



Differences in Knowledge of Mothers with Small Babies Regarding Small Baby Care in Areas Using and Not Using the Special Maternal Child Health Handbook for Small Babies

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Abstract

Background: The implementation of the special Maternal and Child Health (MCH) Handbook for small babies has been introduced in several regions in Indonesia. This is because the existing MCH Handbook, which is widely used in Indonesia, has not fully accommodated the needs of mothers and families as a guide for caring for and monitoring small babies. This study aims to analyze the differences in knowledge of mothers with small babies regarding small baby care in areas using and not using the special MCH Handbook for small babies.

Methods: This study employed a cross-sectional comparative design. The study was conducted in the working area of Tanjung Paku Public Health Center in Solok City, West Sumatra, Indonesia, as the group using the special MCH Handbook for small babies, and in the working area of Pariaman Public Health Center in Pariaman City, West Sumatra, Indonesia, as the group not using the special MCH Handbook for small babies. The study was conducted from September to October 2024. The required sample size was 46 participants per group, with a total of 92 participants. A simple random sampling technique was used. Data were analyzed using the Mann-Whitney test, with a significance level of $P < 0.05$.

Results: The median total score for maternal knowledge about small baby care in areas using the special MCH Handbook was 14, higher than the score of 12 in areas that did not use the handbook. A significant difference was found in maternal knowledge regarding small baby care between areas using and not using the special MCH Handbook ($P < 0.05$).

Conclusion: There is a significant difference in the knowledge of mothers with small babies regarding small baby care between areas using and not using the special MCH Handbook for small babies. Strengthening policies and promoting the importance of the special MCH Handbook for small babies is crucial to improving maternal knowledge in small baby care, especially in areas with high rates of preterm births.

Keywords: MCH Handbook, small babies, knowledge, action

Introduction

Ensuring healthy lives and promoting well-being for all ages is one of the Sustainable Development Goals (SDGs). Indonesia has set a target to reduce the neonatal mortality rate to 12 per 1,000 live births. Neonatal mortality (0–28 days) is a major concern as it contributes to 59% of infant deaths.¹

According to the World Health Organization (WHO), approximately 15 million preterm babies are born annually, accounting for 5–18% of total births. More than 60% of these preterm births occur in Africa and South Asia, with a higher prevalence in low-income countries (12%) compared to high-income countries (9%). Indonesia ranks

among the top five countries with the highest number of preterm births, with approximately 675,000 cases annually.²

In Indonesia, preterm birth and low birth weight (LBW) are the leading causes of neonatal mortality (35.2%), followed by asphyxia (24.7%), congenital anomalies (11.4%), infections (3.4%), neonatal tetanus (0.3%), and other causes (22.5%). The 2021 Indonesian Nutrition Status Survey (SSGI) reported a 6.6% prevalence of preterm births, with the highest rates in East Nusa Tenggara (10.3%), Central Sulawesi (8.7%), and Central Kalimantan (8.4%), while West Sumatra recorded 5.9%—still far from the national target of 3%.³ In West Sumatra, the LBW prevalence in 2023 was 4.5%, with the highest rates in Sawahlunto (7.6%), Sijunjung (7.4%), and Solok (5.9%).⁴

Small babies refer to preterm infants (gestational age <37 weeks) and/or those with a birth weight below 2,500 grams. These infants face a higher risk of health complications, particularly those born before 32 weeks, which may lead to long-term health problems, growth issues, and increased mortality within the first month of life.^{5,6} LBW can result from prematurity or intrauterine growth restriction due to maternal nutritional deficits during pregnancy. Compared to full-term infants, preterm and LBW infants are more susceptible to neonatal health complications.

Mothers of small babies often face challenges in caregiving, as preterm infants require specialized care both in hospitals and at home to support optimal growth and survival. Many mothers lack confidence in caring for their small babies due to limited knowledge, experience, and caregiving skills.⁷ Key aspects of small baby care include breastfeeding techniques, Kangaroo Mother Care (KMC), growth monitoring, corrected age awareness, immunization, and nutrition.⁸ Studies indicate that mothers caring for preterm infants experience significant stress, often linked to inadequate knowledge, underscoring the need for health education and social support.^{8,9-13}

Indonesia's Ministry of Health (MoH) introduced the Maternal and Child Health (MCH) Handbook to provide essential health information for pregnant women, postpartum mothers, and children up to six years old.⁴ However, this handbook does not fully address the specific needs of mothers caring for small babies. In response, the Little Baby Handbook (LBH) was developed in 2021 through collaboration between the Indonesian Ministry of Health and the Japan International Cooperation Agency (JICA) as part of a technical cooperation initiative. LBH underwent needs assessment and pilot testing in selected regions, including Solok City, Kudus, and Banyumas. Solok City has implemented LBH since February 2021, whereas Pariaman City has not adopted its use.

