EDUCARE: Jurnal Pendidikan dan Kesehatan
E-ISSN: 3031-0709
Website: https://j-edu.org/index.php/
VOLUME 3, ISSUE 1, 2025

MCH BOOK AS A GUIDE FOR CHOOSING A CHILDBIRTH ASSISTANT FOR HIGH-RISK PREGNANT WOMEN

Lola Meyasa[1*], Seri Wahyuni[2]

Department of Midwifery, Poltekkes Kemenkes Palangka Raya, Kalimantan Tengah, Indonesia

Email Korespondensi: *lolameyasa@polkesraya.ac.id*

ABSTRACT

The MCH handbook is a tool for recording and monitoring maternal and child health and for maternal and child health education. It can be used in all health facilities, but there is no data on the relationship between the use of the MCH handbook and the selection of birth attendants in high-risk pregnant women. This research aims to determine the effectiveness of the MCH handbook in selecting helpers for high-risk pregnant women. This was an observational analytic study with a case-control design. The respondents were 101 postpartum mothers selected by purposive sampling, consisting of 41 cases (mothers with high-risk pregnancy) and 60 controls (mothers without risk factors). Data were collected through interviews using questionnaires and observation. Data were analyzed using the Chi-square test or Fisher's exact test, and odds ratios (OR) with 95% confidence intervals (CI) were calculated. Most mothers were in the non-risk age group (64.4%), had further education (81.2%), had risk parity (51.5%), and made good use of the MCH handbook (66.3%), while 13 mothers (12.9%) gave birth with non-health workers. Maternal age ($p < 0.001$; OR = 34.10), education ($p = 0.001$; OR = 5.70), and parity ($p = 0.005$; OR = 3.23) were associated with high-risk pregnancy, whereas hemoglobin level ($p = 0.986$) and MCH handbook use ($p = 0.607$) did not differ between cases and controls. Maternal age ($p = 0.060$), education ($p = 0.066$), parity ($p = 0.073$), and hemoglobin level ($p = 0.743$) were not significantly associated with the choice of birth attendant, whereas poor use of the MCH handbook was (Fisher's exact test $p = 0.030$; OR = 3.82; 95% CI 1.14–12.76; $r = 0.221$). The use of the MCH handbook is effective in helping high-risk pregnant women select a birth attendant; mothers who made poor use of the handbook were almost four times more likely to give birth with non-health workers.

Keywords: *Birth attendant; High-risk pregnant women; MCH handbook*

INTRODUCTION

The Maternal and Child Health Handbook (MCH Handbook) is a widely recognized health information medium that provides comprehensive guidance on maternal and child healthcare. The information contained in the MCH Handbook covers almost the entire continuum of maternal and child health, including pregnancy, childbirth, postpartum care, newborn care, child vaccination, and growth monitoring for children under five years of age (Kuramata et al., 2022; Nishimura, Rahman, Ota, Toyama, & Nakamura, 2023; Osaki et al., 2019). The MCH Handbook has attracted considerable attention from policymakers

because of its potential to promote maternal and child healthcare utilization and improve the continuity of health services. Research conducted by Mori et al. (2015) demonstrated a significant increase in the proportion of antenatal care visits among pregnant women who utilized the MCH Handbook. Similarly, in Angola, the Ministry of Health, in collaboration with the Japan International Cooperation Agency (JICA), developed and implemented the MCH Handbook program to strengthen maternal and child health documentation and encourage greater utilization of essential healthcare services (Balogun et al., 2023; Kuramata et al., 2022).

Beyond its function as a medical record and health information resource, the MCH Handbook serves as an important health education instrument that may influence maternal knowledge, awareness, and healthcare-seeking behavior. The information provided in the handbook helps pregnant women recognize pregnancy-related danger signs, understand potential obstetric complications, and prepare for safe childbirth (Angela, Purnamasari, & Suptiani, 2024; Hardayanti, Ramadhan, Suharto, & Agusrianto, 2021). Previous studies conducted in Indonesia, Angola, Mongolia, and Bangladesh have reported associations between MCH Handbook utilization and improvements in maternal and child health service indicators, including antenatal care attendance, skilled birth attendance coverage, postpartum healthcare utilization, and maternal and child vaccination coverage (Balogun et al., 2023; Gai Tobe et al., 2022; Mori et al., 2015; Nishimura et al., 2023; Osaki et al., 2019). These findings suggest that the MCH Handbook has the potential to support informed maternal healthcare decisions. Nevertheless, improvements in general maternal healthcare utilization do not necessarily establish whether handbook utilization is associated with the specific decision to select an appropriate birth attendant, particularly among women experiencing high-risk pregnancies.

