



Determinants of Low Birth Preparedness in Primigravida Mothers from the Perspective of Women's Empowerment

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Article Info

Keywords:
Childbirth
Preparedness;
Digital Health
Literacy;
Self-Efficacy;
Mother's Knowledge;
Determinant of
Reproductive Health;

Abstract

Background: Birth preparedness and complication readiness are essential strategies for reducing pregnancy-related complications and maternal mortality. Social factors, maternal knowledge, and digital access may substantially influence a mother's preparedness for childbirth. **Objective:** This study aimed to identify the determinants of low birth preparedness among primigravida mothers. **Method:** An analytical cross-sectional study was conducted among 187 primigravida pregnant women in Purwasari Sub-district, Indonesia, in February 2025. Data were collected using a structured questionnaire and analyzed using the chi-square test to determine associations between study variables and birth preparedness. **Results:** Digital health literacy and digital access were significantly associated with birth preparedness ($p < 0.001$). Childbirth self-efficacy ($p = 0.016$) and maternal knowledge ($p < 0.001$) were also significantly associated with birth preparedness. In contrast, reproductive decision-making autonomy ($p = 0.731$), financial control over childbirth ($p = 0.985$), and perceptions of local gender norms ($p = 0.778$) showed no significant associations. **Conclusion:** Digital health literacy, childbirth self-efficacy, and maternal knowledge are key determinants of low birth preparedness among primigravida mothers. Interventions aimed at improving digital health competencies and strengthening comprehensive maternal health education are needed to enhance women's preparedness for safe and planned childbirth.

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Received 30/11/2025

Revised 12/04/2026

Accepted 29/08/2026

How to Cite:

Rahma M, Rahayu YS, Kurniasih A, Ginting AK, Aziz FA. Determinants of Low Birth Preparedness in Primigravida Mothers from the Perspective of Women's Empowerment. J. Kesehat. Reproduksi [Internet]. 2026 June. 17(1):26-38. Available from: <https://doi.org/10.58185/jkr.v17i1.418>

INTRODUCTION

Birth preparedness and complication readiness (BPCR) are key strategies for reducing maternal and neonatal mortality because they accelerate decision-making and access to emergency services when obstetric problems occur.^{1,2} Despite advances in antenatal care in many low-middle income countries, the prevalence of adequate BPCR practices remains low and variation remains large across regions, including among primigravida who are vulnerable due to their first pregnancy experience.³ Systematic findings and cross-country studies confirm that the level and determinants of BPCR remain a central issue for maternal health policy.⁴

Primigravida mothers often experience anxiety, limited experience, and lower knowledge regarding obstetric danger signs, so they are at risk of showing poor labor readiness compared to multigravida mothers. This increases the importance of identifying specific determinants for this group.⁵ Recent empirical studies have shown a correlation between pregnancy knowledge, social support, and childbirth preparedness in primigravidas, suggesting that interventions targeting these factors may reduce the risk of delayed decision-making. Therefore, a study focusing on primigravidas will provide targeted evidence for designing more effective antenatal interventions.⁶

Regarding anxiety in primigravida women, several studies have shown that first pregnancy is a factor associated with increased anxiety before childbirth. A 2025 study explained that primigravida generally experience childbirth anxiety, especially in the final trimester of pregnancy, due to the uncertainty of the birth process and lack of previous experience.⁶ In addition, other studies concerning primigravida pregnant women in the third trimester in Nganjuk on 2023 showed that 78% of respondents experienced severe anxiety before the childbirth. This condition was influenced by a lack of experience with first-time births, concerns about the birthing process, as well as physical and psychological changes during pregnancy.⁷

Women's empowerment, including decision-making autonomy, financial control, and self-efficacy, plays a crucial role in women's ability to proactively prepare for childbirth. Studies and research over the past five years have shown that dimensions of empowerment related to health decisions are strongly associated with the use of maternal services and the practice of BPCR. However, some studies still measure empowerment in general terms without focusing on specific aspects related to childbirth. Using a more detailed perspective on empowerment (e.g., financial control related to childbirth, digital health literacy) has the potential to explain variations in childbirth readiness that have not yet been unraveled.⁸ Regarding women's empowerment in decision-making, women in the research locations are increasingly involved in decisions related to maternal health. However, decisions regarding the use of health services, the place of giving childbirth/delivery, and medical procedures are still largely influenced by husbands or family. Studies in Indonesia show that

women with better decision-making autonomy tend to utilize antenatal and maternal health services more optimally.^{9,10}

