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Literasi kesehatan berbasis budaya dan pengetahuan perawatan nifas pada ibu etnis ternate: Studi kuasi-eksperimental

Culturally tailored health literacy and postpartum care knowledge among ternate mothers: A quasi-experimental study

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Abstract

Background: Traditional postpartum care practices are common in the Ternate ethnic community and may pose health risks when maternal knowledge is limited. This study assessed whether a culturally tailored health literacy intervention was associated with improved postpartum care knowledge among Ternate women.
Methods: A quasi-experimental pretest-posttest study with a non-randomized control group was conducted at coastal community health centers in Ternate, North Maluku, Indonesia, from February to April 2024. Sixty-two postpartum mothers were recruited through purposive sampling and allocated to the intervention and control groups (n = 31 each). The intervention group received eight weekly culturally tailored education sessions and a booklet, whereas the control group received routine education. Knowledge was measured using a validated 20-item questionnaire (Cronbach's alpha = .85). Paired- and independent-samples t tests were used.
Results: The baseline mean (SD) knowledge scores were 11.74 (1.71) in the intervention group and 11.74 (1.69) in the control group. At posttest, the mean score was 19.35 (0.42) in the intervention group and 16.74 (1.67) in the control group ($p < .001$). The reported between-group mean difference was 2.61 (95% CI, 2.01-3.21; $p < .001$), with Cohen's d = 2.14.
Conclusion: The culturally tailored intervention was associated with higher immediate posttest knowledge than routine education among Ternate mothers. Interpretation should consider the non-randomized, site-based allocation and short-term knowledge outcome.

Keywords:
Culturally tailored education, health literacy, maternal health, postpartum care, postpartum mothers

Abstrak

Latar belakang: Praktik perawatan nifas tradisional masih umum di komunitas etnis Ternate dan dapat menimbulkan risiko kesehatan ketika pengetahuan ibu terbatas. Penelitian ini menilai hubungan intervensi literasi kesehatan berbasis budaya dengan peningkatan pengetahuan perawatan nifas pada ibu etnis Ternate.
Metode: Penelitian kuasi-eksperimental dengan desain pretest-posttest kelompok kontrol nonrandomisasi dilaksanakan di puskesmas wilayah pesisir Kota Ternate, Maluku Utara, pada Februari-April 2024. Sebanyak 62 ibu nifas direkrut secara purposif dan dialokasikan berdasarkan lokasi ke kelompok intervensi dan kontrol (masing-masing n = 31). Kelompok intervensi menerima delapan sesi edukasi mingguan berbasis budaya dan buklet, sedangkan kelompok kontrol menerima edukasi rutin. Pengetahuan diukur menggunakan kuesioner 20 butir yang telah diuji (Cronbach's alpha = 0,85). Analisis menggunakan uji t berpasangan dan uji t sampel independen.
Hasil: Rerata (SD) skor pengetahuan awal adalah 11,74 (1,71) pada kelompok intervensi dan 11,74 (1,69) pada kelompok kontrol. Pada posttest, rerata skor adalah 19,35 (0,42) pada kelompok intervensi dan 16,74 (1,67) pada kelompok kontrol ($p < 0,001$). Selisih rerata antarkelompok yang dilaporkan sebesar 2,61 (95% CI: 2,01-3,21; $p < 0,001$), dengan Cohen's d = 2,14.

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Kesimpulan: Intervensi berbasis budaya berkaitan dengan skor pengetahuan posttest yang lebih tinggi dibandingkan edukasi rutin pada ibu etnis Ternate. Interpretasi perlu mempertimbangkan alokasi berbasis lokasi yang tidak acak dan pengukuran hasil jangka pendek.

Kata Kunci:
Edukasi berbasis budaya, ibu pascapersalinan, kesehatan maternal, literasi kesehatan, perawatan nifas

Introduction

The postpartum period is an important phase of maternal recovery after childbirth. During this period, mothers require appropriate care to prevent complications and support their physical and psychological recovery (Nguyen et al., 2022). However, in several regions of Indonesia, traditional postpartum care practices are still commonly performed based on cultural beliefs that have been passed down through generations (Pattinasarany et al., 2020). Some traditional practices may provide benefits, while others may pose health risks to postpartum mothers when not aligned with modern healthcare principles (Usman & Sapril, 2018).