Maternal mortality remains a major public health concern, with most maternal deaths resulting from obstetric complications during pregnancy, childbirth, and the postpartum period, many of which are preventable through timely and appropriate healthcare interventions (WHO, UNICEF, UNFPA, World Bank Group, & UNDESA/Population Division, 2023). Women with high-risk pregnancies are particularly vulnerable to adverse maternal and neonatal outcomes because pre-existing conditions, pregnancy-related complications, and other obstetric risk factors may increase the likelihood of delivery-related complications (Rajbanshi, Norhayati, & Nik Hazlina, 2020; Rochjati, 2003). Consequently, selecting a qualified birth attendant is a critical component of safe delivery planning, especially for women requiring specialized obstetric monitoring and timely referral services. Although approximately 96.1% of deliveries in Indonesia are assisted by healthcare professionals, childbirth assistance provided by non-health personnel continues to occur, indicating persistent challenges in ensuring universal access to skilled birth attendance (Badan Kebijakan Pembangunan Kesehatan, 2024; Kusumawati, Erlinawati, Safitri, Nurman, & Erlin, 2023).

Despite the growing evidence supporting the benefits of MCH Handbook utilization, an important research gap remains regarding its association with birth attendant selection among women with high-risk pregnancies. Existing studies have primarily examined broader maternal and child health outcomes, such as antenatal care utilization, maternal health knowledge, postpartum service attendance, and overall

skilled birth attendance coverage. However, these outcomes do not specifically explain whether women with high-risk pregnancies who actively utilize the MCH Handbook are more likely to select qualified healthcare professionals as their birth attendants. Furthermore, the available evidence does not adequately distinguish the healthcare decision-making needs of high-risk pregnant women from those of the general pregnant population, despite their greater vulnerability to obstetric complications and their need for appropriate delivery planning. This distinction is particularly important because understanding pregnancy-related risks does not necessarily translate into selecting a skilled birth attendant. Therefore, the novelty of this study lies in its specific focus on the association between MCH Handbook utilization and birth attendant selection among women with high-risk pregnancies, rather than examining maternal healthcare utilization in the general pregnant population. Accordingly, this study aims to investigate the association between MCH Handbook utilization and the selection of birth attendants among women with high-risk pregnancies, providing evidence to inform targeted maternal health education and safe delivery planning strategies.

METHODS

This study was an observational analytic study with a case-control design. The case group consisted of postpartum mothers with high-risk pregnancy, and the control group consisted of postpartum mothers without risk factors. The independent variables were respondent characteristics (age, education, parity), hemoglobin level during pregnancy (anemia: Hb < 11 g/dL), and the utilization of the Maternal and Child Health (MCH) handbook, while the dependent variables were high-risk pregnancy (case or control status) and the choice of birth attendant (health worker or non-health worker).

The target population in this study consists of all postpartum mothers in the working areas of other community health centers comparable to the Kereng Bangkirai Public Health Center in Palangka Raya City. The study population includes all postpartum mothers in the working area of the Kereng Bangkirai Public Health Center in Palangka Raya City. The subjects in this study are postpartum mothers in the working area of the Kereng Bangkirai Public Health Center who were recorded in the Maternal and Child Health (MCH) Room register book of the Kereng Bangkirai Public Health Center.

Data were collected by conducting anamnesis or direct interviews with respondents using a questionnaire. The questionnaire used in this study was adapted from the questionnaire on the utilization of the Maternal and Child Health (MCH) handbook developed by Kusumayati and Nakamura (2007). In addition, data were also obtained through direct observation/examination, including the hemoglobin level recorded during pregnancy. The data were analyzed univariately to describe the frequency distribution of respondent characteristics (age, education, parity, and hemoglobin level), the utilization of the MCH handbook, and the choice of birth attendant. Differences in respondent characteristics, hemoglobin level, and MCH handbook utilization between the case and control groups were analyzed using the Pearson Chi-square test. Because only 13 mothers delivered with non-health workers, expected cell counts below five occurred in most comparisons of the choice of birth attendant; therefore, these relationships were analyzed using Fisher's exact test (two-sided). The significance level was set at $p < 0.05$. The strength of association

was expressed as crude odds ratios (OR) with 95% confidence intervals (CI) and as the contingency coefficient (r).

This study underwent an ethical review because it falls under behavioral research (social, psychosocial) involving humans as research subjects or participants, and the researchers obtained an ethics approval letter issued by the Ethics Committee of the Poltekkes Ministry of Health Palangka Raya.

RESULTS AND DISCUSSION

Results

The sample size was initially calculated using a formula for an unmatched categorical analytical study based on the odds ratio (OR), with a minimum required sample of 40 participants in each group. Using a non-probability purposive sampling approach, the study included 101 postpartum mothers residing in the working area of the Kereng Bangkirai Public Health Center, Palangka Raya City, who met the predefined eligibility criteria. Of the 101 participants, 41 (40.6%) were classified into the case group, consisting of postpartum mothers with at least two pregnancy-related risk factors identified using the Poedji Rochjati risk scoring system (2003). The remaining 60 participants (59.4%) were classified into the control group, comprising postpartum mothers without identified pregnancy-related risk factors. The inclusion of participants from both groups enabled comparisons of maternal characteristics, MCH Handbook utilization, and birth attendant selection according to pregnancy risk status.