The digital transformation of healthcare services and the expansion of mothers' social networks (WhatsApp/Facebook groups, maternal apps) have created new pathways of influence on knowledge, social support, and access to pregnancy information factors that can strengthen or weaken BPCR. Furthermore, local gender norms governing who has the authority to make health decisions can limit the implementation of childbirth preparedness even when resources are available. Recent literature emphasizes the role of social/gender norms as a major barrier to accessing reproductive services. Incorporating digital variables and gender norms into a determinant model provides novelty and contextual relevance for today.^{11,12}

Although many studies identify demographic and service factors (education, access to facilities, ANC visits) as predictors of BPCR, there is little quantitative study that focuses on primigravidas, isolates empowerment dimensions specific to childbirth (e.g., financial control over childbirth, birth-planning self-efficacy), and incorporates indicators of digital health literacy and local gender norms. This study introduces a novel element compared to prior studies. It incorporates digital health literacy as a key determinant, a factor that remains relatively underexplored in the context of birth preparedness. This inclusion is particularly relevant given the evolving patterns of health information-seeking behavior in the digital era. Furthermore, the study goes beyond individual-level determinants by integrating local gender norms as a contextual variable, recognizing their influence on women's autonomy and their readiness to prepare for childbirth. This gap hinders understanding the mechanisms by which empowerment and the socio-digital context interact to influence childbirth preparedness. Therefore, this study aims to fill this gap with a more rigorous conceptual and analytical approach. The main objective of this article is to examine and test the determinants of low birth preparedness in primigravida mothers by integrating women's empowerment (dimensions of autonomy, financial control over childbirth, self-efficacy) with digital factors and local gender norms. This study contributes to extending the BPCR framework by incorporating more operational and context-specific dimensions of women's empowerment. It also demonstrates that birth preparedness is not shaped by a single factor, but rather emerges from the dynamic interplay between individual, social, and digital influences.

METHODS

This study employed a quantitative analytical approach with a cross-sectional design. It was conducted in the Purwasari Sub-district, Karawang Regency, in February 2025. The study population was all primigravida mothers undergoing prenatal checkups at community health centers in the study area. The sampling technique used was convenience sampling, with 187 respondents who met the inclusion criteria: primigravida pregnant women in their second and third trimesters, able to

communicate well, and willing to participate. Convenience sampling is used because it allows researchers to obtain samples practically from respondents. It is easy to reach by taking into account efficiency of time, cost, and ease of access to research subjects. Data collection in February 2025 used a structured questionnaire, covering sociodemographic aspects and all study variables. The questionnaire was administered directly after respondents received an explanation and signed informed consent.

The selection of Purwasari sub-district, Karawang Regency as the study location was based on several strategic considerations. First, recent data show that the maternal mortality rate in Karawang Regency remains relatively high, according to the 2024 Karawang Health Office performance development document, with the maternal mortality ratio at approximately 123 per 100,000 live births, and the achievement of the Strategic Plan target is still only 57.82 %.¹³ This situation indicates that childbirth preparedness in the region may not be optimal and constitutes a relevant area for a study on childbirth preparedness and women's empowerment. Second, Karawang, as a semi-urban/industrial area in West Java, has unique demographic and health service characteristics, such as rapid urbanization, pressure on primary health care services, and local social and cultural norms that may differ from those in rural or large metropolitan areas.

The dependent variable in this study was Birth Preparedness and Complication Readiness (BPCR), while the independent variables included reproductive decision-making autonomy, financial control for childbirth, digital health literacy, and digital access for reproductive health, childbirth self-efficacy, perceptions of local gender norms on maternal health decisions, and maternal knowledge. Childbirth readiness is defined as a pregnant woman's preparedness to face childbirth and potential complications. Measurements were conducted using the Birth Preparedness and Complication Readiness (BPCR) indicator, which includes preparation of childbirth place, costs, transportation, healthcare personnel, blood donation, and knowledge of danger signs in pregnancy and childbirth. Measurement results were categorized as Low BPCR Practice and Not Low BPCR Practice.

