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# Modeling the Prediction of Baby Blues Risk Against the Variables of Maternal Age, Parity, and Delivery Method

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**Abstract:** Baby Blues Syndrome (BBS) is a common, yet critical, transient mood disorder during the postpartum period, serving as a significant risk factor for severe postpartum depression. Identifying high-risk mothers based on common obstetric factors, such as maternal age, parity, and delivery method, is essential for timely intervention in clinical practice. This study aimed to develop an integrated prediction model for the risk of BBS based on the simultaneous contribution of maternal age, parity, and delivery method. This quantitative study used a cross-sectional design involving a sample of 46 postpartum mothers. Data analysis utilized the Chi-Square test for bivariate analysis and logistic regression for multivariate modelling. Multivariate logistic regression analysis demonstrated that the final model was statistically significant and explained 51.1% of the variation in BBS incidence. The strongest predictor of BBS was the C-Section delivery method, increasing the risk by 13.5 times compared to normal delivery. Additionally, Primipara was a significant predictor, increasing the risk by 8.4 times. Maternal Age was not found to be a significant predictor in the final model. C-Section and Primipara are the most significant obstetric risk predictors for BBS.

**Keywords:** risk prediction; baby blues; age; parity; delivery method

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## Introduction

The postpartum period is a crucial transition period for a mother, characterized by significant physical, hormonal, and psychological changes after childbirth. A common phenomenon in the first week after childbirth is Baby Blues Syndrome (BBS) or Postpartum Blues, which is characterized by symptoms of uneasy emotions, easy crying, irritability, anxiety, and sleep disturbances, with reported prevalence varying greatly globally, ranging from 10% to 85% in some Asian regions, including Indonesia. Although the symptoms of BBS are generally mild and temporary, this condition requires serious attention because it is a major risk factor that can continue into postpartum depression which is more severe and negatively affects mother-infant bonding and infant growth and development (Maria Quatraro & Grussu, 2020; Pawluski et al., 2021; Yaqoob et al., 2024).

Recognizing mothers who are at high risk of developing BBS early is an important step in the field of obstetrics and public health. Many studies show that factors such as the mother's age, number of births, and the manner of delivery can influence the likelihood of BBS. Mothers who are too young or over 35 years old are usually more vulnerable due to psychological or physical problems. Mothers who give birth for the first time also tend to be more at risk due to lack of experience and major changes in their roles, although some studies have also shown that mothers who have given birth multiple times can be at risk due to physical fatigue and difficulty parenting. In addition, the method of delivery, whether vaginal or cesarean section, also affects mood and stress levels after childbirth, especially if the delivery process is difficult or not as expected (Dufford et al., 2019; Jenatabadi et al., 2020; Munk-Olsen et al., 2023; Pawluski et al., 2021).

However, although there has been a lot of research on the relationship between several variables and BBS, the results of the study are still inconsistent. For example, some studies show a strong relationship between parity and BBS, while others do not find such a relationship. This also happens with the variables of maternal age and method of delivery. Research is generally conducted by bivariate or multivariate analysis methods to determine the relationship between variables. This study was conducted because there is no good and integrated prediction model that can evaluate the simultaneous contribution of three demographic and obstetric factors that are often studied, namely maternal age, parity, and delivery method, in predicting the risk of BBS in pregnant women. An accurate

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prediction model will make it easier for health workers, especially midwives, to carry out proper screening and intervention from the pregnancy stage. Therefore, the purpose of this study is to develop a model for predicting the risk of Baby Blues Syndrome based on maternal age, parity, and delivery methods (Astari & Yuwansyah, 2022; Baattaiah et al., 2023; Peñacoba-Puente et al., 2016; Utami & Nurfita, 2022).

This study uses the theoretical framework of Stress and Adaptation Theory and the Maternal Role Attainment Model. According to the Stress and Adaptation Theory, the process of childbirth and postpartum period is stressful, so it requires adaptation in the physical and psychological fields. Factors such as age, number of births, and the manner of delivery play a role as variables that affect the mother's ability to cope with stress and adapt to a new role. Mothers who have a certain risk tend to have a harder time adapting and have lower pressure thresholds, making them more susceptible to developing BBS. Meanwhile, the Mother's Role Transition Theory explains that transforming into a mother is a complex process and in the process of self-development. The age and number of births are closely related to the mother's readiness and experience in undergoing this transition. Difficulty or failure to adapt to the new role of motherhood, possibly influenced by abnormal childbirth, can lead to mood disorders such as BBS. With this research, it is hoped that it can provide great benefits to midwifery practice by providing a simple clinical prediction tool, so that it can be used in primary health facilities (Astari & Yuwansyah, 2022; Baattaiah et al., 2023; Roman et al., 2019; Utami & Nurfita, 2022).

