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DEVELOPMENT OF DIGITAL EDUCATIONAL MEDIA BY NURSES AND MIDWIVES FOR POSTPARTUM MATERNAL CARE AT UNS HOSPITAL

Amalia Arifatul Diktina^{1*}, Yuyun Triani², Erlisda Zahwa Listyafah³, Hasna Izzatun Ni Mah⁴, Ardevi Rika Susanto⁵, Ikhsan Budi Laksono⁶

^{1*}Nursing lecturer, Universitas Aisyiyah Surakarta

²Midwifery lecturer, Universitas Aisyiyah Surakarta

^{3,4,5,6}Nursing student, Universitas Aisyiyah Surakarta

amaliadiktina3@gmail.com^{1*}, yyntrn.aiska@gmail.com²,

erlisdazahwalistyafah@gmail.com³, hasnaizzatunnikmah@gmail.com⁴,

kakaardevi84@gmail.com⁵, budi31741@gmail.com⁶

*Corresponding author

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ABSTRACT

The postpartum period is a critical phase requiring intensive education to prevent maternal complications. Constraints in healthcare staff time and traditional educational methods often lead to sub-optimal maternal knowledge regarding self-care. This study aimed to develop animation-based digital health education media created through nurse-midwife collaboration and evaluate its effectiveness in improving postpartum mothers' knowledge at UNS Hospital. A quasi-experimental study with a one-group pretest-posttest design was conducted. The study population consisted of postpartum mothers in the maternity ward of UNS Hospital. A sample of 30 respondents was selected using consecutive sampling. The intervention delivered was an animated digital education video structured according to hospital standard operating procedures. Knowledge levels were measured before (pre-test) and after (post-test) the intervention using a validated questionnaire. Statistical analysis was performed to compare the mean knowledge scores. The mean knowledge score significantly increased from 61.8 ± 8.7 at pre-test to 87.3 ± 6.2 at post-test (p -value < 0.001). This digital solution provides an innovative and flexible approach to overcome standard face-to-face educational limitations in clinical settings.

Keywords: Digital education media, nurse, midwife, care, postpartum mother.

INTRODUCTION

The postpartum period (puerperium) represents a critical transitional phase in a woman's life cycle, involving profound physiological, psychological, and social adaptations (Lubis et al., 2023). Globally, this phase is frequently categorized as "the neglected phase" of maternal and newborn care compared to pregnancy and childbirth, resulting in a disproportionate number of maternal morbidities and mortalities occurring during this timeframe (Lubis et al., 2023). According to data from the Indonesian Ministry of Health, postpartum complications—including postpartum hemorrhage, puerperal infections, and preeclampsia—remain primary contributors to the Maternal Mortality Rate (MMR) (Kemenkes RI, 2022). The fundamental necessity of providing optimal physical care, nutritional support, and adequate knowledge to mothers to ensure successful post-natal recovery and child-rearing is also strongly emphasized in Islamic spiritual values, specifically within QS. Al-Baqarah [2]: 233 (Kementerian Agama RI, 2019).

At Universitas Sebelas Maret (UNS) Hospital, maternal monitoring is rigorously conducted during inpatient care. However, a substantial clinical challenge arises after discharge when mothers transition to self-care at home without direct clinical supervision (Sari, 2024). Knowledge is a key domain in forming sustainable health behaviors (Nursalam, 2020). Insufficient maternal knowledge regarding home-based self-care practices—such as proper lactation techniques, post-cesarean/perineal wound care, and early recognition of postpartum danger signs—directly correlates with reduced maternal self-efficacy and elevated risks of preventable complications (Mukhoirotn & Masruroh, 2022; Yuliani et al., 2023).

This knowledge gap is exacerbated by systemic limitations in conventional inpatient health education methods. High clinical workloads and time constraints among nursing and midwifery staff often result in rushed discharge planning sessions, leading to sub-optimal information retention by patients (Sari, 2024). Preliminary observational data at UNS Hospital further illustrates the magnitude of this issue, where staff reported spending limited time per patient on routine health education due to clinical demands. Furthermore, conventional static media such as printed leaflets often fail to engage patients effectively during short clinical encounters (Pratiwi & Kurniawati, 2021). This issue is further compounded by the digital era's "infodemic," where postpartum mothers frequently consume unverified, contradictory, or misleading health information from social media platforms (Lubis et al., 2023). Therefore, an authoritative, standardized, and easily accessible educational channel is urgently required to bridge hospital-based care and home recovery. By combining concise visual storytelling with standardized clinical content, animated media simplifies complex medical concepts, maximizes patient engagement, and allows mothers to review material independently at their own pace without increasing healthcare staff workload.

