crying, anxiety, and fatigue. These symptoms typically occur within the first few days post partum and may persist for up to two weeks. Although often self-limiting, postpartum blues can progress into postpartum depression or even psychosis if left untreated.[2]

The global prevalence of postpartum blues varies widely, with studies in Japan and Australia reporting incidence rates between 26-80%. In Indonesia, postpartum blues affects an estimated 50-70% of postpartum women. Screening using the Edinburgh Postnatal Depression Scale (EPDS) at RSUD Sidoarjo showed that 44,5% of postpartum mothers experienced symptoms consistent with postpartum blues[1]. Initial data collected from BPM Ida Susila, SST.,M.Kes indicated that 20% of postpartum mothers experienced postpartum blues. These figures highlight the significant burden of this condition and the need for targeted screening and preventive strategies in maternal health services.[2]

Postpartum blues is often attributed to psychosocial stressors; however, physiological factors also play a substantial role. Among them, hemoglobin (Hb) levels and body mass index (BMI) are two critical indicators frequently overlooked in mental health assessments. Postpartum anemia has been linked to fatigue, cognitive dysfunction, and mood instability, while both low and high BMI are associated with increased psychological vulnerability due to hormonal imbalances and systemic inflammation. According to the biopsychosocial model by Engel (1977), biological, psychological, and social factors interact in complex ways to influence mental health outcomes.[3]

The pathophysiology of postpartum blues involves a sharp drop in estrogen and progesterone, disrupting mood-related neurotransmitters like serotonin and dopamine. This is worsened by anemia and nutritional deficiencies, as iron deficiency reduces brain oxygenation. Additionally, elevated BMI is linked to increased inflammation and emotional dysregulation, further contributing to postpartum depressive symptoms.[4]

Despite these insights, there remains a paucity of research that examines the direct relationship between hemoglobin levels, BMI, and postpartum blues using

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standardized tools like the EPDS. Most studies tend to focus on psychosocial determinants, while the biological dimension is often underexplored.[5]

Therefore, from the review above, the researchers want to delve deeper into several internal factors such as hemoglobin levels and body mass index on the incidence of postpartum blues.[6]The Labor Planning and Complication Prevention Program (P4K), initiated by the Ministry of Health of the Republic of Indonesia, basically aims to improve the safety of mothers and babies through the promotion of delivery preparedness and the prevention of complications at the community level.[7]

The Labor Planning and Complication Prevention Program (P4K) initiated by the Ministry of Health of the Republic of Indonesia essentially aims to improve the safety of mothers and babies through the promotion of delivery preparedness and the prevention of complications at the community level. Although the initial focus of this program is on preventing physical complications during pregnancy and childbirth, the P4K framework also provides strategic opportunities for early detection of psychosocial risks during the antenatal examination period.[8]

Through structured antenatal screening in the P4K program, healthcare workers, particularly midwives and health cadres, engage in direct interactions with pregnant women and their families. This ongoing interaction allows for the identification of psychosocial vulnerabilities such as lack of family support, financial pressure, history of depression or anxiety, and other emotional challenges, which are known to contribute to the occurrence of postpartum blues and more severe mental health disorders after childbirth.[8].

The relevance of the Labor Planning and Complication Prevention Program (P4K) to the topic of postpartum blues is very strong, as the program not only addresses the physical aspects of childbirth but also fosters consistent interactions between healthcare workers—especially midwives and community health cadres—and pregnant women along with their families. Through structured screening within the P4K framework, midwives can identify psychosocial risk factors that may contribute to postpartum blues, such as lack of family support, economic pressure, a history of emotional disturbances, and anxiety experienced during pregnancy.[9]

The Edinburgh Postnatal Depression Scale (EPDS) is a widely used tool to screen for postpartum depression and identify early signs of postpartum blues. Mental health profiling using the EPDS provides valuable insights into depressive symptoms during the postpartum period. However, limited research has explored the direct association between hemoglobin levels, BMI, and postpartum blues using this scale.