The independent variables in this study were measured using a structured questionnaire based on the Birth Preparedness and Complication Readiness (BPCR) concept. Reproductive decision-making autonomy was measured by looking at maternal ability to determine healthcare and childbirth decisions, and was then categorized as low, moderate, or high autonomy. Financial control for childbirth was measured based on maternal readiness and access to childbirth financing, and was then categorized as low, moderate, and high control. Digital health literacy and digital access for reproductive health were measured by looking at the ability to obtain and understanding reproductive health information through digital media, and were categorized as low, moderate, or high. Childbirth self-efficacy was measured based on maternal confidence in facing childbirth and was categorized

as low and supportive. Perceptions of local gender norms on maternal health decisions were measured based on maternal perception of the influence of gender norms on maternal health decision-making and were categorized as egalitarian and patriarchal. Meanwhile, maternal knowledge variable is measured through maternal knowledge about pregnancy danger signs, childbirth preparation, and pregnancy complications, then categorized into low and high knowledge based on the respondent's answer score.

Data analysis was conducted in several stages: univariate analysis to describe the frequency distribution of each variable, and bivariate analysis using the Chi-Square test to determine the relationship between the independent and dependent variables. All analyses were conducted at a 95% confidence level ($p < 0.05$). This study has received ethical approval from the Research Ethics Committee of Hang Tuah Health College, Surabaya Number: PE/237/XII/2024/KEP/SHT.

RESULTS

Table 1. Demographic Variable

Demographic Variables	Frequency	Percentage (%)
Education Level		
Primary Education or Below	117	62.6
Secondary Education	35	18.7
Tertiary Education	35	18.7
Age		
18-30	107	57.2
31-45	80	42.8
Occupation		
Housewife	145	77.5
Employee	42	22.5
Gestational Age at Examination		
2 nd Trimester	81	43.3
3 rd Trimester	106	56.7
ANC Visit		
<4 times	11	5.9
≥4 times	176	94.1
Ownership of Residence		
Contract/Rent/Boarding House	78	41.7
One's own	109	58.3

The characteristics of respondents in this study indicate that the majority had primary education or less (62.6%), were aged 18–30 years (57.2%), and were mostly housewives (77.5%). Most examinations were performed in the third trimester (56.7%), while adherence to antenatal care

(ANC) visits was quite high, with 94.1% of respondents having made ≥ 4 visits as recommended. From a socioeconomic perspective, more than half of the respondents lived in their own homes (58.3%).

Table 2. Determinant of Low BPCR Practice

Variables	Low BPCR Practice						P-Value
	BPCR LBP		Not BPCR		Total		
	n	%	n	%	n	%	
Reproductive Decision-Making Autonomy							
Low Autonomy	32	32.0	24	24.0	56	100	0.731
Moderate Autonomy	63	61.2	44	45.8	107	100	
High Autonomy	12	13.7	12	10.3	24	100	
Financial Control for Childbirth							
Low Control	14	14.3	11	10.7	25	100	0.985
Moderate Control	68	68.1	51	50.9	119	100	
High Control	25	24.6	18	18.4	43	100	
Digital Health Literacy & Digital Access for Reproductive Health							
Low	58	38.3	9	28.7	67	100	0.000
Moderate	35	56.1	63	41.9	98	100	
High	14	12.6	8	9.4	22	100	
Childbirth Self-Efficacy							
Low	52	43.5	24	32.5	76	100	0.016
Supportive	55	63.5	56	47.5	111	100	
Perceptions of Local Gender Norms on Maternal Health Decisions							
Egalitarian	25	26.3	21	19.7	46	100	0.778
Patriarchal	82	80.7	59	60.3	141	100	
Mother's Knowledge							
Low	75	59.5	29	44.5	104	100	0.000
High	32	47.5	51	35.5	83	100	

The distribution of BPCR based on autonomy shows that respondents with moderate autonomy have the highest proportion of BPCR (61.2%), followed by low (32.0%) and high (13.7%) autonomy, but no statistically significant relationship is found ($p=0.731$). BPCR distribution based on financial control for childbirth showed that respondents with moderate control have the highest BPCR proportion (68.1%), followed by high control (24.6%) and low control (14.3%), with a p-value of 0.985 indicating no significant relationship. Conversely, the level of digital literacy shows a significant relationship with the incidence of BPCR ($p=0.000$), in which the moderate literacy group has the highest proportion (56.1%), followed by low (38.3%) and high (12.6%). Other findings show a significant relationship between childbirth self-efficacy and BPCR ($p=0.016$), with a higher proportion in the supportive self-efficacy group (63.5%) compared to the low (43.5%) group. Meanwhile, perception of gender norms is not associated with BPCR ($p=0.778$), although the proportion in the patriarchal group (80.7%) is higher than in the egalitarian group (26.3%). The knowledge variable shows a significant relationship with BPCR ($p=0.000$), in which the proportion of BPCR is higher in respondents with low knowledge (59.5%) compared to high knowledge (47.5%).