Descriptive Statistics

Descriptive analysis was performed to summarize the demographic and obstetric characteristics of the study participants, including maternal age, educational attainment, and parity. The analysis also examined the distribution of MCH Handbook utilization and birth attendant selection across the case and control groups. Categorical variables were summarized using frequencies and percentages. The results are presented in Table 1, providing an overview of participant characteristics and the distribution of the main study variables according to pregnancy risk status. Based on pregnancy risk status, 41 participants (40.6%) were classified as having pregnancy-related risk factors, while 60 participants (59.4%) were categorized as having no identified risk factors. Regarding maternal age, 36 participants (35.6%) were classified into the at-risk age category, whereas 65 participants (64.4%) were classified into the non-risk age category. Most participants had advanced educational attainment (81.2%), while 18.8% had basic education. In terms of parity, 52 participants (51.5%) were categorized as having at-risk parity, compared with 49 participants (48.5%) in the non-risk category.

Regarding maternal hemoglobin status, 27 participants (26.7%) had anemia, defined as a hemoglobin concentration below 11 g/dL, while 74 participants (73.3%) were classified as non-anemic. These findings describe the distribution of selected maternal characteristics and potential obstetric risk indicators within the study population. With respect to MCH Handbook utilization, 67 participants (66.3%) demonstrated good utilization, defined as achieving a utilization score of at least 60%, whereas 34 participants (33.7%) demonstrated poor utilization. This finding indicates that approximately two-thirds of the participants met the study's criterion for good MCH Handbook utilization.

Table 1. Frequency Distribution of Characteristics of Respondents of High-Risk Pregnant Women in the Working Area of the Kereng Bangkirai Health Center.

Variable	n	%
Pregnant woman		

At risk	41	40.6
Not at risk	60	59.4
Amount	101	100.0
Age		
At Risk	36	35.6
Not at risk	65	64.4
Amount	101	100.0
Education		
Basic	19	18.8
Advanced	82	81.2
Amount	101	100.0
Parity		
At risk	52	51.5
Not at risk	49	48.5
Amount	101	100.0
Hemoglobin level		
Anemia (Hb < 11 g/dL)	27	26.7
Not anemic (Hb ≥ 11 g/dL)	74	73.3
Amount	101	100.0
Utilization of the MCH handbook		
Poor (score < 60%)	34	33.7
Good (score ≥ 60%)	67	66.3
Amount	101	100.0
Birth Attendant		
Non-healthcare worker	13	12.9
healthcare worker	88	87.1
amount	101	100.0

The results in Table 1 show that most mothers were in the non-risk age group (65 people; 64.4%), had further education (82 people; 81.2%), and had risk parity (52 people; 51.5%). A total of 27 mothers (26.7%) were anemic (Hb < 11 g/dL) during pregnancy. Most mothers who gave birth in the working area of the Kereng Bangkirai Health Center (67 people; 66.3%) made good use of the MCH handbook. However, 13 mothers (12.9%) still gave birth with non-health workers.

Primary Outcome Measures

Following the descriptive analysis, a comparative analysis was conducted to examine differences in maternal characteristics, hemoglobin levels, and MCH Handbook utilization between the case group (women with high-risk pregnancies) and the control group (women without identified pregnancy-related risk factors). This analysis aimed to identify variations in demographic, obstetric, and health-related characteristics across the two groups and to provide a clearer understanding of factors potentially associated with pregnancy risk status. Particular attention was given to MCH Handbook utilization to explore whether its distribution differed according to pregnancy risk status. These comparisons provide a basis for further examining the potential role of the MCH Handbook in maternal healthcare decision-making, particularly regarding birth attendant selection. The comparative results are presented in Table 2.

Table 2. Cross-tabulation of Respondent Characteristics, Hemoglobin Level, and Utilization of the MCH Handbook between High-Risk Pregnant Women (Cases) and Pregnant Women without Risk Factors (Controls) in the Working Area of the Kereng Bangkirai Health Center.

Variable	High-risk pregnancy				p-value*)	OR (95% CI)	r
	Yes (cases)		No (controls)				
	n	%	n	%			
Maternal age							
At risk	31	75.6	5	8.3	< 0.001	34.10 (10.69–108.81)	0.568
Not at risk	10	24.4	55	91.7			
Maternal education							
Basic	14	34.1	5	8.3	0.001	5.70 (1.86–17.48)	0.309
Advanced	27	65.9	55	91.7			
Parity							
At risk (primipara & grande multipara)	28	68.3	24	40.0	0.005	3.23 (1.40–7.46)	0.268
Not at risk (multipara)	13	31.7	36	60.0			
Hemoglobin level							
Anemia (< 11 g/dL)	11	26.8	16	26.7	0.986	1.01 (0.41–2.47)	0.002
Not anemic (≥ 11 g/dL)	30	73.2	44	73.3			
Utilization of the MCH handbook							
Poor (score < 60%)	15	36.6	19	31.7	0.607	1.25 (0.54–2.87)	0.051
Good (score ≥ 60%)	26	63.4	41	68.3			