This study addresses that gap by examining the relationship between maternal hemoglobin levels, BMI, and the incidence of postpartum blues, assessed using the EPDS. Early detection of these physiological triggers is crucial for timely and effective management to prevent further mental health deterioration.

The research is highly relevant to midwifery science, as it takes a holistic approach to maternal mental health by linking biological indicators—hemoglobin and BMI—with postpartum emotional well-being. The findings are expected to enhance understanding of the physiological contributors to postpartum blues and support clinical strategies for early intervention and prevention. This study aims to analyze the relationship between maternal Hemoglobin (Hb) levels and body mass index (BMI) with the incidence of postpartum blues in postpartum mothers.

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METHODS

This study used an observational study design with a quantitative approach, which means the researchers observe and measure variables without providing any intervention to the research subjects. Data collection was conducted from January to December 2024 at the Independent Midwifery Practice (BPM) of Ida Susila, Lamongan Regency.The target population in this study is all postpartum mothers undergoing the postpartum period at the BPM, with a total number of 30 individuals. A sample of 30 people in this study is indeed sufficient for basic statistical analyses such as Pearson correlation or simple linear regression, but it is not strong enough to produce broad generalizations about the postpartum population as a whole. Because the population size is relatively small, the total sampling or census technique is used, where all members of the population are made the research sample. However, the use of a sample of 30 people also becomes one of the limitations of the research, as it can affect the strength of the generalization of the results and the statistical analysis used.

The inclusion criteria in this study include mothers who have recently given birth within a maximum of 14 days postpartum, are willing to become respondents by signing the consent form after receiving an explanation (informed consent), and do not have a history of mental disorders based on anamnesis or medical records. However, the study did not control for potential confounding variables such as social support, previous history of depression, or psychosocial stressors, which are known to influence the risk of developing postpartum blues. The absence of these controls limits the ability to isolate the effect of hemoglobin levels and body mass index (BMI) on postpartum blues and may introduce bias in the interpretation of results. Future studies are recommended to include standardized measures of social support and mental health history to strengthen the internal validity of the findings.

The exclusion criteria include mothers with a history of mental disorders before pregnancy (based on medical records or self-report), mothers without a husband (due to potential lack of social support), mothers who experience severe postpartum complications that may interfere with the interview process (such as severe bleeding, severe infection, or preeclampsia), and mothers who use certain medications such as psychotropics or hormones that may affect mood (if relevant, the type of medication needs to be identified further).

The independent variables in this study are the mother's age at delivery (measured in years on a ratio scale), postpartum hemoglobin (Hb) levels measured using a Hb meter on the 14th day postpartum (in g/dL, ratio scale), and postpartum body mass index (BMI) calculated using the formula BMI = weight (kg) / height² (m^2), also on a ratio scale[10].

Postpartum blues assessment was conducted on the 14th day after delivery using the Edinburgh Postnatal Depression Scale (EPDS), as this period represents a critical emotional transition phase for mothers. Data collection included interviews, anthropometric measurements (weight and height for calculating Body Mass Index), and laboratory testing to assess hemoglobin (Hb) levels.

The EPDS instrument was validated, culturally and linguistically adapted, and administered with assistance from trained midwives. Respondents were ensured to be not using psychotropic medications and were informed beforehand. Data were analyzed using logistic regression and Pearson correlation. Postpartum Hb categories: 1) normal > 12 g/dl; mild anemia: 11-11.9 g/dl; moderate anemia: 8-10.9 g/dl; severe anemia: <8g/dl[10]. BMI

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categories: 1) Underweight:< 18.5 kg/m^2; 2) Normal: Normal: 18.5 – 24.9 kg/m^2; 3) Overweight: 25-29.9 kg/m^2 ; 4) Obese: > 30 kg/m.[21] All were measured on the 14th day postpartum (in kg/m^2 with a ratio scale). The dependent variable is postpartum blues (PPB), which is measured using the Edinburgh Postnatal Depression Scale (EPDS) and can be analyzed as a total score ratio. The operational definitions for each variable have been clearly and measurably established, including age, postpartum hemoglobin levels, postpartum BMI, and postpartum blues measured by the EPDS

The research instruments used include the EPDS questionnaire[11] (characterized by the number of items, assessment scale, and score interpretation), patient medical records at BPM (to collect information such as history of delivery complications and previous mental disorders), physical examination (Hb measurement using the Easy Touch Hb meter), anthropometric measurements (body weight with GEA scales and height following standard protocols), and interviews (aimed at collecting demographic data or other relevant information related to the main topic that needs to be mentioned).