Risky traditional postpartum care practices are still widely found in communities with strong cultural traditions, including the Ternate ethnic community (Rahayu et al., 2017). Several practices are commonly performed, including dietary restrictions, the use of traditional herbal remedies without medical supervision, postpartum massage, body fumigation, and delayed access to healthcare services when complications occur during the postpartum period (Reiza, 2018). These practices are generally influenced by family beliefs and the role of traditional birth attendants known as *mama biang*, who remain highly trusted in postpartum care (Mariyati & Tumansery, 2018).

The persistence of risky traditional postpartum practices may negatively impact maternal health. Limited knowledge of postpartum danger signs and the importance of modern postpartum care often leads mothers to prioritize traditional practices over professional healthcare services (Mirawati et al., 2020). This condition may increase the risk of infection, postpartum hemorrhage, delayed treatment of complications, and impaired maternal recovery (Yufuai & Widagdo, 2018).

One of the factors influencing maternal health behavior during the postpartum period is health literacy (Wagner et al., 2020). Health literacy refers to an individual's ability to obtain, understand, evaluate, and use health information appropriately to make health-related decisions (Barnes et al., 2022). Postpartum mothers with adequate health literacy are more likely to understand safe postpartum care practices and appropriately utilize healthcare information during the postpartum period (Bazzano et al., 2020).

Health literacy can be strengthened through education adapted to the sociocultural characteristics of the community (Wagner et al., 2020). Culturally responsive approaches can incorporate local values and beliefs to make health information more understandable and acceptable. However, evidence on culturally tailored postpartum health literacy interventions in the Ternate ethnic community remains limited.

Conventional education may not adequately address local beliefs that shape postpartum care. This study evaluated a culturally tailored health literacy intervention that combined evidence-based postpartum guidance with selected Ternate cultural practices. The objective was to compare immediate changes in postpartum care knowledge between mothers receiving the tailored intervention and those receiving routine education.

Methods

Study Design

This quasi-experimental study used a pretest-posttest non-equivalent control group design. Allocation was site-based rather than randomized: participants from one community health center cluster were assigned to the intervention group, and participants from a geographically distinct cluster were assigned to the control group.

Participant and facilitator blinding were not feasible. The sites were separated to reduce cross-contamination, and routine education at the control site was delivered without access to the culturally tailored booklet.

Study Setting and Period

This study was conducted in coastal communities inhabited by the Ternate ethnic group in Ternate,

North Maluku, Indonesia, from February to April 2024. The eight-week intervention and synchronized posttest assessments were completed within this period.

Population and Sample

The study population consisted of postpartum mothers from the Ternate ethnic community residing in the selected research areas. The inclusion criteria were postpartum mothers within 0–42 days after delivery, those willing to participate in the study, those able to communicate effectively, and those residing in the study area during the research period. Mothers with severe postpartum complications or serious medical conditions were excluded.

The sample size was calculated a priori for an independent-samples t-test, assuming Cohen's d = 0.80, alpha = .05, 1 - beta = .85, and a 1:1 allocation ratio. The minimum required sample size was 56 participants (28 per group). After allowing for 10% attrition, the target sample was 62 participants (31 per group). Purposive sampling was used to recruit eligible participants; however, this approach limits population-level generalizability.

The recruitment flow is as follows: a total of 75 postpartum mothers were assessed for eligibility. Among them, 13 were excluded (9 did not meet the inclusion criteria and 4 declined to participate). The remaining 62 mothers were allocated to either the intervention group ($n = 31$) or the control group ($n = 31$). Throughout the 8-week study period, there was zero attrition (lost to follow-up = 0) in both groups due to rigorous community-based monitoring. Therefore, a final total of 62 participants (31 in the intervention group and 31 in the control group) were fully analyzed.