**) Pearson Chi-square test. OR = crude odds ratio of being in the high-risk (case) group (95% confidence interval); r = contingency coefficient.*

Table 2 shows a significant relationship between high-risk pregnancy and maternal age (χ^2 = 48.06; p < 0.001; OR = 34.10; 95% CI 10.69–108.81; r = 0.568), maternal education (χ^2 = 10.63; p = 0.001; OR = 5.70; 95% CI 1.86–17.48; r = 0.309), and parity (χ^2 = 7.81; p = 0.005; OR = 3.23; 95% CI 1.40–7.46; r = 0.268). Mothers in the risk age group, with basic education, and with risk parity had higher odds of being in the high-risk (case) group. In contrast, the proportion of anemic mothers was almost identical in the case and control groups (26.8% vs. 26.7%; χ^2 < 0.001; p = 0.986; OR = 1.01; 95% CI 0.41–2.47; r = 0.002), and poor use of the MCH handbook was not lower among high-risk mothers (36.6%) than among controls (31.7%; χ^2 = 0.26; p = 0.607; OR = 1.25; 95% CI 0.54–2.87; r = 0.051).

Secondary Outcome Measures

Following the descriptive and comparative analyses, a bivariate analysis was conducted to examine the associations between maternal characteristics, hemoglobin levels, MCH Handbook utilization, and birth attendant selection. This analysis aimed to identify factors potentially associated with the selection of healthcare professionals or non-healthcare personnel as birth attendants, with particular emphasis on the role of MCH Handbook utilization in maternal healthcare decision-making. Maternal characteristics, including age, educational attainment, and parity, were examined alongside hemoglobin levels and MCH Handbook utilization to provide a broader understanding of factors potentially influencing birth attendant selection. Particular attention was given to determining whether MCH Handbook utilization was associated with birth attendant selection and assessing the magnitude and statistical significance of this association. The findings are expected to provide insights into the potential contribution of maternal health information and other individual characteristics to childbirth-related decisions, particularly among women with pregnancy-related risk factors. The results of the bivariate analysis are presented in Table 3.

Table 3. Cross-tabulation of Respondent Characteristics, Hemoglobin Level, and Utilization of the MCH Handbook with the Choice of Birth Attendant in the Working Area of the Kereng Bangkirai Health Center.

Variable	Choice of Birth Attendant				p-value*)	OR (95% CI)	r
	Non-health worker		Health worker				
	n	%	n	%			
Maternal age							
At risk	8	22.2	28	77.8	0.060	3.43 (1.03–11.43)	0.203
Not at risk	5	7.7	60	92.3			
Maternal education							
Basic	5	26.3	14	73.7	0.066	3.30 (0.94–11.59)	0.190
Advanced	8	9.8	74	90.2			
Parity							
At risk (primipara & grande multipara)	10	19.2	42	80.8	0.073	3.65 (0.94–14.17)	0.192
Not at risk (multipara)	3	6.1	46	93.9			
Hemoglobin level							
Anemia (< 11 g/dL)	4	14.8	23	85.2	0.743	1.26 (0.35–4.47)	0.035
Not anemic (≥ 11 g/dL)	9	12.2	65	87.8			
Utilization of the MCH handbook							
Poor (score < 60%)	8	23.5	26	76.5	0.030	3.82 (1.14–12.76)	0.221
Good (score ≥ 60%)	5	7.5	62	92.5			

**) Fisher's exact test, two-sided. One-sided p-values: maternal age 0.040; education 0.066; parity 0.046; hemoglobin 0.477; MCH handbook 0.027. OR = crude odds ratio of delivery by non-health workers (95% confidence interval); r = contingency coefficient.*

Table 3 shows that the proportion of deliveries assisted by non-health workers was higher among mothers in the risk age group (22.2% vs. 7.7%), with basic education (26.3% vs. 9.8%), with risk parity (19.2% vs. 6.1%), and with anemia (14.8% vs. 12.2%). However, these differences were not statistically significant (p = 0.060, 0.066, 0.073, and 0.743, respectively), and their associations were weak (r = 0.203, 0.190, 0.192, and 0.035). The only variable significantly associated with the choice of birth attendant was the utilization of the MCH handbook (p = 0.030; r = 0.221): mothers who made poor use of the handbook delivered with non-health workers more often (23.5%) than mothers who made good use of it (7.5%), with an odds ratio of 3.82 (95% CI 1.14–12.76).

Discussion

Interpretation of Key Findings

Based on the univariate analysis, out of a total of 101 samples, 41 mothers (40.6%) had at least two risk factors on the Poedji Rochjati risk scoring card, while the majority—60 women (59.4%)—did not have any risk factors in their pregnancy. Pregnant women who have risk factors are more likely to develop complications than those without risk factors. A prospective cohort in Nepal found that women classified as high-risk were 4.2 times more likely to develop severe maternal morbidity during childbirth, even though severe events also occurred among low-risk women (Rajbanshi et al., 2020). This supports the continued use of simple antenatal risk screening such as the Poedji Rochjati score card, which is not only a screening

instrument but also an effective counseling medium that improves women's knowledge of avoidable high-risk pregnancies (Rochjati, 2003; Simanungkalit, Handayani, & Akbar, 2021).