Anthropometric measurements, including body weight, measured using a GEA digital scale, and height, measured with a stadiometer, both following standardized WHO measurement protocols. All measurements were conducted by the same operator to minimize measurement bias. Hemoglobin (Hb) measurement, conducted using the Easy Touch® Hb meter, with a capillary blood sample taken from the fingertip. To reduce inter-rater variability, all Hb measurements were performed by the same trained health personnel.

Data collection followed a structured procedure, beginning with ethical and BPM approvals, followed by respondent recruitment, informed consent, EPDS questionnaire completion, and physical and anthropometric assessments. Data from medical records were also collected, ensuring confidentiality. All data were collected directly by the researchers, without assistants, following a pre-collection briefing to maintain consistency.

Data analysis was performed using SPSS version 25. Descriptive statistics (mean and standard deviation) described variable characteristics. Pearson correlation tested the relationship between hemoglobin, BMI, and EPDS scores, while multiple linear regression identified independent predictors of postpartum blues.

This study received ethical approval from the Research Ethics Committee of PGRI Adi Buana University Surabaya (Ethical Clearance No: 163-KEPK), ensuring compliance with ethical standards for research involving human subjects, including informed consent and risk minimization.

RESULTS

Data were obtained from 30 respondents who met the inclusion and exclusion criteria. The research results are presented in the form of frequency distribution tables and diagrams that illustrate the characteristics of the respondents and the relationships between variables. Analysis was conducted to determine the distribution pattern and the potential relationship between independent variables and the occurrence of postpartum blues.

Table 1. Characteristics of Subjects

Variable	Mean	Standar of Deviation
Age, years	28.7	2.52
Postpartum haemoglobin, g/dl	10.86	1.13
Postpartum body mass index, kg/m^2	25.29	2.87
EPDS score at day 14	11.57	3.277

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Table 1 shows that the participants had a mean age of 28.7 years (SD = 2.52), indicating a relatively uniform age group. The average postpartum hemoglobin level was 10.86 g/dl (SD = 1.13), suggesting mild anemia. The mean BMI was 25.29 kg/m² (SD = 2.87), classifying most participants as overweight. The average EPDS score at 14 days postpartum was 11.57 (SD = 3.28), indicating a notable presence of mild depressive symptoms.

Table 2. Characteristics of Classification Subjects

Variable		n	%
Categories of Ages	Late Adolescence	3	10
	Young Adulthood	15	50
	Early Adulthood	12	40
	Late Adulthood	0	0
Education	Low Education	10	33.3
	High Education	20	66.7
Occupation	Unemployed	10	33.3
	Employed	20	66.7
Haemoglobin Level	Normal (≥12.5 g/dl)	15	50
	Mild Anemia (<12.4 g/dl)	15	50
Categories of BMI	Underweight (<18.5 kg/m^2)	0	0
	Normal (18.5– 24.9 kg/m^2)	15	50
	Overweight (25–29.9 kg/m^2)	13	43.3
	Obese (>30 kg/m^2)	2	6.7
Classification of EPDS Score	Normal (≤10)	17	56.7
	Mild Depression (>10)	13	43.3

Berdasarkan Tabel 2, sebagian besar peserta berada pada usia dewasa muda (50%), memiliki pendidikan tinggi (66,7%), dan bekerja (66,7%). Sebanyak 50% memiliki kadar hemoglobin postpartum dan BMI dalam kategori normal. Penilaian EPDS pada hari ke-14 menunjukkan 56,7% peserta berada dalam rentang normal.