Previous studies over the last decade have explored various health education modalities for maternal care. Audio-visual media and animated videos have been demonstrated to significantly enhance maternal knowledge and breastfeeding self-efficacy compared to traditional printed media (Astrid et al., 2025; Herlinadiyaningsih et al., 2025; Pratiwi & Kurniawati, 2021). Furthermore, recent advancements in digital health (mHealth) highlight the flexibility of electronic platforms in delivering post-discharge educational content directly to patients' mobile devices (Handayani et al., 2025; Sari, 2024). However, a critical gap in the recent literature is that most existing mHealth interventions utilize generic, commercial digital applications or single-discipline educational materials that lack integration with hospital-specific clinical protocols (Chen et al., 2023; Rahmawati & Ningrum, 2024; Zhang et al., 2022). This discrepancy often causes confusion among patients when home-care recommendations differ from the specific procedures taught during hospital stays (Martins et al., 2023).

To address this limitation, this study introduces a novel digital education model that explicitly bridges this gap in two ways: first, by grounding the animated content directly in hospital Standard Operating Procedures (SPO) to guarantee institutional consistency; and second, by employing a true interprofessional development model—co-designed by

practicing nurses and midwives—to synthesize nursing care and midwifery management into a cohesive, patient-centered educational tool. Prior to data collection, ethical approval for this research was officially granted by the Health Research Ethics Committee of Universitas Sebelas Maret under Ethical Clearance Certificate No. 082/UN27.46/TA.04.19/KEP/EC/2026. The primary research problems investigated are: (1) how to collaboratively design and validate a standardized animated digital education medium for postpartum care, and (2) whether the implementation of this interprofessional digital media effectively increases postpartum mothers' knowledge levels. Accordingly, the main objective of this study is twofold: first, to design and validate an SPO-based animated digital education medium through nurse-midwife interprofessional collaboration; and second, to evaluate its implementation in improving postpartum mothers' knowledge levels at UNS Hospital.

RESEARCH METHOD

This study employed a quasi-experimental design (one-group pretest-posttest) involving 30 postpartum mothers selected via consecutive sampling in the maternity ward of UNS Hospital. The sample size was calculated using the paired-means sample size formula. Assuming a medium effect size ($d = 0.5$), a significance level (α) of 0.05, and a statistical power ($1 - \beta$) of 0.80, a minimum sample size of 27 participants was required. To compensate for potential non-response or dropouts, the sample was rounded up to 30 participants. Participants were recruited between January – March 2026.

The inclusion criteria were: (1) postpartum mothers in the maternity ward within 24–48 hours post-delivery, (2) mothers who owned and were capable of operating a smartphone, and (3) mothers who were willing to participate and signed written informed consent. The exclusion criteria were: (1) postpartum mothers experiencing severe physical or obstetric complications (e.g., severe postpartum hemorrhage or eclampsia), (2) mothers with cognitive, visual, or hearing impairments that hindered engagement with digital media, and (3) mothers whose neonates required intensive care in the NICU.

The intervention consisted of an animated digital education medium developed collaboratively by nurses and midwives based on hospital Standard Operating Procedures (SPO) covering lactation, wound care, and danger signs, following five stages: needs analysis, content formulation, media production, expert validation, and field implementation. Data were collected using a postpartum knowledge questionnaire consisting of 20 multiple-choice items covering lactation management (7 items), perineal wound care (7 items), and postpartum danger signs (6 items). Correct responses were scored 1 and incorrect responses 0, yielding a total score range of 0–20. Instrument validity and reliability were confirmed prior to data collection through Pearson's product-moment correlation ($r_{\text{count}} > r_{\text{table}} 0.361$) and Cronbach's alpha ($\alpha = 0.84$), respectively.

Differences in mean knowledge scores before (pre-test) and after (post-test) the intervention were evaluated using a Paired-Sample t-Test at a significance level of $p < 0.05$. Ethical clearance for this study was officially approved by the Health Research Ethics Committee of Universitas Sebelas Maret / UNS Hospital (No.

082/UN27.46/TA.04.19/KEP/EC/2026), and written informed consent was obtained from all respondents.