## Method

This research is a quantitative study using a cross-sectional design. The sample involved 46 mothers in the postpartum phase, spanning from the third to the thirtieth day, based on Dau District, Malang Regency, East Java, Indonesia, during the first 3 months of 2025. Researchers conducted data collection directly through instruments and interviews. For data analysis, the chi-square test was used for bivariate analysis, and logistic regression was applied for multivariate analysis using the Statistical Package for the Social Sciences (SPSS).

## Results and Discussion

This study involved 46 postpartum mothers who were subjects of Baby Blues Syndrome (BBS) risk prediction modeling. The distribution of demographic and obstetric characteristics of the study subjects showed that most mothers were in the age range of 20–35 years (71.7% or n=33), had a parity status of second/next childbirth (54.3% or n=25), and underwent childbirth by C-Section method (56.5% or n=26).

Bivariate (Chi-Square) analysis was performed to test the relationship between each independent variable and the occurrence of BBS (Table 1). The results of bivariate analysis

showed that the parity variable and the method of delivery had a statistically significant relationship with the incidence of BBS (p<0.05). Descriptively, mothers with the first delivery had a much higher percentage of BBS (71.4%) than the second/subsequent delivery (24.0%). Meanwhile, mothers who underwent SC childbirth had a BBS percentage of 61.5%, higher than mothers who gave birth normally (25.0%). Meanwhile, the age variable did not have a significant relationship with the incidence of BBS (p=0.139), so it was reduced for multivariate analysis.

Furthermore, a multivariate logistic regression analysis was performed to build a BBS risk prediction model (Table 2). The tested model showed a goodness-of-fit with the data, as shown by the results of the Hosmer and Lemeshow Test (p=0.658). A logistic regression model that included both predictor variables simultaneously was statistically significant, with the ability to explain the variation in PPB incidence by 51.1% (Nagelkerke R Square = 0.511).

Table 1. The frequency distribution and bivariate correlation between demographic and obstetric variables affecting BBS.

| Variables | Frequency *n* (%) | *p*-value (Sig. 2-sided) |
|---|---|---|
| Age | | |
| <20 years | 6 (13%) | 0.139 |
| 20-35 years | 33 (71.7%) | |
| >35 year | 7 (15.2%) | |
| Parity | 21 (45.7%) | |
| Primipara (first childbirth) | 25 (54.3%) | 0.004 |
| Multipara (second/next childbirth) | | |
| Childbirth method | 20 (43.5%) | |
| Normal | 26 (56.5%) | 0.030 |
| C-Section | | |

*Significance of *p-value*<0,05

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Table 2. Results of Multivariate Logistics Regression BBS Prediction.

| Variable | *p*-value (Sig.) | OR | 95% CI |
|---|---|---|---|
| Parity | | | |
| Primipara (first childbirth) | 0.028 | 8.42 | 1.260, 56.345 |
| Childbirth Method | | | |
| C-Section | 0.004 | 13.48 | 2.321, 78.346 |

*Significance of *p-value*<0,05; CI: Confidence Interval.

Based on multivariate analysis (Table 2), it was found that Parity and Delivery Method were significant predictors of BBS incidence, with a p<0.05 value. Mothers with first childbirth had an 8.4x higher risk of experiencing BBS than mothers with second/subsequent childbirth (p=0.028). Meanwhile, the C-section childbirth method variable showed the strongest and most significant influence, namely increasing the risk of PPB by 13.5x compared to normal childbirth (p=0.004). The results showed that prediction models involving parity and delivery methods collectively significantly predicted the incidence of PPB. This model is substantially able to explain more than half of the variation in BBS incidence (R2= 0.511).

The main finding of the logistic regression model is that the C-Section delivery method and primipara/first childbirth are significant risk predictors. Primipara increases the risk of BBS by 8.4x. This interpretation is in line with the theory of maternal role transition, in which primipara face greater adaptation stress in entering the "maternal role" without prior experience, which makes them more susceptible to mood disorders such as BBS. The need to master new skills in caring for a baby and the lack of proven coping mechanisms can be overwhelming for mothers (Jenatabadi et al., 2020; Lowe, 2019; Maria Quatraro & Grussu, 2020).

On the other hand, the C-section delivery method emerged as the strongest predictor, increasing the risk by up to 13.5x compared to normal delivery. Although the bivariate results showed that C-Section had a higher percentage of BBS, the multivariate Odds Ratio value corroborated that after controlling for other factors, the C-section independently had the greatest contribution to risk. Possible mechanisms are physical limitations and significant postoperative pain limiting mother-infant mobility and early interaction, disrupting the maternal-infant bonding process, and increasing frustration and physical fatigue. In addition, a C-section emergency can also trigger feelings of loss of control or traumatic experiences related to childbirth, which directly impacts emotional well-being (Jenatabadi et al., 2020; Munk-Olsen et al., 2023).

Age variables were reduced in multivariate trials because the bivariate relationship was not significant, but descriptive analysis showed that the extreme age group (< 20 years) had a high percentage of BBS. These non-significant results may be due to the uneven distribution in extreme age groups, which reduces the statistical power to detect existing differences (Bruce et al., 2008).