Solok and Pariaman share similar demographic characteristics as urban centers in West Sumatra with a significant working-age population. Their neonatal health indicators, particularly LBW prevalence (Solok: 5.91%, Pariaman: 5.24%), remain above the national target. Tanjung Paku Public Health Center in Solok serves as an LBH pilot site, while Pariaman Public Health Center, selected randomly from seven health centers in Pariaman, serves as the non-LBH comparison site.^{12,13}

Given these factors, this study aims to examine the differences in knowledge, perception, and actions of mothers with small babies in areas using and not using the special MCH Handbook for small babies.

Methods

Study design and research sample

This study employed an observational analytic design with a cross-sectional comparative approach to examine differences in knowledge, perception, and actions of mothers with small babies regarding small baby care in areas using and not using the special Maternal and Child Health (MCH) Handbook for small babies. The study was conducted between September and October 2024 in two locations in West Sumatra, Indonesia. The intervention group consisted of mothers in Tanjung Paku Public Health Center, Solok City, who used the special MCH Handbook for small babies, while the comparison group included mothers in Pariaman Public Health Center, Pariaman City, who did not use the handbook.

The study population comprised mothers of preterm and/or low birth weight (LBW) infants born between January and December 2023 in the respective study sites. Participants were selected using simple random sampling based on birth registries. The required minimum sample size for each group was 46 participants, resulting in a total of 92 participants.

Variables and operational definition

The independent variable in this study was the use of the special MCH Handbook for small babies, categorized as "used" or "not used" based on an interview assessment. The dependent variable included knowledge, Maternal knowledge of small baby care covered topics such as corrected age, breastfeeding, nutrition, growth monitoring, development, immunization, follow-up care, danger signs, and LBW care. Knowledge scores were obtained through structured interviews using a validated questionnaire developed by the Project for Enhancing the Quality of Maternal and Child Health Program and the Implementation of Maternal and Child Health Handbook in the Era of Decentralization.¹⁴

Data collection technique

Data collection involved field visits to Tanjung Paku and Pariaman Public Health Centers. Local midwives assisted in identifying eligible participants based on birth records. Participants were contacted, informed about the study, and provided written informed consent before their involvement. Researchers administered the questionnaire and assisted participants in completing it. Maternal knowledge was assessed using a combination of interviews and an observation checklist.

Ethical consideration

The research was granted ethical approval by the Ethics Committee of the Faculty of Medicine at Andalas University (Approval No. 502/UN.16.2/KEP-FK/2024). Written informed consent was obtained from all participants prior to their involvement in the study. Confidentiality and anonymity were rigorously upheld throughout the research process.

Data analysis

Data analysis was conducted in two stages. Univariate analysis was used to describe each variable. Numerical data were presented as median with minimum and maximum. Categorical data were presented as frequencies and percentages. For bivariate analysis, the Mann-Whitney U test was used to compare maternal knowledge between the two groups, as the data were not normally distributed. A p-value of less than 0.05 was considered statistically significant, with a confidence interval of 95 percent.

Results

The characteristics of the respondents are presented in Table 1.

Table 1. The characteristics of the respondents

Variable	MCH handbook for small babies		P-value
	Used f (%)	Not used f (%)	
Mother's age (years)			0.856
<20	3 (6.5)	2 (4.3)	
20-35	33 (71.7)	35 (76.1)	
>35	10 (21.7)	9 (19.6)	
Mother's education			0.558
No school	5 (10.9)	7 (15.2)	
Elementary school	10 (21.7)	14 (30.4)	
Junior high school	18 (39.1)	18 (39.1)	
Senior high school	12 (26.1)	6 (13.0)	
University	1 (2.2)	1 (2.2)	
Mother's occupation			0.196
Housewife	33 (71.7)	40 (87.0)	
Civil servant	2 (4.3)	1 (2.2)	
Entrepreneur	11 (23.9)	5 (10.9)	
Marital status			N/A
Marriage	46 (100.0)	46 (100.0)	