Data Collection

Data were collected by trained research assistants using a structured postpartum care knowledge questionnaire under the supervision of the researcher. The instrument development and psychometric testing are described below.

Maternal postpartum knowledge instrument. A structured questionnaire was developed by the researchers to measure postpartum care knowledge based on standard maternal health guidelines from the Indonesian Ministry of Health, culturally tailored to the Ternate ethnic context. The instrument consists of 20 items spanning four core domains: maternal hygiene and nutrition, newborn care, recognition of postpartum danger signs, and cultural practices during the puerperium. Each item uses a binary response option (correct = 1, incorrect/do not know = 0), yielding a total score range of 0 to 20. Higher scores indicate a higher level of knowledge, interpreted as low (score < 12), moderate (12–16), and high (> 16). Content validity was established through expert panel reviews involving two senior obstetricians and a public health specialist, achieving a content validity index (CVI) of 0.92. A pilot test was conducted among 15 postpartum mothers outside the study sample to establish construct clarity, and the instrument demonstrated high internal consistency with a Cronbach's alpha coefficient of .85.

Intervention protocol (culturally tailored health literacy). The intervention group received face-to-face counseling and a culturally adapted educational booklet. The booklet was developed through focus group discussions with Ternate cultural leaders and community midwives to integrate biomedical guidance with safer adaptations of local practices. The intervention comprised eight weekly 60-minute home sessions delivered by the primary researcher, with assistance from trained village midwives. Adherence and fidelity were monitored using standardized checklists. The pretest was administered before the first session, and the posttest was administered one week after the final session.

Control group protocol (routine education). The control group received routine maternal health education from the local community health center. This consisted of one counseling session of approximately 30-45 minutes using the government Maternal and Child Health booklet. The content addressed general maternal nutrition and infant care without cultural tailoring or repeated home visits. Pretest and posttest timing matched the intervention group.

Data Processing and Statistical Analysis

Analyses were performed using IBM SPSS Statistics version 26. Normality was assessed using the Shapiro–Wilk test, and homogeneity of variance was assessed using Levene's test. No missing data were reported. Baseline categorical variables were compared using the chi-square test or Fisher's exact test, as appropriate. Within-group changes in

knowledge were analyzed using paired-samples t tests, and between-group posttest and change-score comparisons were analyzed using independent-samples t tests. Tests were two-sided with alpha = .05; 95% confidence intervals and Cohen's d were reported for the primary comparison.

Ethical Considerations

This study followed the Declaration of Helsinki and was approved by the Health Research Ethics Committee, Faculty of Public Health, Universitas Hasanuddin (No. 408/UN4.14.1/TP.01.02/2024; February 12, 2024). Written informed consent was obtained from all adult participants. For participants aged 17 years, written assent and permission from a legally authorized representative were obtained before enrollment.

Hasil

Respondents' Characteristics

The demographic characteristics of the participants are presented in Table 1.

Table 1. Baseline demographic characteristics of the intervention and control groups

Characteristics	Intervention Group, f (%)	Control Group, f (%)	p-value
Maternal Age (Years)			
17–25	4 (12.9)	9 (29.0)	0.287
26–35	20 (64.5)	17 (54.8)	
36–45	7 (22.6)	5 (16.1)	
Maternal Education			
Junior High School	10 (32.3)	6 (19.4)	0.240
Senior High School	18 (58.1)	24 (77.4)	
Bachelor's degree	3 (9.7)	1 (3.2)	
Occupation			
Housewife	23 (74.2)	24 (77.4)	0.895
Private Employee	5 (16.1)	5 (16.1)	
Civil servant	3 (9.7)	2 (6.5)	
Family Income			
< 2 million IDR	6 (19.4)	9 (29.0)	0.673
2–3 million IDR	17 (54.8)	15 (48.4)	
> 3 million IDR	8 (25.8)	7 (22.6)	
Parity Status			
1–2 children	13 (41.9)	10 (32.2)	0.588
3–4 children	15 (48.4)	19 (61.3)	
> 4 children	3 (9.7)	2 (6.5)	
Total	31 (100)	31 (100)	

Note. Values are presented as n (%). a Baseline categorical variables were compared using chi-square or Fisher's exact tests, as appropriate. No baseline comparison reached the pre-specified significance threshold (p > 0.05).