Based on the age factor, most pregnant women who gave birth in the working area of the Kereng Bangkirai Health Center were not at risk (64.4%). However, maternal age showed the strongest association with high-risk pregnancy ($r = 0.568$) and differed markedly between groups: 75.6% of high-risk mothers were in the risk age group compared with only 8.3% of mothers without risk factors ($p < 0.001$; OR = 34.10; 95% CI 10.69–108.81). The optimal reproductive age is generally considered to be 20–35 years. Adolescent pregnancy is associated with preeclampsia, preterm birth, and low birth weight, and pregnant adolescents in low- and middle-income countries often receive less adequate maternal care (Sabet et al., 2023), whereas advanced maternal age (≥ 35 years) increases the risk of stillbirth, fetal growth restriction, and other complications related to placental dysfunction (Lean, Derricott, Jones, & Heazell, 2017).

Based on the education level, most mothers had further education (81.2%), yet basic education was four times more common in the high-risk group (34.1%) than in the group without risk (8.3%; $p = 0.001$; OR = 5.70; 95% CI 1.86–17.48). Education shapes health literacy, the ability to recognize danger signs, and decision-making regarding care. A meta-analysis of studies from developing countries showed marked education-related inequity in the uptake of antenatal, skilled delivery, and postnatal care (Gube, Murányi, Vitrai, & Lohner, 2024), and analyses of Indonesian Demographic and Health Survey data consistently identified maternal education as a determinant of delivery assisted by health workers (Idris, Budiastuti, Razak, & Hasyim, 2022; Idris & Syafriyanti, 2022; Istifa et al., 2021).

Most mothers were in the high-risk parity group, namely primipara and grand multipara (51.5%), and risk parity was more frequent among high-risk mothers (68.3% vs. 40.0%; $p = 0.005$; OR = 3.23; 95% CI 1.40–7.46). According to the risk factor classification by Rochjati (2003), first-time pregnant women under the age of 20 have a uterus and pelvis that have not yet fully developed to adult size and are often not yet psychologically prepared, whereas mothers who have given birth four times or more are more likely to experience impaired health, laxity of the abdominal and uterine walls, and a pendulous abdomen. Recent evidence confirms that grand multiparity doubles the risk of postpartum hemorrhage and increases malpresentation (Dasa, Okunlola, & Dessie, 2022), while higher birth order with short birth intervals is associated with lower use of skilled birth attendants in eastern Indonesia (Efendi et al., 2020). Maternal age and parity are also determinants of the continuity of maternal health service use in Indonesia (Andriani, Rachmadani, Natasha, & Saptari, 2021).

A total of 26.7% of mothers in this study were anemic during pregnancy, which is close to the national prevalence of anemia among pregnant women of 27.7% (Badan Kebijakan Pembangunan Kesehatan, 2024). Anemia was equally common among high-risk mothers and mothers without risk factors (26.8% vs. 26.7%; $p = 0.986$; OR = 1.01), which indicates that anemia was not concentrated in the high-risk group and that hemoglobin screening and iron supplementation remain necessary for all pregnant women regardless of their risk category. Anemia is an important obstetric risk factor: in a large cohort from the WOMAN-2 trial, every 10 g/L reduction in prebirth hemoglobin increased the odds of clinical postpartum hemorrhage by 29%, and severe anemia was strongly associated with death or near miss (WOMAN-2 trial collaborators,

2023). Nevertheless, anemic mothers in our study delivered with non-health workers almost as often as non-anemic mothers (14.8% vs. 12.2%; p = 0.743; OR = 1.26; 95% CI 0.35–4.47). This suggests that a known clinical risk, such as anemia, did not by itself lead mothers to choose a health worker, so the risk communicated during antenatal care may not have been fully understood or acted upon.

Most pregnant women who gave birth in the working area of the Kereng Bangkirai Health Center made good use of the MCH handbook, as shown by 67 women (66.3%) who scored ≥ 60%. Nevertheless, 13 women (12.9%) still delivered with non-health personnel, and 15 high-risk pregnant women (36.6%) made insufficient use of the MCH handbook. Poor handbook use was not less common among high-risk mothers than among mothers without risk factors (36.6% vs. 31.7%; p = 0.607; OR = 1.25; 95% CI 0.54–2.87). In other words, mothers who most needed the information in the handbook did not use it more intensively, suggesting that handbook-based counseling during antenatal care was not yet targeted to their higher level of risk. Mothers with poor handbook use delivered with non-health personnel three times as often as mothers with good use (23.5% vs. 7.5%; p = 0.030; OR = 3.82; 95% CI 1.14–12.76), with a weak positive association (r = 0.221). In contrast, the higher proportions of non-health attendants among mothers in the risk age group (OR = 3.43; 95% CI 1.03–11.43), with basic education (OR = 3.30; 95% CI 0.94–11.59), and with risk parity (OR = 3.65; 95% CI 0.94–14.17) did not reach statistical significance (p = 0.060, 0.066, and 0.073). For maternal age, the confidence interval of the odds ratio only just excluded one while the exact test was not significant, so this finding should be regarded as borderline; with only 13 non-health deliveries, the study had limited power to detect moderate associations. Taken together, these results suggest that the way a mother actively uses the MCH handbook—reading it, discussing it with health workers, and using it to plan childbirth—influences her choice of birth attendant more consistently than her sociodemographic or clinical characteristics.