RESULTS AND DISCUSSION

Results

The implementation of the interprofessionally developed digital education media (animated video) was evaluated among 30 postpartum mothers in the maternity ward of UNS Hospital. All respondents completed both the baseline knowledge assessment (pre-test) and the post-intervention assessment (post-test). The data analysis revealed a significant enhancement in maternal knowledge following the digital educational intervention. The mean knowledge score increased from 61.8 ± 8.7 at baseline (pre-test) to 87.3 ± 6.2 after the intervention (post-test). Statistical analysis using paired statistical testing demonstrated a highly significant difference between pre-test and post-test scores (p < 0.001), confirming the clinical and educational efficacy of the animated media.

Table 1. Results of Pre-test and Post-test Knowledge Scores of Postpartum Mothers (n = 30)

Variable	Mean ± SD	Mean ± SD
Pre-test	61.8 ± 8.7	
Post-test	87.3 ± 6.2	< 0.001

The data analysis revealed a significant enhancement in maternal knowledge following the digital educational intervention. The mean knowledge score increased from 61.8 + 8.7 at the baseline (pre-test) 87.3 + 6.2 after the intervention (post-test). Statistical analysis using paired statistical testing demonstrated a highly significant difference between pre-test and post-test scores (p<0.001), confirming the clinical and educational efficacy of the animated media.

Data Analysis

Analysis Phase	Statistical Test	Parameter Output	Result / Value	Conclusion
Descriptive	Central Tendency (Mean ± SD)	Pre-test Score	61.8 ± 8.7	Baseline knowledge prior to media exposure
Descriptive	Central Tendency (Mean ± SD)	Post-test Score	87.3 ± 6.2	Marked improvement post-intervention
Normality	Shapiro-Wilk (n = 30)	Significance (p-value)	p > 0.05	Data followed a normal distribution
Comparative	Paired-Sample t-Test	Mean Diff. & p-value	p < 0.001	Digital media is statistically effective (p < 0.05)

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Based on the quantitative data synthesis shown in Table 1, the data analysis was structured across three main analytical phases: descriptive statistics, normality testing, and comparative analysis. In the descriptive analysis phase, central tendency measurements (Mean $\pm$ SD) were utilized to evaluate maternal knowledge levels before and after the educational intervention. Prior to media exposure, the pre-test knowledge score yielded a mean of 61.8 ± 8.7 , reflecting baseline maternal knowledge regarding postpartum care. Following the implementation of the animated digital media, a post-test evaluation demonstrated a marked score improvement to 87.3 ± 6.2 , indicating enhanced information retention among participants.

To determine the appropriate comparative statistical test, a normality testing phase was conducted using the Shapiro-Wilk test ($n = 30$). The test yielded Shapiro-Wilk statistics of $W = 0.958$ ($p = 0.274$) for pre-test scores, $W = 0.963$ ($p = 0.368$) for post-test scores, and $W = 0.971$ ($p = 0.562$) for the paired difference scores (post-pre). Since all p-values exceeded the threshold of 0.05, the normality assumption for the paired difference scores was fully satisfied, confirming that the data followed a normal distribution.

Consequently, a parametric comparative analysis phase was executed using a Paired-Sample t-Test to measure mean differences and statistical significance. The test revealed a highly significant difference between pre- and post-intervention scores ($p < 0.001$). The mean score increase was 25.50 points with a 95% Confidence Interval (CI) for the mean difference of 22.12 to 28.88. Furthermore, the intervention yielded a large effect size (Cohen's d), reflecting a substantial gain in knowledge scores following the administration of the educational media.

Discussion

The primary objective of this study was to evaluate the effectiveness of an interprofessionally developed animated digital education medium in enhancing postpartum mothers' knowledge at UNS Hospital. The empirical findings demonstrate a statistically significant increase in mean knowledge scores, rising from 61.8 ± 8.7 at pre-test to 87.3 ± 6.2 at post-test ($p < 0.001$). These results confirm that integrating structured digital visual tools into inpatient care substantially improves maternal knowledge retention regarding post-discharge self-care.

According to Dual-Coding Theory and Cognitive Load Theory in multimedia learning, animated media simultaneously stimulate visual and auditory processing channels, which reduces cognitive overload and accelerates information encoding into long-term memory (Mayer, 2021; Sweller, 2020). Educational animated media engage multiple sensory channels, simplifying complex physiological concepts—such as post-cesarean wound management, perineal hygiene, and proper infant latching—into accessible visual steps.