Most participants in both groups were aged 26–35 years, had completed senior high school, were housewives, reported a family income of IDR 2–3 million, and had three to four children. None of the reported baseline comparisons were statistically significant; however, nonsignificant tests do not establish group equivalence.

Comparison of Maternal Knowledge Scores Between Intervention and Control Groups

A comparison of the maternal knowledge scores before and after the intervention is presented in Table 2.

Table 2. Pretest, posttest, and change scores for maternal postpartum care knowledge by study group

Maternal Knowledge	Pretest Mean ± SD	Posttest Mean ± SD	p-value	Mean change ± SD
Intervention	11.74 ± 1.71	23.77 ± 0.42	< 0.001*	12.03 ± 1.74
Control	11.74 ± 1.69	16.74 ± 1.67	< 0.001*	5.00 ± 2.08
p-value	1.000**	< 0.001**		< 0.001**

Note. M = mean; SD = standard deviation; MD = mean difference; CI = confidence interval; t = t statistic; d = Cohen's d. The stated total score range was 0–20. Within-group differences were analyzed using paired-samples t tests, and between-group comparisons were analyzed using independent-samples t tests. Statistical significance was set at p < 0.05.

The reported intervention group posttest mean of 19.35 with SD = 0.42, on a scale ranging from 0 to 20, suggests a possible ceiling effect and restricted score variability. This pattern may inflate the standardized effect estimates and should be interpreted cautiously. Identical baseline means should be reported descriptively rather than treated as evidence that the groups were equivalent.

Baseline knowledge scores did not differ between the intervention and control groups (p = 1.000). At posttest, the groups differed significantly in both knowledge scores and mean change scores (both p < .001), indicating that the culturally tailored health literacy intervention was associated with greater improvement in postpartum care knowledge than routine health education.

Discussion

Principal Findings

This study found that postpartum mothers who received a culturally tailored health literacy intervention demonstrated greater immediate improvement in postpartum care knowledge than those who received routine health education. Based on the internally plausible result reported in the narrative, the mean post-intervention knowledge score was 19.35 in the intervention group and 16.74 in the control group, with a reported standardized mean difference of Cohen's *d* = 2.14. These findings suggest that the intervention was associated with a substantial short-term improvement in knowledge.

Nevertheless, the magnitude of this association should be interpreted cautiously because group allocation was non-randomized and determined by study site, the intervention and control conditions differed markedly in educational intensity, and the outcome was assessed immediately after the intervention.

Participants in both groups were predominantly aged 26–35 years, had completed senior high school, were housewives, reported monthly family incomes of IDR 2–3 million, and had three to four children each. These characteristics provide important contextual information regarding the population to which the findings are most applicable. Recent studies have shown that maternal health literacy is shaped by interacting socioeconomic and contextual factors, including educational attainment, income, ethnicity, social support, access to health information, and media use (Chen et al., 2025; Ningrum et al., 2024; Sangdang et al., 2025). Consequently, the relatively homogeneous profile of the present sample may have facilitated the delivery of a standardized intervention but may also restrict the transferability of the findings to women with different educational, economic, linguistic, and cultural backgrounds.

The absence of statistically significant differences in the measured baseline characteristics should not be interpreted as evidence that the groups were equivalent before intervention. Non-significant tests may reflect limited statistical power in a small sample and cannot exclude meaningful differences in unmeasured characteristics. This issue is particularly important because allocation was based on geographically distinct sites rather than individual randomization. Differences between sites and including healthcare personnel, routine educational practices, community leadership, access to digital information, family involvement, and local interpretations of postpartum traditions—may have contributed to the observed outcomes.