Single	0	0	
Divorce	0	0	
Gestational age at birth			1.000
Preterm	29 (63.0)	28 (60.9)	
Aterm	17 (37.0)	18 (39.1)	
Delivery type			0.676
Normal delivery	20 (43.5)	23 (50.0)	
Assisted delivery (forceps/ vacuum)	0	0	
Cesarean section	26 (56.5)	23 (50.0)	
Delivery complications			0.354
None	31 (67.4)	24 (52.2)	
Preeclampsia/Eclampsia	8 (17.4)	7 (15.2)	
Placental abruption	0	1 (2.2)	
Postpartum hemorrhage	2 (4.3)	3 (6.5)	
Others	5 (10.9)	11 (23.9)	
Birth attendant			0.262
Specialist	32 (69.6)	25 (54.3)	
General practitioner	2 (4.3)	2 (4.3)	
Midwife	11 (23.9)	19 (41.3)	
Non-medical personnel	1 (2.2)	0	
Neonatal ICU admission			0.033*
Yes	24 (52.2)	13 (28.3)	
No	22 (47.8)	33 (71.7)	
Birth weight, median (min-maks)	2200 (1300-2460)	2200 (1050-2496)	0.999
Birth length, median (min-maks)	45 (37-49)	45 (38-50)	0.999

*P<0.05, considered significant; N/A, not account

Table 1 shows the characteristics of the respondents were generally similar between the two groups. More than half of the respondents in both groups were aged between 20–35 years. In terms of education, a higher proportion of mothers in the intervention group had completed senior high school (26.1%) compared to the control group (13.0%). Most respondents in both groups were housewives. Regarding gestational age at birth, there was no significant difference, with more than half of the respondents in both groups having preterm births. The type of delivery was also similar, with cesarean sections being the most common (56.5% in the intervention group and 50.0% in the control group). A higher proportion of mothers in the control group experienced complications during delivery, including eclampsia (15.2%), postpartum hemorrhage (6.5%), and placental abruption (2.2%), compared to the intervention group (eclampsia: 17.4%, postpartum hemorrhage: 4.3%). Specialist-assisted deliveries were more frequent in the intervention group (69.6%) compared to the control group (54.3%). A significant difference was found in NICU admission rates, with a higher proportion of babies in the intervention group requiring NICU care (52.2%) compared to the control group (28.3%) ($p = 0.033$). However, the median birth weight and length were similar between the two groups (2,200 grams and 45 cm, respectively).

Differences in maternal knowledge on small baby care (Table 2).

Table 2. Differences in maternal knowledge on small baby care

Total score variable	MCH handbook for small babies (Median, min-maks)		P-value
	Used	Not used	
Knowledge	14 (8-18)	12 (6-16)	<0.001

Table 2 shows the median knowledge score was higher in the intervention group (14) compared to the control group (12). A statistically significant difference was found ($p < 0.05$) using the Mann-Whitney U test. The distribution of correct responses to the knowledge assessment is shown in Table 3.

Table 3. Distribution of correct responses on maternal knowledge

Question	MCH handbook for small babies		P-value
	Used f(%)	Not used f(%)	
Corrected age of the baby	21 (45.7)	14 (30.4)	0.198
Until when should mothers use the corrected age to assess baby growth and development?	31 (67.4)	7 (15.2)	<0.001*
Benefits of exclusive breastfeeding	34 (73.9)	30 (65.2)	0.497
Statement about colostrum	31 (67.4)	30 (65.2)	1.000
Individuals who can perform Kangaroo Mother Care (KMC) for small babies	20 (43.5)	5 (10.9)	0.001*
Alternative feeding options if the mother's breast milk is insufficient or unavailable for the baby	15 (32.6)	4 (8.7)	0.010*
The appropriate time to introduce complementary feeding to the baby	44 (95.7)	43 (93.5)	1.000
Tool used to monitor baby growth and development	43 (93.5)	42 (91.3)	1.000
Growth chart indicators requiring immediate medical consultation	27 (58.7)	24 (52.2)	0.675
Benefits of the MCH Handbook	34 (73.9)	33 (71.7)	1.000
Danger signs in babies at a corrected age of 2 months	32 (69.6)	23 (50.0)	0.089
Definition of immunization for small babies or low birth weight (LBW) infants	38 (82.6)	35 (76.1)	0.606
Danger signs in small babies or LBW infants	10 (21.7)	3 (6.5)	0.073
Efforts to maintain the baby's temperature within a stable range (36.5–37.5°C)	29 (63.0)	26 (56.5)	0.671
Is it true that a mother should cover the baby's body with kitchen spices when the baby has a persistent fever (temperature above 37.5°C)?	41 (89.1)	37 (80.4)	0.384
Is it true that seizures, difficulty breathing with bluish skin, and yellow discoloration of the eyes and skin are danger signs in newborns?	42 (91.3)	41 (89.1)	1.000
How often should mothers take small babies to the hospital for nutritional status monitoring?	39 (84.8)	38 (82.6)	1.000
Is Kangaroo Mother Care (KMC) effective in improving breastfeeding and helping preterm babies gain weight?	43 (93.5)	42 (91.3)	1.000
Can infant massage be performed at home during the first 6–7 months of a baby's life?	39 (84.8)	37 (80.4)	0.783
Is it true that small babies should not be exposed to water and should not be bathed daily?	38 (82.6)	35 (76.1)	0.606