When comparing these results with prior literature, key distinctions emerge across interventions, participant cohorts, measurement protocols, and empirical findings. While Pratiwi & Kurniawati (2021) and Herlinadiyaningsih et al. (2025) demonstrated that animated videos improved maternal comprehension and oxytocin massage practices over

traditional leaflets, their interventions focused primarily on single-skill demonstrations using commercial or non-standardized videos. In contrast, the current study utilized an interprofessionally co-designed animation strictly aligned with hospital Standard Operating Procedures (SPO) covering three broad clinical domains: lactation, wound care, and danger signs.

Regarding participants, previous studies evaluated broader community clinic cohorts (Puskesmas or private midwife practices), whereas this study focused on 30 postpartum mothers ($n = 30$) admitted directly to a tertiary teaching hospital's maternity ward. In terms of measurement methods, earlier research relied heavily on non-validated satisfaction scales or simple post-intervention checklists, whereas this study employed a validated 20-item, 3-domain knowledge questionnaire ($\alpha = 0.84$) with formal parametric pre-post testing. Finally, regarding findings, while Mukhoirotin & Masrurroh (2022) emphasized that general visual media bridge clinical communication gaps during brief encounters to build maternal self-efficacy, our findings demonstrate that integrating institutional SPO provision into animated media generates quantifiable, large-magnitude knowledge gains ($t(29) = 15.42, p < 0.001, \text{Cohen's } d = 2.82, \text{mean score increase of } 25.50 \text{ points}$). This underscores that tailored interprofessional media not only enhance maternal confidence but also ensure the retention of standardized, clinical-grade information essential for post-discharge recovery.

From a clinical workflow perspective, the digital intervention addresses critical operational constraints within the inpatient maternity ward. High clinical workloads and time limitations often cause traditional discharge planning sessions to be rushed, leaving patients overwhelmed during short face-to-face consultations (Sari, 2024). By providing smartphone-compatible animated videos accessible via ward-placed QR codes, mothers can review standardized information at their own pace during recovery. This flexible self-paced learning framework reduces cognitive fatigue and reinforces long-term retention of critical health behaviors (Lubis et al., 2023; Yuliani et al., 2023).

The principal novelty of this intervention lies in its interprofessional design, collaboratively authored by practicing nurses and midwives directly aligned with UNS Hospital's Standard Operating Procedures (SPO). Unlike previous studies over the last five years that primarily evaluated single-discipline educational materials or generic commercial mHealth applications—such as animated videos focusing solely on oxytocin massage or general breastfeeding techniques without institutional protocol integration (Astrid et al., 2025; Herlinadiyaningsih et al., 2025; Zhang et al., 2022)—this study bridges nursing care and midwifery management into a unified, hospital-standardized digital tool. This interprofessional alignment prevents conflicting post-discharge instructions, addressing a major limitation identified in recent literature where unstandardized digital media often create care discrepancies between clinical advice and home practices (Martins et al., 2023; Rahmawati & Ningrum, 2024).

Beyond its initial implementation at UNS Hospital, this collaborative digital education framework demonstrates strong potential for broader applicability across diverse postpartum care settings. The core methodology—integrating interprofessional

content co-creation with institutional clinical guidelines—can be readily adapted by primary healthcare centers (Puskesmas), community maternity clinics, and regional hospitals. Recent evidence confirms that mobile health solutions tailored to localized protocols significantly improve maternal health literacy, self-efficacy, and post-discharge continuity of care (Handayani et al., 2025; Lubis et al., 2023; Sari, 2024). By customizing the animated content to reflect local operational protocols, regional healthcare resources, and specific patient demographics, this scalable model serves as a flexible, standardized solution to elevate maternal health literacy, strengthen post-discharge continuity of care, and minimize preventable postpartum complications across varied clinical environments (Ekananda et al., 2025; Fahrudin, 2023; Yuliani et al., 2023)

CONCLUSION

The development and implementation of an animated digital education medium, collaboratively designed by nurses and midwives in accordance with UNS Hospital's Standard Operating Procedures (SPO), resulted in a significant improvement in maternal knowledge. The intervention yielded a statistically significant increase in the mean knowledge scores of postpartum mothers, rising from 61.8 ± 8.7 at baseline (pre-test) to 87.3 ± 6.2 post-intervention (post-test) with . By delivering standardized, expert-validated visual content accessible via personal smartphones and ward-based QR codes, this digital tool offers a practical medium to support information delivery and retention during discharge planning. Within the scope of a one-group pretest-posttest evaluation, this interprofessional mHealth strategy demonstrates strong potential as an efficient, scalable, and authoritative approach to support postpartum self-care education and facilitate the transition from hospital-based clinical care to home recovery.

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