Figure 1 illustrates the association between Edinburgh Postnatal Depression Scale (EPDS) scores and postpartum hemoglobin levels at day 14. Visual inspection of the scatter plot suggests a negative linear trend, indicating that as postpartum hemoglobin levels increase, EPDS scores tend to decrease.

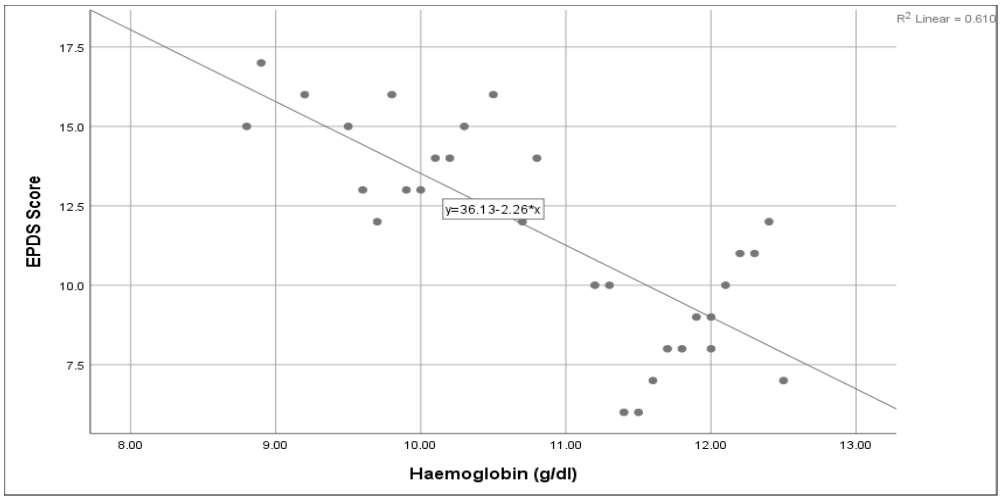

Figure 1. Association of Edinburgh Postnatal Depression Scale scores and Postpartum Haemoglobin at day 14

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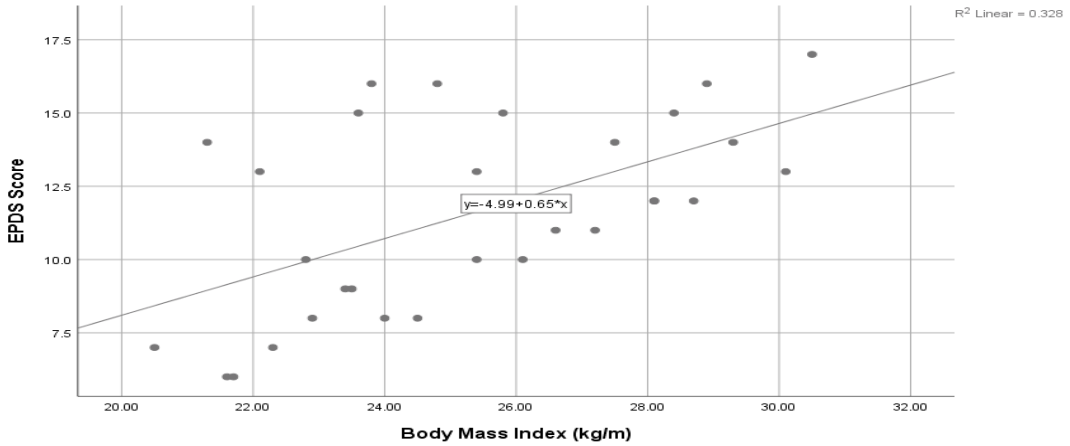

Figure 2. Association of Edinburgh Postnatal Depression Scale scores and Postpartum Body Mass Index at day 14

Figure 2 illustrates the association between Edinburgh Postnatal Depression Scale (EPDS) scores and postpartum Body Mass Index (BMI) at day 14. Visual inspection of the scatter plot reveals a positive linear trend, suggesting that as postpartum BMI increases, EPDS scores tend to increase as well.

