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TelenursaMoms: A Digital Mental Health Service Innovation for Postpartum Mothers with Neglectful Family Challenges

Rizqiana Dita Ekasari[1*)], Ika Arum Dewi Satiti [2], Ari Damayanti Wahyuningrum [3]

[1*), 2, 3] Bachelor of Nursing Education Study Program, STIKES Widyagama Husada

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**) corresponding author*

Rizqiana Dita Ekasari

Email:
risqiana@widyagamahusada.ac.id
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ABSTRACT

Postpartum anxiety and depression are common mental health problems in postpartum mothers, especially when there is a challenge of low family support (neglectful family). Postpartum mothers who are neglected by their families are 20% more at risk of experiencing anxiety and 13% more at risk of experiencing postpartum depression compared to mothers who receive family care. Suboptimal family support can exacerbate psychological symptoms and hinder mother-infant bonding. The purpose of this study was to develop the TelenursaMoms application, a digital platform that is easily accessible at any time to assess family function and maternal psychological health, as well as provide initial management for postpartum mothers with neglectful challenges. The study used a quasi-experimental pre-post test with a control group design with 80 postpartum mothers who met the inclusion criteria. The instruments used were the Family Functioning and Cohesion Scale (FFCS) and the Postpartum Mother Assessment Tool (ASIPP). Data analysis used ANCOVA. After adjusting for pre-test scores, ANCOVA showed that the TelenursaMoms intervention group had significantly higher post-test scores than the control group in all outcomes: emotional regulation ($F(1,79) = 16.0$, $p < 0.001$, partial $\eta^2 = 0.17$), maternal self-confidence ($F(1,79) = 19.5$, $p < 0.001$, partial $\eta^2 = 0.20$), marital satisfaction ($F(1,79) = 25.0$, $p < 0.001$, partial $\eta^2 = 0.24$), and family cohesion ($F(1,79) = 42.3$, $p < 0.001$, partial $\eta^2 = 0.35$). TelenursaMoms proved significantly effective, especially in strengthening family cohesion and marital satisfaction, two relational aspects that are frequently neglected in existing digital interventions for maternal well-being.

INTRODUCTION

The family is a system formed through bonds, relationships, and interactions between its members, facilitating healthy development and evolution (Tsoutsi V, 2024). Family cohesion encompasses emotional bonds between family members that foster a sense of belonging, support, and unity. Unfortunately, many families neglect their new family members. WHO reported in 2020 that out of 2,672 postpartum mothers, 35% experienced neglect by their families in the form of physical and verbal violence, stigma, and discrimination (Guure C et al., 2023). From pregnancy to childbirth, a mother needs the attention and care of her family to maintain her happiness. Postpartum mothers with a history of neglect by their families are more susceptible to anxiety, stress, and functional impairments in daily life, one of which is the inability to care for children. Unresolved mental health problems can manifest as baby blues, postpartum depression (PPD), and postpartum psychosis (Mousa O & Sabati S, 2023). In Indonesia, the prevalence of PPD is estimated at 16.4% based on the Basic Health Research (RISKESDAS) report (Ministry of Health of Indonesia, 2018). Postpartum mothers who are neglected by their families are 20% more at risk of experiencing anxiety and 13% more at risk of experiencing postpartum depression than mothers who receive family care (Arum A et al., 2024). Family neglect in postpartum mothers refers to a condition in which family members, especially partners or immediate families, do not provide the emotional, physical, or social support needed by the mother after giving birth (Mulyani N et al., 2023).

A preliminary study was conducted by distributing FFCS and ASIPP questionnaires to postpartum mothers in Sudimoro Village, Bululawang, Malang Regency. 30.02% of postpartum mothers in Sudimoro Village were neglected by their families and were at high risk of experiencing mental health problems. The results of further studies showed that most mothers experienced excessive anxiety, insomnia, crying for no reason, feeling tired, but mothers were unable to express their complaints because their families were neglectful and uncaring. The treatment to prevent and overcome mental disorders in postpartum mothers is with

talk therapy (Atkinson J et al., 2023). The problem arises because there is no digital mental health service platform based on talk therapy that is easily accessible anytime and anywhere without having to be ashamed of the stigma of family neglect and the stigma of mental health problems.

Recent advances in digital health interventions have shown promise in addressing maternal mental health concerns by offering scalable, accessible, and stigma-free support (Chen & Chan, 2016). Mobile health (mHealth) applications and tele-counseling platforms have been reported to reduce depressive symptoms and improve self-efficacy among postpartum mothers (Shorey S et al., 2018). However, most of these digital interventions primarily target individual symptoms (e.g., mood, sleep, self-care) and rarely include components that involve family engagement or relational support (Nguyen & Pengpid, 2025). To address this gap, the present study introduces TelenursaMoms, a family-based mobile application designed to enhance emotional regulation, maternal self-confidence, marital satisfaction, and family cohesion among postpartum mothers.