Comparison with Previous Studies

These findings are in line with recent evidence. A systematic review and meta-analysis of randomized trials found that the MCH handbook increased skilled birth attendance during delivery by 13% and the likelihood of six or more antenatal visits by 19%, while also fostering autonomy during antenatal care, better communication with providers, and family support (Nishimura et al., 2023). In rural Java, active use of the MCH handbook promoted continuous care, including professional assistance during delivery (Osaki et al., 2019). In Bangladesh, the MCH handbook—particularly when combined with a mobile platform—significantly improved the continuum of care from pregnancy to the neonatal period (Gai Tobe et al., 2022), and in Mongolia, handbook use increased antenatal visits and the detection of pregnancy complications (Mori et al., 2015). Earlier Indonesian evidence also showed that actually using the handbook, rather than merely owning it, was associated with better knowledge and greater use of skilled birth attendance (Kusumayati & Nakamura, 2007), which is consistent with our measurement of handbook utilization rather than ownership.

However, disparities with other studies warrant consideration. In a cluster randomized trial in Angola, the MCH handbook intervention promoted the initiation of antenatal care but did not significantly improve the continuum of care or facility-based delivery (Balogun et al., 2023). Likewise, the association in our study

was weak, and some mothers with good handbook use still delivered with non-health personnel (7.5%). Possible explanations include cultural norms, family-dominated decision-making, and the close social and geographical proximity of traditional birth attendants (Nasir et al., 2020), as well as personal beliefs, feelings of social alienation, and limited access to services that lead some Indonesian women to give birth at home assisted by untrained family members (Kusumawati et al., 2023). The benefit of the handbook also depends on how health workers explain and use it: mothers' engagement is shaped by providers' commitment (Carandang et al., 2022), and barriers such as difficult wording, a preference for more visual content, and inadequate encouragement from providers have been reported (Luta, Abdul Mumin, Abdul Rahman, & Hashim, 2024). Moreover, the proportion of deliveries by health workers in our study (87.1%) remains below the national figure of 96.1% (Badan Kebijakan Pembangunan Kesehatan, 2024), indicating a local gap that requires further research to reconcile with the broader literature.

Implications for Public Health

The implications of our study extend to public health practice. The MCH handbook should be actively used as a counseling tool during antenatal care for high-risk pregnant women, integrated with risk screening using the Poedji Rochjati score card and with birth planning. Because more than one third of high-risk mothers in this study made poor use of the handbook—a proportion no better than that of mothers without risk factors—mothers identified as high-risk should receive prioritized and repeated handbook-based counseling, including on danger signs, anemia, and the choice of a skilled birth attendant. Structured education using the MCH handbook has been shown to raise high-risk mothers' knowledge of pregnancy danger signs (Angela et al., 2024), and education on safe childbirth preparation can strengthen mothers' readiness to deliver with health workers (Hardayanti et al., 2021). Health workers should consistently record and explain the handbook content, and digital versions of the MCH handbook may complement the printed book for mothers who do not carry it to every visit (Amalia et al., 2025; Gai Tobe et al., 2022). Culturally sensitive health promotion and partnerships between midwives and traditional birth attendants are also needed so that high-risk mothers are referred to health workers (Nasir et al., 2020). These efforts are aligned with Sustainable Development Goal target 3.1 to reduce the global maternal mortality ratio to less than 70 per 100,000 live births by 2030 (WHO et al., 2023).

Limitations and Cautions

Despite its meaningful contributions, this study has several limitations. As a case-control study, it can show associations but cannot establish causality. It was conducted in a single public health center using purposive sampling with a relatively small sample (101 mothers, of whom only 13 delivered with non-health personnel), which produced small cell counts, wide confidence intervals, limited statistical power for the analysis of birth attendant choice, and limited generalizability. The analysis was bivariate, so the association between handbook use and choice of birth attendant was not adjusted for potential confounders such as distance to health facilities, economic status, health insurance, antenatal visit frequency, and husband or family support. Hemoglobin was taken from a single recorded measurement during pregnancy and may not reflect the mother's status at delivery. Handbook utilization and birth attendant choice were assessed retrospectively through interviews after delivery, which may introduce

recall and social desirability bias, and the utilization score was dichotomized at 60%. These limitations should be considered when interpreting the results.