Table 3 shows a strong negative correlation between postpartum hemoglobin levels and EPDS scores (r = –0.781; p < 0.001), as well as a moderate positive correlation between postpartum BMI and EPDS score (r = 0.573; p = 0.001). Both were statistically significant (p < 0.01), confirming the importance of screening for mild anemia and BMI assessment in the early detection of postpartum blues. Potential confounding factors include a history of psychiatric disorders, childhood trauma, prenatal stress, as well as spousal support and socioeconomic status. Poor diet may also mediate the relationship between BMI and postpartum depression through microbiota and inflammatory pathways.

Table 3. Correlation between Haemoglobin, Body Mass Index, and Postpartum Blues Based on Edinburgh Postnatal Depression Scale Scores

Variable	Pearson Correlation	Sig. (2-tailed)
Age, years	0.272	0.146
Haemoglobin (g/dl)	-0.781	0.000
Body Mass Index (kg/m2)	0.573	0.001

Table 4. Factors Influencing Postpartum Blues Based on Edinburgh Postnatal Depression Scale Scores

Variable	B	P value	Exp (B)
Age, years	-0.335	0.243	-0.258
Postpartum haemoglobin, g/dl	-1.925	0.000	-0.665
Postpartum body mass index, kg/m2	22.207	0.003	0.355

Table 4 presents a regression analysis examining factors influencing postpartum blues based on EPDS scores. Maternal age was not a significant predictor (B = –0.335, p = 0.243), suggesting no meaningful association between age and postpartum depressive symptoms—consistent with existing literature.

In contrast, postpartum hemoglobin levels were a significant negative predictor (B = –1.925), indicating that each 1 g/dL increase in hemoglobin corresponded to lower EPDS scores. This reinforces the clinical relevance of anemia as a contributor to postpartum mood disturbances through mechanisms like brain hypoxia and

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neurotransmitter imbalance. Thus, anemia screening and management are critical components of postpartum mental health care.

Postpartum BMI also showed a significant positive association (B = 22.207), linking higher BMI with more severe depressive symptoms. Regression equations further illustrated a negative relationship between hemoglobin and EPDS (y = 36.13 − 2.26x), and a positive one between BMI and EPDS (y = −4.99 + 0.65x). Pearson correlations confirmed stronger associations for hemoglobin (r = –0.781) than for BMI (r = 0.573).

In summary, while maternal age was not influential, both low hemoglobin and high BMI were significant predictors of postpartum blues, with hemoglobin showing the strongest relationship. These findings highlight the importance of integrating physiological assessments into postpartum mental health screening.

DISCUSSION

Table 1 shows that the average postpartum hemoglobin level was 10.86 g/dL, classified as mild anemia (<11 g/dL) by WHO standards. The average EPDS score was 11.57, indicating a potential risk of postpartum depression (scores >10 suggest mild to moderate symptoms). These findings support existing research linking postpartum anemia with a higher risk of depression, as lower Hb levels are associated with higher EPDS scores.[12] This mechanism is explained through the role of hemoglobin in brain oxygenation and neurotransmission, which, if disrupted, can affect mood and emotional stability.[13]

The average BMI of postpartum mothers is 25.29 kg/m², which falls into the overweight category. This is base explains that a woman with a higher BMI during and after pregnancy has a higher risk of postpartum depression, and is associated with systemic inflammation and bodily disorders. In this case, a BMI > 25 is associated with low-grade chronic inflammation that contributes to the dysregulation of stress hormones like cortisol, as well as disturbances in serotonin metabolism that also affect mood regulation.[10]

Meanwhile, the average age and risk of postpartum blues is 28.7 years, which falls within the optimal reproductive age.[13] However, some studies mention that age is not the only main risk factor, but psychosocial stressors and social support are more dominant in influencing EPDS scores.[13]