Association Between the Intervention and Maternal Knowledge

The greater knowledge improvement observed in the intervention group is broadly consistent with evidence that structured and health-literacy-oriented education can strengthen mothers' understanding of postpartum and newborn-care. In a randomized trial of women with limited maternal health literacy, Cheng et al. (2023) found that adding teach-back to routine education improved maternal health literacy and several post-partum health behaviors. Similarly, Eluri et al. (2022) reported that visual education using flip charts improved essential newborn care knowledge and skills, with some benefits maintained for six months. These findings support the use of interactive, comprehensible, and visually reinforced education rather than relying exclusively on one-way information.

However, the present results should not be interpreted as definitive evidence that cultural tailoring alone produced the observed differences. The intervention group received eight weekly face-to-face sessions, home-based counseling, an adapted booklet, and repeated contact with educators, whereas the control group received a single routine counseling session. Therefore, the intervention differed from routine care not only in terms of cultural content but also in terms of duration, frequency, educational media, personal contact, and facilitator attention. Each of these components can independently improve knowledge. Randomized studies of teach-back and visual education indicate that repetition, opportunities for clarification, and structured

presentations can enhance learning, even when the intervention is not explicitly culturally tailored (Cheng et al., 2023; Eluri et al., 2022). Future evaluations should therefore use attention-matched control groups or factorial designs to distinguish the effects of cultural adaptation from those of educational dose and interpersonal interactions.

The proposed cultural mechanism is nevertheless plausible. Postpartum practices are frequently embedded in family traditions, social relationships, beliefs about bodily recovery, food restrictions, and culturally defined roles of mothers and relatives. Studies conducted in Asian and other culturally distinct populations have shown that traditional postpartum practices may provide emotional, social, or practical support, although some practices may conflict with evidence-based recommendations or delay appropriate care (Alnaji et al., 2024; Bazzano et al., 2020; Nguyen et al., 2022). A culturally responsive intervention may therefore be more acceptable when it acknowledges the meaning and supportive functions of local traditions while clearly distinguishing practices that are beneficial, neutral, or potentially harmful.

Evidence from a randomized trial involving Chinese postpartum women also suggests that education designed around an established cultural practice can modify adherence to potentially harmful postpartum behaviors (Liu et al., 2020). However, cultural adaptation should not be understood merely as translating biomedical messages or inserting local symbols into educational materials. Meaningful adaptation requires engagement with mothers, families, community health workers, midwives, and cultural leaders to identify how information is interpreted and how recommended practices can be incorporated into daily life. Therefore, the present study would be strengthened by reporting the adaptation process in detail, including community participation, formative assessment, pilot testing, and the specific cultural elements that were retained, modified, or discouraged.

Interpretation of the Knowledge Outcome

Maternal health literacy is broader than factual knowledge. It encompasses the ability to access, understand, critically evaluate, communicate, and apply health information when making decisions about maternal and infant care (Putri & Lu, 2024). The 20-item questionnaire used in this study primarily assessed correct responses regarding postpartum care. Therefore, the outcome should be described as postpartum care knowledge rather than comprehensive maternal health literacy. An improvement in knowledge is an important proximal outcome; however, it does not necessarily demonstrate that mothers can evaluate conflicting information, negotiate family expectations, recognize complications in real-life situations, seek timely professional care, or change established postpartum practices.

The post-test distribution also requires careful consideration. A reported intervention group mean of 19.35 with an SD of 0.42 on a scale ranging from 0 to 20 indicates that many participants scored close to the upper limit. This pattern suggests a ceiling effect and restricted post-intervention variability in the study. Under these circumstances, the questionnaire may have had a limited ability to distinguish participants with high levels of knowledge, and the very large standardized effect estimate may partly reflect the unusually small posttest variance. Future studies should use an instrument with a wider range of item difficulty and assess not only recall but also the comprehension, appraisal, decision-making, and application of postpartum information.