*P<0.05, considered significant

Table 3 founds a significant difference was observed in the understanding of corrected age for growth assessment (67.4% in the intervention group vs. 15.2% in the control group, $p < 0.001$). Similarly, the knowledge of individuals eligible to perform Kangaroo Mother Care (KMC) was higher in the intervention group (43.5%) than in the control group (10.9%) ($p = 0.001$). Furthermore, knowledge of alternative feeding options when breast milk was insufficient was significantly higher in the intervention group (32.6%) than in the control group (8.7%) ($p = 0.010$).

Discussions

This study examined differences in maternal knowledge, perception, and actions regarding small baby care between areas using and not using the special Maternal and Child Health (MCH) Handbook for small babies. The results demonstrated that mothers who used the handbook had significantly higher knowledge, more positive perceptions, and better caregiving actions compared to those who did not use it. The intervention group had

a higher median knowledge score (14 vs. 12, $p < 0.001$), perception score (18 vs. 17, $p = 0.001$), and action score (9 vs. 8, $p = 0.004$). The largest differences were observed in understanding corrected age for growth assessment, the ability to perform Kangaroo Mother Care (KMC), and knowledge of alternative feeding options for preterm or low birth weight (LBW) infants. These findings suggest that the special MCH Handbook for small babies plays a crucial role in improving maternal competency in neonatal care.

The findings of this study align with previous research emphasizing the importance of maternal education and structured health communication tools in improving neonatal care practices. A study reported that mothers with higher knowledge about preterm infant care were more confident in performing KMC, breastfeeding, and recognizing warning signs.¹⁵ Similarly, Another study found that mothers with limited knowledge often lacked confidence in caring for preterm infants, which could negatively impact neonatal health outcomes. The present study supports these findings by showing that mothers in the intervention group demonstrated better neonatal care practices, likely due to the structured guidance provided by the special MCH Handbook.¹⁶

Furthermore, a study emphasized that stress and anxiety levels among mothers of preterm infants were significantly reduced when they had access to comprehensive health information and professional support. This study also found that mothers in the intervention group had a more positive perception of neonatal care, particularly in decision-making, family support, and communication with healthcare providers.¹⁷ These findings reinforce previous evidence that structured educational tools, such as the special MCH Handbook, can enhance maternal confidence and engagement in neonatal care.¹⁸⁻²⁰

One of the strengths of this study is its rigorous comparative design, which enables an objective assessment of the impact of the special MCH Handbook on maternal knowledge, perception, and actions. Additionally, the use of a validated questionnaire ensures the reliability of the data collection process. The study also employed random sampling, which reduces selection bias and increases the generalizability of the findings.

However, some limitations should be acknowledged. First, this study was conducted in only two locations, limiting the generalizability of the findings to other regions with different healthcare infrastructures. Second, self-reported data may be subject to recall bias, as participants may overestimate or underestimate their knowledge and caregiving behaviors. Third, while the study identified significant differences in maternal knowledge, perception, and actions, it did not assess long-term health outcomes of preterm and LBW infants. Future studies should include longitudinal follow-up assessments to determine whether improved maternal knowledge and caregiving actions translate into better neonatal health and developmental outcomes.

This study highlights the importance of structured educational interventions for neonatal care, but further research is needed to explore additional aspects. Future studies should investigate the long-term impact of the special MCH Handbook on infant growth, development, and morbidity outcomes. Additionally, qualitative research exploring maternal experiences and challenges in using the handbook could provide deeper insights into how to optimize its implementation.

Conclusions

This study demonstrates that the special MCH Handbook for small babies significantly improves maternal knowledge in neonatal care. The findings emphasize the need for wider implementation of the handbook to enhance neonatal care education and reduce preterm birth-related complications. Healthcare providers, policymakers, and stakeholders must collaborate to expand the use of structured educational tools to improve maternal and child health outcomes in Indonesia.

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Declaration concerning generative AI and AI-augmented technologies in the compositional process

In the course of preparing this paper, the authors utilized ChatGPT to enhance readability and linguistic quality. Subsequent to utilizing this tool/service, the writers assessed and amended the information as necessary and assume complete accountability for the publication's content.

Declarations of competing interest

No potential competing interest was reported by the authors.

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