Based on Table 2, explains that 50% of respondents experienced mild anemia, and from the EPDS classification, 43.3% experienced mild postpartum depression. This indicates that postpartum mothers with Hb levels < 12.5 g/dl are at a higher risk of experiencing postpartum depression due to impaired oxygen supply to the brain and hormonal disturbances.[14]

Data shows that 50% of respondents have a normal BMI, but 43.3% are classified as overweight and 6.7% as obese. This is important because postpartum obesity and overweight are associated with an increased risk of mood disorders, and postpartum mothers with high BMI have double the risk of experiencing postpartum depression, especially when combined with low employment status or low education level.[15]

Postpartum mothers experience hormonal and physiological changes; postpartum mothers with high BMI have low-grade systemic inflammation due to excess adipose tissue producing pro-inflammatory cytokines.[16] This inflammation can disrupt the function of neurotransmitters such as serotonin and dopamine, affect the work of the hypothalamus, and reduce neuroplasticity, contributing to negative mood symptoms such as anxiety, sadness, and irritability.[16]

The majority of respondents have higher education (66.7%) and permanent jobs (66.7%), which in this

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case are protective factors against postpartum depression. This indicates that social support, education, and economic status are protective factors against the risk of postpartum depression. However, these factors are not absolute, and if combined with detrimental biological factors (anemia, obesity), they still have the potential to trigger mood disorders [16]

Most subjects were in their young (50%) and early adulthood (40%), considered productive ages. Although this stage supports good adaptability, it also brings vulnerability due to new social roles. Age alone isn't a direct risk factor; rather, dual roles, fatigue, and hormonal changes can still trigger postpartum blues even at ideal ages.

Table 3 shows a strong negative correlation between hemoglobin levels and EPDS scores (r = -0.781, p = 0.000), indicating that lower Hb levels increase the risk of postpartum blues. Hemoglobin is crucial for oxygen delivery, including to the brain. Postpartum anemia can reduce oxygen supply to mood-regulating areas like the prefrontal cortex and limbic system, impairing emotional regulation.[17]

Anemia conditions increase the physiological stress on the body, triggering the activation of the HPA (hypothalamus-pituitary-adrenal) axis, which leads to increased cortisol secretion and cortisol imbalance. mothers with postpartum anemia are more prone to excessive physical fatigue, weakness, and easy tiredness, which increases their vulnerability to stress.[14]

A positive correlation was found between BMI and EPDS scores (r = 0.573, p = 0.001), indicating that higher postpartum BMI is associated with a greater risk of postpartum blues. Biologically, excess adipose tissue produces pro-inflammatory cytokines that can cross the blood-brain barrier and cause neuroinflammation, especially in the limbic system, which regulates emotions. This inflammation disrupts serotonin and dopamine transmission, affecting mood regulation.[18]

High IMT (brain-derived neurotrophic factor) disrupts the balance of gut microbiota, which affects the gut-brain axis[5]. Changes in microbiota produce neurotoxins and free fatty acids that can lower BDNF (brain-derived neurotrophic factor) levels, a substance important for mood stability and brain health. This can trigger negative affective symptoms, including postpartum blues[19].

Deficiency causes brain hypoxia, impaired synthesis of serotonin and dopamine, and increased oxidative stress, all of which are involved in the mechanism of postpartum depression.[24] Low Hb levels in postpartum mothers are the most significant biological factor that increases the risk of postpartum blues through mechanisms of hypoxia, inflammation, and neurotransmitter disturbances [14]

Because the p-value is < 0.001, the null hypothesis (H0) is rejected, confirming a significant relationship between postpartum hemoglobin levels and postpartum blues. Similarly, a p-value < 0.01 for BMI shows that BMI is also a significant predictor. The large, positive B value and Exp(B) = 0.355 indicate that each unit increase in BMI raises the risk of postpartum blues. This may be due to chronic inflammation, hormonal imbalance, serotonin disruption, and negative body image associated with high postpartum BMI.[20]

Because the p-value for BMI (p = 0.003) is below the 0.05 threshold, it indicates a statistically significant relationship between BMI and postpartum blues. Thus, the null hypothesis is rejected, and the alternative hypothesis is accepted, confirming BMI as a contributing factor to postpartum blues. In contrast, the p-value for age (> 0.05) shows no significant effect, although the negative B value suggests a slight, non-significant decrease in risk with increasing age.