CONCLUSION

This study shows that the use of the MCH handbook is effective in helping high-risk pregnant women select a birth attendant in the working area of the Kereng Bangkirai Health Center. Bivariate analysis showed a significant influence of MCH handbook use on the selection of birth attendants (p-value = 0.030), with a weak positive association (r = 0.221); mothers who made poor use of the handbook were almost four times more likely to deliver with non-health personnel (OR = 3.82; 95% CI 1.14–12.76). Maternal age, education, and parity were significantly related to high-risk pregnancy, whereas hemoglobin level and MCH handbook utilization did not differ between high-risk mothers and mothers without risk factors. Maternal age, education, parity, and hemoglobin level were not significantly related to the choice of birth attendant. Therefore, handbook-based counseling should be prioritized for high-risk pregnant women.

This research provides theoretical benefits to increase insight, experience, and knowledge development, primarily related to using the MCH handbook and high-risk pregnancies. Also, it is a literature input material for the learning process, especially for future researchers. Practically, this research can be an input and consideration for the Health Office and Public Health Center in preparing new policies or programs to optimize using the MCH handbook and high-risk pregnancy screening. For the community, this research also has a positive impact in the form of information related to the use of the MCH handbook and high-risk pregnancies so that appropriate prevention and handling efforts can be made.

REFERENCES

Amalia, R., Sulistiyani, E., Vinarti, R. A., Noveyani, A. E., Salim, L. A., & Indriani, D. (2025). Maternal and child health using the digitalization of the MCH handbook Paciran Primary Health Care. Journal of Nursing Practice, 8(2), 462–465. https://doi.org/10.30994/jnp.v8i2.488

Andriani, H., Rachmadani, S. D., Natasha, V., & Saptari, A. (2021). Continuity of maternal healthcare services utilisation in Indonesia: Analysis of determinants from the Indonesia Demographic and Health Survey. Family Medicine and Community Health, 9, e001389. https://doi.org/10.1136/fmch-2021-001389

Angela, N. F., Purnamasari, W. M., & Suptiani, L. P. (2024). Knowing the signs, changing the outcome: Educational impact of the mother and child health handbook on high-risk mothers. Jurnal Kesehatan Ibu dan Anak, 18(1), 84–94. https://doi.org/10.29238/kia.v18i1.2733

Badan Kebijakan Pembangunan Kesehatan. (2024). Survei Kesehatan Indonesia (SKI) 2023 dalam angka. Jakarta: Kementerian Kesehatan Republik Indonesia.

Balogun, O. O., Aoki, A., Tomo, C. K., Mochida, K., Fukushima, S., Mikami, M., … Takehara, K. (2023). Effectiveness of the maternal and child health handbook for improving continuum of care and other maternal and child health indicators: A cluster randomized controlled trial in Angola. Journal of Global Health, 13, 04022. https://doi.org/10.7189/jogh.13.04022

Carandang, R. R., Sakamoto, J. L., Kunieda, M. K., Shibanuma, A., Yarotskaya, E., Basargina, M., & Jimba, M. (2022). Effects of the maternal and child health handbook and other home-based records on mothers' non-health outcomes: A systematic review. BMJ Open, 12(6), e058155. https://doi.org/10.1136/bmjopen-2021-058155

Dasa, T. T., Okunlola, M. A., & Dessie, Y. (2022). Effect of grand multiparity on adverse maternal outcomes: A prospective cohort study. Frontiers in Public Health, 10, 959633. https://doi.org/10.3389/fpubh.2022.959633

Efendi, F., Sebayang, S. K., Astutik, E., Hadisuyatmana, S., Has, E. M. M., & Kuswanto, H. (2020). Determinants of safe delivery utilization among Indonesian women in eastern part of Indonesia. F1000Research, 9, 332. https://doi.org/10.12688/f1000research.23324.2

Gai Tobe, R., Haque, S. E., Mubassara, S., Rahman, R., Ikegami, K., & Mori, R. (2022). Maternal and child health handbook to improve continuum of maternal and child care in rural Bangladesh: Findings of a cluster randomized controlled trial. PLOS ONE, 17(4), e0266074. https://doi.org/10.1371/journal.pone.0266074

Gube, A. A., Murányi, E., Vitrai, J., & Lohner, S. (2024). Inequity in uptake of maternal health care services in developing countries: A systematic review and meta-analysis. Frontiers in Public Health, 12, 1415092. https://doi.org/10.3389/fpubh.2024.1415092

Hardayanti, D. A., Ramadhan, K., Suharto, D. N., & Agusrianto, A. (2021). Edukasi persiapan persalinan yang aman di era Covid-19. Madago Community Empowerment for Health Journal, 1(1), 21–25. https://doi.org/10.33860/mce.v1i1.660

Idris, H., Budiastuti, A., Razak, R., & Hasyim, H. (2022). Delivery services utilization based on urban rural status in Indonesia. Open Access Macedonian Journal of Medical Sciences, 10(E), 1147–1152. https://doi.org/10.3889/oamjms.2022.9757

Idris, H., & Syafriyanti, W. (2022). Trends and determinants of using delivery assistance by health workers: A secondary analysis using the 2007–2017 Indonesian Health and Demographics Survey. Makara Journal of Health Research, 26(1), 22–28. https://doi.org/10.7454/msk.v26i1.1332