Improvement in the Control Group

The control group also showed a meaningful increase in knowledge, from 11.74 at baseline to 16.74 at posttest. This improvement indicates that routine maternal health education may itself provide benefits. However, several additional mechanisms are possible, including repeated exposure to the questionnaire, informal discussion with healthcare workers, family advice, and access to health information through social or digital media. Media use and social support have been identified as relevant predictors of maternal health literacy among postpartum women, while family members can influence whether women understand, accept, and use postnatal health information (Finlayson et al., 2023; Sangdang et al., 2025). Because these exposures were not measured, their contribution to knowledge improvement in either group cannot be determined.

The involvement of family members may be particularly important in the Ternate context because postpartum decisions may not be made by mothers alone. Evidence syntheses indicate that

partners and relatives can facilitate postnatal care by providing practical assistance, encouragement, transportation, and help interpreting health information. However, they may also reinforce social norms that discourage formal care or promote unsupported practices (Finlayson et al., 2023; Sacks et al., 2022). Future interventions should consider including influential relatives while ensuring that the mother remains central to the decision-making process.

Implications for Practice and Research

The findings provide preliminary support for integrating culturally relevant content into postpartum education delivered through primary healthcare services. Programs can incorporate locally familiar examples, acknowledge the perceived benefits of traditional practices, explain maternal danger signs using accessible language, and provide practical guidance on when traditional care should be modified or replaced by professional treatment. Systematic reviews indicate that health literacy interventions are more likely to be useful when they address women's linguistic and socioeconomic circumstances and are supported by trained healthcare professionals and responsive health systems (Khan et al., 2024; Ningrum et al., 2024).

Nevertheless, implementation should not proceed on the assumption that the present study has demonstrated clinical effectiveness. The findings represent an immediate difference in knowledge within a small, purposively selected, nonrandomized sample. The study did not assess sustained knowledge retention, actual postpartum practices, recognition of complications, healthcare utilization, maternal morbidity, newborn outcomes, or cost effectiveness. These outcomes are essential because evidence from postnatal care research shows that access to information alone may be insufficient when women face barriers involving service availability, perceived quality, family norms, psychosocial needs, and previous experiences with healthcare providers (Sacks et al., 2022).

Future research should employ a multicenter cluster-randomized or individually randomized design with several sites in each study arm, adequate allocation concealment, and analyses that account for the clustering. An attention-matched control condition would help separate the specific effects of cultural tailoring from those of repeated contact and educational intensity. Follow-up assessments should be conducted at multiple time points to evaluate knowledge retention and include behavioral and clinical outcomes. Process evaluation is also required to assess intervention fidelity, participant engagement, cultural acceptability, family involvement, exposure to external health information, and the mechanisms through which the intervention may influence decision making.

The culturally tailored intervention was associated with a greater immediate increase in postpartum care knowledge than routine education. This finding is promising and consistent with a growing body of evidence supporting accessible, interactive, and context-sensitive maternal education. However, the non-randomized site-based allocation, unequal intervention intensity, possible ceiling effect, and exclusive focus on short-term knowledge preclude strong causal or clinical conclusions. The intervention should therefore be considered a potentially valuable model that requires confirmation through more rigorous multisite studies assessing sustained behavioral and maternal health outcomes.

Conclusion

The culturally tailored intervention was associated with a greater immediate increase in postpartum care knowledge than routine education among the participating Ternate mothers. This finding is limited to a short-term knowledge outcome and should not be interpreted as evidence of improved clinical practice or maternal health. Non-randomized site-based allocation, unequal intervention intensity, and reported data inconsistencies require resolution before firm conclusions can be drawn.

Healthcare providers may integrate culturally relevant examples, local beliefs, and evidence-based postpartum guidance into maternal health education while monitoring intervention fidelity and participant understanding.

Future studies should use larger multisite samples, validated instruments, longer follow-up periods, and stronger allocation procedures and assess whether knowledge gains translate into safer postpartum practices, appropriate care-seeking, and improved maternal outcomes.

Declaration of Conflict of Interest

The authors declare no conflicts of interest regarding the publication of this article. This study was conducted independently, without any financial, commercial, or personal relationships that could influence the study results.

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