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This study did not control for psychosocial factors such as social support, partner relationship, life stress, or prior mental health history, all of which are known to influence postpartum blues. Notably, lack of social support is a strong predictor of depressive symptoms, and as shown by Wang et al. (2020), psychosocial stressors can intensify biological effects like anemia or obesity on postpartum mood.[17]

This study uses a cross-sectional design with measurements taken only once (on the 14th postpartum day), without follow-up on mood changes or biological levels over a specific period. This weakens the causal conclusions. The symptoms of postpartum blues can change rapidly in the early weeks, making longitudinal studies more ideal.[14] Emphasize the importance of repeated measurements to understand the dynamics of hormonal and mood fluctuations postpartum.[13]

This study uses objective biological parameters (hemoglobin and BMI) as well as standardized psychometric instruments (EPDS) that have been widely validated in screening for postpartum mood disorders. This study focuses on the relationship between hemoglobin and BMI with postpartum blues, which is still relatively limited in the local context, thus adding to the current evidence-based literature for the mother population in Indonesia.

The results showed that age was not a significant predictor of postpartum blues (B = –0.335, p = 0.243), indicating no meaningful link between maternal age and EPDS scores in this study. Although younger age is theoretically linked to less experience and support, this was not reflected in the findings. However, in this study, the majority of respondents were in the range of young productive adults (20–35 years), who are relatively stable and adaptive psychosocially.[21]

The insignificance of age as a predictor of postpartum blues in this study may be due to the homogeneity of the respondents' ages, as well as other more dominant risk factors such as low Hb levels and high BMI. Therefore, it is important to emphasize that age should not be treated as the sole risk indicator, but rather should be viewed in a broader context alongside other psychosocial and biological factors.[18]

This study integrates biological markers (hemoglobin and BMI) with the EPDS to examine their association with postpartum blues—an area still underexplored locally. Results show a strong link between low hemoglobin and postpartum blues, underscoring anemia's role in maternal mental health. However, the cross-sectional design limits causal inference, and the small, homogeneous sample reduces generalizability.

Future studies should adopt longitudinal or cohort designs, include larger and more diverse samples, and control for confounders like social support, economic status, mental health history, and stress.

These findings have clinical relevance for midwifery practice. Routine postpartum hemoglobin screening can help identify psychological risks early, while monitoring BMI is crucial, as excessive weight may contribute to mood disorders. The study supports existing evidence that postpartum anemia is associated with increased EPDS scores, likely due to hypoxia and inflammation pathways.[21] Additionally, a high BMI is found to be associated with higher EPDS scores. This is based on research that explains the biological relationship between obesity and depression through chronic inflammation pathways; moreover, postpartum obesity can become a predisposition factor for stress. [21]

Several important confounding variables in this study include a history of childhood trauma and previous mental disorders, as explained in the IGEDEPP study, which emphasizes that these two factors are the main risks for

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postpartum depression. In addition, the roles of inflammation, gut microbiota, and stress are also of significant concern, with the involvement of the gut-brain axis and changes in gut microbiota as additional pathways contributing to the risk of postpartum depression. [21]

CONCLUSION

Postpartum maternal Hb levels show a strong negative association with EPDS scores (Exp(B) = 0.146), meaning each 1 g/dl increase in Hb reduces the risk of postpartum blues by 85.4% ($p < 0.05$). H0 is rejected—indicating a significant relationship. Similarly, postpartum BMI correlates positively with EPDS scores ($r = 0.573$; Exp(B) = 0.355), suggesting higher BMI increases the risk of blues, possibly due to inflammation, serotonin imbalance, and body image issues. H0 is again rejected. In contrast, maternal age shows no significant association ($p = 0.243$); thus, H0 is accepted.

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