DISCUSSION

Reproductive Decision-Making Autonomy

The results show no significant association between the level of autonomy in reproductive decision-making and the incidence of BPCR. This finding is consistent with the literature showing heterogeneity in the relationship between women's autonomy and the use of maternal services. Some studies found a strong association between autonomy and service utilization, while others reported weak or inconsistent effects after controlling for sociodemographic factors. In this context, large population studies and meta-analytic studies illustrate that the influence of autonomy on maternal health behaviors is often moderated by factors such as education, access to information, family support, and service availability. In other words, autonomy is not always sufficient to ensure adequate childbirth preparation.¹⁴

Conceptually, if autonomy is not significantly associated with BPCR in this study, the possibility of a mechanism involves the decision-action gap. That is, even though a woman may have awareness or decision-making power, economic limitations, physical access to facilities, or family norms may hinder the realization of practical preparations (e.g., saving for childbirth, arranging transportation). Therefore, interventions that solely target strengthening decision-making autonomy need to be paired with efforts to improve service access, family support, and financial resources so that decisions can be translated into concrete preparedness. Operational recommendations include strengthening ANC counseling services involving partners/families and integrating social service referrals to address barriers to decision implementation.¹⁵

Financial Control for Childbirth

The analysis shows no significant association between household financial control for childbirth and BPCR, although the proportion of BPCR appeared relatively high in the moderate control group. Recent literature suggests that the relationship between financial control and childbirth preparedness is complex, with financial literacy aspect, access to social protection schemes (e.g., health insurance), and local financing mechanisms (out-of-pocket vs. insurance) playing a significant role in determining whether financial control translates into concrete preparedness actions. Health policy studies emphasize that the availability of financing mechanisms (e.g., JKN, subsidies, community emergency funds) is often more important than who in the household holds financial control.¹⁶

From a mechanistic perspective, the lack of a significant relationship may indicate that individual financial control is not the sole or strongest predictor of childbirth preparedness. Systemic factors such as unexpected costs, access to free/subsidized services, and social support networks can counteract the effect of individual control. The practical implication is that policy interventions

should combine efforts to improve family financial literacy and control with guaranteed access to childbirth financing schemes (e.g., insurance enrollment, transportation vouchers) so that financial control can synergize with structural financial protection. Program evaluations should measure not only financial holdings but also the liquidity of funds when needed, access to insurance, and administrative barriers.¹⁶

Digital Health Literacy & Digital Access for Reproductive Health

The results show that digital literacy and digital access to reproductive health information are significantly associated with the incidence of BPCR. Specifically, mothers with intermediate or low digital literacy had significantly higher rates of BPCR than those with high literacy. This finding aligns with the literature suggesting that eHealth literacy (the ability to search for, assess, and use online health information) is an important factor in childbirth preparedness. For example, Zhou et al. found that eHealth literacy is positively correlated with childbirth preparedness and that self-efficacy acted as a partial mediator in this relationship.¹⁷

In addition, a scoping review for digital health interventions show that digital technology in pregnant women, especially in areas with limited resources, can increase engagement and understanding of health messages.¹⁸ Additionally, reviews and studies on telehealth/telemedicine in antenatal care during COVID-19 documented that remote services improve access to clinical information, user satisfaction, and in some cases care outcomes, supporting the role of digital access and literacy as important factors in childbirth preparedness during the pandemic.¹⁹ This reinforces that digital access is not only about device ownership, but also the user's ability to utilize information effectively.

Perceptions of Local Gender Norms on Maternal Health Decisions

Perceptions of local gender norms are not significant in this study, although the proportion of LBP in the patriarchal group is significantly higher (80.7%) than in the egalitarian group (26.3%). In the literature, patriarchal gender norms are associated with restrictions on women's access to resources and health autonomy, which in turn influence the use of maternal services. However, empirical evidence also suggests that context-dependent variability in some settings of patriarchal norms is mitigated by family support or pro-maternal service policies, so it may reduce or mask their influence on certain outcomes in quantitative analyses. Therefore, the non-significant results here may reflect heterogeneity in local contexts, sample size, or the way gender norms are measured, which may not capture key dimensions (e.g., mobility control vs. economic control vs. information control).²⁰ Patriarchal norms can operate through indirect channels, e.g. suppressing spousal support for ANC registration, preventing women from communicating with health workers, or restricting access to money, so their impact appears as a mediator or moderator in a more complex model.^{21,22}