The implication of this study is midwives should prioritize intensive screening and social support efforts for primipara mothers and mothers undergoing childbirth by C-Section. These prediction models provide a solid basis for more focused early interventions.

## Conclusion

This predictive modeling study showed that C-Section and primipara were the most significant risk predictors, with mothers undergoing C-Section having a 13.5 times higher risk of BBS and primipara having an 8.4 times higher risk than other groups. Meanwhile, the age variable was not proven to be a significant predictor in this prediction model. As such, midwives should prioritize screening and early intervention efforts, especially psychosocial support, specifically aimed at mothers with first childbirth and those undergoing C-sections to prevent and mitigate the risk of BBS. The suggestion for the next researcher is to integrate psychosocial variables, such as the level of stress during pregnancy or the level of social support, with obstetric factors to produce accurate prediction model and effective screening tool in clinical practice of obstetrics.

## Authors' Contribution

All authors contributed equally to every aspect of this research, from the initial study design and data collection to the analysis, interpretation, manuscript preparation, and critical revisions. All authors have read and approved the final version for submission.

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## Conflict of Interests Statement

The authors declare no conflict of interest.

## Data Availability

The dataset presented in the study is available on request from the corresponding author during submission or after publication.

## Informed Consent

Written informed consent was obtained from the participants.

## References

Astari, R. Y., & Yuwansyah, Y. (2022). Psychosocial study on the incidence of postpartum blues. *Jurnal Aisyah: Jurnal Ilmu Kesehatan, 8*(1). https://doi.org/10.30604/jika.v8i1.1524

Baattaiah, B. A., Alharbi, M. D., Babteen, N. M., Al-Maqbool, H. M., Babgi, F. A., & Albatati, A. A. (2023). The relationship between fatigue, sleep quality, resilience, and the risk of postpartum depression: An emphasis on maternal mental health. *BMC Psychology, 11*(1). https://doi.org/10.1186/s40359-023-01043-3

Bruce, N., Pope, D., & Stanistreet, D. (2008). *Quantitative methods for health research: A practical interactive guide to epidemiology and statistics*. Wiley.

Jenatabadi, H. S., Radzi, C. W. J. B. W. M., & Samsudin, N. (2020). Associations of body mass index with demographics, lifestyle, food intake, and mental health among postpartum women: A structural equation approach. *International Journal of Environmental Research and Public Health, 17*(14), 1–24. https://doi.org/10.3390/ijerph17145201

Lowe, N. K. (2019). Reconsidering postpartum care. *Journal of Obstetric, Gynecologic & Neonatal Nursing, 48*(1), 1–2. https://doi.org/10.1016/j.jogn.2018.12.001

Munk-Olsen, T., Di Florio, A., Madsen, K. B., Albiñana, C., Mægbæk, M. L., Bergink, V., Frøkjær, V. G., Agerbo, E., Vilhjálmsson, B. J., Werge, T., Nordentoft, M., Hougaard, David M., Børglum, A. D., Mors, O., Mortensen, P. B., & Liu, X. (2023). Postpartum and non-postpartum depression: A population-based matched case-control study comparing polygenic risk scores for severe mental disorders. *Translational Psychiatry, 13*(1). https://doi.org/10.1038/s41398-023-02649-2

Pawluski, J. L., Swain, J. E., & Lonstein, J. S. (2021). Neurobiology of peripartum mental illness. Dalam *Handbook of Clinical Neurology* (Vol. 182, hlm. 63–82). Elsevier B.V. https://doi.org/10.1016/B978-0-12-819973-2.00005-5

Peñacoba-Puente, C., Marín-Morales, D., Carmona-Monge, F. J., & Velasco Furlong, L. (2016). Post-partum depression, personality, and cognitive-emotional factors: A longitudinal study on Spanish pregnant women. *Health Care for Women International, 37*(1), 97–117. https://doi.org/10.1080/07399332.2015.1020540

Quatraro, R. M., & Grussu, P. (2020). *Handbook of perinatal clinical psychology: From theory to practice*. Routledge.

Roman, M., Bostan, C. M., Diaconu-Gherasim, L. R., & Constantin, T. (2019). Personality traits and postnatal depression: The mediated role of postnatal anxiety and moderated role of type of birth. *Frontiers in Psychology, 10*. https://doi.org/10.3389/fpsyg.2019.01625

Utami, F. P., & Nurfita, D. (2022). Postpartum blues reviewed by the risk factors in Indonesia. *Journal of Ideas in Health, 5*(4). https://doi.org/10.47108/jidhealth.vol5.iss4.258

Yaqoob, H., Ju, X. D., Bibi, M., Anwar, S., & Naz, S. (2024). A systematic review of risk factors of postpartum depression: Evidence from Asian culture. *Acta Psychologica, 249*, 104436. https://doi.org/10.1016/j.actpsy.2024.104436