Istifa, M. N., Efendi, F., Wahyuni, E. D., Ramadhan, K., Adnani, Q. E. S., & Wang, J. (2021). Analysis of antenatal care, intranatal care and postnatal care utilization: Findings from the 2017 Indonesian Demographic and Health Survey. PLOS ONE, 16(10), e0258340. https://doi.org/10.1371/journal.pone.0258340

Kuramata, M., Mochida, K., Fukushima, S., Sadamori, T., Suzuki, M., Francisco, K. R., … Takehara, K. (2022). Development and implementation of the maternal and child health Handbook in Angola. BMJ Global Health, 7(10), e010313. https://doi.org/10.1136/bmjgh-2022-010313

Kusumawati, N., Erlinawati, E., Safitri, Y., Nurman, M., & Erlin, F. (2023). Exploring women's reasons for choosing home birth with the help of their untrained family members: A qualitative research. International Journal of Community Based Nursing and Midwifery, 11(2), 72–84. https://doi.org/10.30476/IJCBNM.2023.97491.2186

Kusumayati, A., & Nakamura, Y. (2007). Increased utilization of maternal health services by mothers using the maternal and child health handbook in Indonesia. Journal of International Health, 22(3), 143–151.

Lean, S. C., Derricott, H., Jones, R. L., & Heazell, A. E. P. (2017). Advanced maternal age and adverse pregnancy outcomes: A systematic review and meta-analysis. PLOS ONE, 12(10), e0186287. https://doi.org/10.1371/journal.pone.0186287

Luta, Q. A., Abdul Mumin, K. H., Abdul Rahman, H., & Hashim, S. H. (2024). Usefulness of antenatal care handbook: A cross-sectional study of mothers' perspectives. Healthcare in Low-resource Settings, 12, 11813. https://doi.org/10.4081/hls.2023.11813

Mori, R., Yonemoto, N., Noma, H., Ochirbat, T., Barber, E., Soyolgerel, G., … Lkhagvasuren, O. (2015). The maternal and child health (MCH) handbook in Mongolia: A cluster-randomized, controlled trial. PLOS ONE, 10(4), e0119772. https://doi.org/10.1371/journal.pone.0119772

Nasir, S., Zerihun Kea, A., Steege, R., Limato, R., Tumbelaka, P., Datiko, D. G., … Taegtmeyer, M. (2020). Cultural norms create a preference for traditional birth attendants and hinder health facility-based childbirth in Indonesia and Ethiopia: A qualitative inter-country study. International Journal of Health Promotion and Education, 58(3), 109–123. https://doi.org/10.1080/14635240.2020.1719862

Nishimura, E., Rahman, M. O., Ota, E., Toyama, N., & Nakamura, Y. (2023). Role of maternal and child health handbook on improving maternal, newborn, and child health outcomes: A systematic review and meta-analysis. Children, 10(3), 435. https://doi.org/10.3390/children10030435

Osaki, K., Hattori, T., Toda, A., Mulati, E., Hermawan, L., Pritasari, K., … Kosen, S. (2019). Maternal and child health handbook use for maternal and child care: A cluster randomized controlled study in rural Java, Indonesia. Journal of Public Health, 41(1), 170–182. https://doi.org/10.1093/pubmed/fdx175

Rajbanshi, S., Norhayati, M. N., & Nik Hazlina, N. H. (2020). High-risk pregnancies and their association with severe maternal morbidity in Nepal: A prospective cohort study. PLOS ONE, 15(12), e0244072. https://doi.org/10.1371/journal.pone.0244072

Rochjati, P. (2003). Skrining antenatal pada ibu hamil: Pengenalan faktor risiko. Surabaya: Airlangga University Press.

Sabet, F., Prost, A., Rahmanian, S., Al Qudah, H., Cardoso, M. N., Carlin, J. B., … Patton, G. C. (2023). The forgotten girls: The state of evidence for health interventions for pregnant adolescents and their newborns in low-income and middle-income countries. The Lancet, 402(10412), 1580–1596. https://doi.org/10.1016/S0140-6736(23)01682-3

Simanungkalit, N., Handayani, S., & Akbar, M. I. A. (2021). Poedji Rochjati score card as media for preconception counseling. Folia Medica Indonesiana, 57(4), 310–316. https://doi.org/10.20473/fmi.v57i4.26818

WHO, UNICEF, UNFPA, World Bank Group, & UNDESA/Population Division. (2023). Trends in maternal mortality 2000 to 2020: Estimates by WHO, UNICEF, UNFPA, World Bank Group and UNDESA/Population Division. Geneva: World Health Organization.

WOMAN-2 trial collaborators. (2023). Maternal anaemia and the risk of postpartum haemorrhage: A cohort analysis of data from the WOMAN-2 trial. The Lancet Global Health, 11(8), e1249–e1259. https://doi.org/10.1016/S2214-109X(23)00245-0