Effective intervention programs should include components of male engagement and community norm change in addition to women-based interventions.²⁰

Childbirth Self-Efficacy

The finding that childbirth self-efficacy is significantly related to LBP is consistent with the health psychology literature, particularly Bandura's self-efficacy theory. Individual beliefs influence behavioral choices, persistence in the face of obstacles, and stress responses in the context of childbirth. Higher self-efficacy tends to encourage planning, resource management, and active involvement in childbirth education.^{23,24} Therefore, the significant relationship in this study indicates that, in addition to knowledge, psychological aspects (confidence in facing childbirth) play an important role in encouraging preparedness actions. A recent experimental study by Azza et al. shows that childbirth preparation classes significantly increase pregnant women's self-efficacy and have a positive impact on birth experiences (shorter labor duration, decreased cesarean rates, higher satisfaction).¹⁹ In the study area, there are childbirth preparation classes or classes for pregnant women held by local health care facilities. These activities aim to educate pregnant women and their families about pregnancy, childbirth preparation, newborn care, breastfeeding, pregnancy danger signs, and the importance of family support during pregnancy and childbirth. This supports the finding that self-efficacy is an important variable in prenatal readiness. Furthermore, the mediation mechanism is also supported by a study by Zhou et al., who found that self-efficacy mediates the relationship between eHealth literacy and childbirth readiness, accounting for approximately 33% of the total effect of digital literacy on childbirth readiness.²⁵ This indicates that increasing digital literacy not only requires providing information, but also strengthening mothers' confidence in their ability to face the birthing process.

Mother's Knowledge

Another finding that mothers' knowledge is strongly associated with BPCR is also consistent with many maternal education intervention studies. Conceptually, the mothers' knowledge about pregnancy danger signs, birth planning, and preparedness measures (transportation, funds, companions) serves as a cognitive prerequisite for taking practical action (e.g., developing a birth plan).^{26,27} Knowledge influences a mother's ability to recognize risks and make preventive decisions, so that a decrease in knowledge levels easily translates into low levels of birth preparation activities, in accordance with patterns reported in surveys and cross-country studies related to BPCR (birth preparedness and complication readiness).²⁸ For example, a community study in Ethiopia by Yosep et al. (through a cluster trial) shows that a community-based educational intervention significantly improved mothers' knowledge of obstetric danger signs and birth preparedness and complication readiness (BPCR).²⁹ This reinforces the fact that knowledge is fundamental to childbirth preparedness.

Furthermore, the use of digital booklets (e-booklet) in a study in Indonesia by Wahidah has proven highly effective in increasing the knowledge of young pregnant women.³⁰ Observational studies and systematic reviews consistently show that increased maternal education/knowledge is correlative with increased BPCR practices and ANC adherence, so your findings (low knowledge → high BPCR) are in line with the predicted causal relationship in the literature.³¹ The practical implication is that ANC-based educational interventions or targeted information campaigns could be a strategic entry point to reduce BPCR. Currently, there are still prenatal classes or childbirth preparation programs in the research area, regularly held by community health centers (Puskesmas) or integrated health posts (Posyandu). These programs provide education to pregnant women and their families about pregnancy, childbirth, breastfeeding, and family support during pregnancy.

CONCLUSION

Overall, the findings of this study indicate that digital health literacy, childbirth self-efficacy, and mothers' knowledge are the main factors associated with low birth preparedness. Meanwhile, variables such as autonomy in reproductive decisions, financial control, and local gender norms do not show significant relationships. Future studies should explore mediating mechanisms, refine methodologies, and develop digital and community-based interventions to effectively improve birth preparedness. Systematically improving childbirth preparedness through a digital literacy-based approach, strengthening maternal capacity, and ongoing education.

ACKNOWLEDGEMENT

The authors would like to express their sincere gratitude to all parties who contributed to complete this study. Special thanks are extended to Sehati Indonesia University for providing the necessary facilities and support.

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Declarations

- Author contribution : Marliana Rahma was responsible for the entire research project. She also led the writing of the manuscript and the collaboration with the all author. Yayuk Sri Rahayu, Ari Kurniasih participated in the data collection, transcription, and analysis. Ade Krisna Ginting and Firdaus Abdul Aziz revised the manuscript. All authors approved the final manuscript.
- Funding statement : This research did not receive any funding.
- Conflict of interest : The authors declare that they have no competing interests.
- Additional information : No additional information is available for this paper.