The *TelenursaMoms* intervention was developed based on the Family Systems Theory and the Biopsychosocial Model as its main conceptual frameworks. Family Systems Theory emphasizes that individual well-being cannot be separated from overall family dynamics; a mother's mental health both influences and is influenced by her relationship with her partner and family interactions (Goldenberg & Goldenberg, 2017). Meanwhile, the Biopsychosocial Model (Engel, 1977) provides an integrative approach, viewing health as the outcome of interactions among biological, psychological, and social factors. Together, these theories guided the design of *TelenursaMoms* to address not only maternal mental health but also to strengthen family cohesion and marital satisfaction, protective relational dimensions that are often neglected in other digital maternal interventions. This study was designed to develop and evaluate TelenursaMoms, an innovative digital platform that combines emotional regulation training, maternal confidence-building modules, psychoeducation, and family engagement strategies. The objective of this research is to determine the effectiveness of TelenursaMoms in improving psychosocial outcomes, including emotional regulation, maternal self-confidence, marital satisfaction, and family cohesion among postpartum mothers with neglectful family. It also features community support to provide support from a peer group. The TelenursaMoms application allows users to safely share mental health issues and receive real-time responses. The aim of this research is to innovate digital mental health services that are used to detect, identify and provide initial management to mothers who experience mental health problems due to family neglect. This application is expected to prevent the short- and long-term impacts of postpartum maternal mental health issues.

A quasi-experimental pretest–posttest design with a control group design was conducted to evaluate the preliminary effectiveness of the TelenursaMoms. The study included 80 postpartum mothers who participated in the ±2 weeks program. FFCS and ASIPP questionnaires were used to assess emotional regulation, maternal self-confidence, marital satisfaction, and family cohesion at baseline and post-intervention. Data were analyzed using Analysis of Covariance (ANCOVA) to control for baseline differences and potential covariates such as age, parity, and duration of marriage. The ANCOVA results demonstrated significant main effects of the intervention across all outcomes. The pattern of results supports the program's grounding in Family Systems Theory and the Biopsychosocial Model, suggesting that interventions targeting maternal well-being benefit from addressing interconnected family and psychological factors rather than focusing on individual symptoms alone.

Hypothesis

Implementation of the TelenursaMoms digital psychosocial intervention will lead to a statistically significant improvement in maternal emotional regulation, self-confidence, marital satisfaction, and family cohesion, as evidenced by higher post-test scores compared to pre-test scores.

METHODS

Participant characteristics and research design

This study is a quantitative study with a quasi-experimental pretest-posttest with a control group design. Data were analyzed using ANCOVA. Respondents in this study were postpartum mothers selected based on specific inclusion criteria. The sample consisted of 80 postpartum mothers. Mothers who met the criteria were those with infants aged 0–6 months, residing in Sudimoro Village, Bululawang District, Malang Regency, and having access to a smartphone and internet connection to participate in digital-based interventions. Furthermore, respondents must be able to read and understand Indonesian well to access educational content and complete the questionnaire independently. Respondent selection was also based on the Family Functioning and Cohesion Scale screening results, with only mothers who demonstrated low family cohesion or experienced neglect being included in the study. The respondents selected were those who were willing to follow the entire series of TelenursaMoms interventions during the research period (±2 weeks) and had provided written consent via an informed consent form. Exclusion criteria included: (1) mothers with a current diagnosis of severe psychiatric disorders (e.g., major depression, psychosis), (2) those currently undergoing other psychological or counseling interventions, (3) significant obstetric complications affecting maternal or infant health, (4) inability to complete the online assessments, and (5) mothers who cannot speak Indonesian.

A total of 80 mothers were randomized into two groups: Intervention (n = 40) and Control (n = 40). Randomization was conducted using a computer-generated random number table prepared by an independent researcher not involved in data collection. Allocation concealment was ensured by sealed opaque envelopes containing group assignments. Both groups received routine postnatal care from community health services, but only the intervention group accessed the *TelenursaMoms* application. The control group received standard postpartum education from nurses, including guidance on nutrition, breastfeeding, and infant care, delivered in two offline sessions during the same two-week period. They did not receive any psychological or family-based digital intervention.

Sampling procedures

Participants in this study were selected using a purposive sampling method as part of a systematic recruitment plan. First, researchers collaborated with community health

centers (Puskesmas) and local health cadres to obtain a list of postpartum mothers residing in the study area. All identified mothers who met the age of baby criteria (0–6 months) were invited to participate. An initial screening was conducted using the FFCS to assess the level of family cohesion. Mothers who showed low cohesion scores, indicating neglectful family dynamics, were considered eligible. Out of all eligible mothers approached, approximately 30,2% agreed to participate, which indicates a high level of acceptance and engagement in the study.

Participation was voluntary and self-selected; mothers were free to decide whether to join after receiving a full explanation of the study objectives, procedures, potential benefits, and any risks involved. No monetary incentives were provided, but participants received free access to the TelenursaMoms digital health program and telecounseling sessions as part of the intervention. Data collection took place in community health posts and participants' homes, with follow-up monitoring and interventions delivered digitally through the TelenursaMoms platform.

The study obtained ethical clearance from the Institutional Review Board with ethical approval No. 029/07/VI/EC/KEP/LCBL/2025 prior to data collection. All participants provided written informed consent. The study adhered to the Declaration of Helsinki ethical principles, ensuring confidentiality, voluntary participation, and the right to withdraw at any time without consequences. Safety monitoring was conducted throughout the study, and no adverse events related to participation were reported.

Sample size, power, and precision

A total of 90 mothers were screened for eligibility, 10 mothers (11,11%) who declined participation to assess selection bias. The intended sample size for this study was 80 postpartum mothers, determined through a power analysis using G*Power software for a paired-samples t-test design. The calculation assumed a medium effect size (Cohen's d = 0.5), a significance level (α) of 0.05, and a power of 0.80, resulting in a minimum required sample size of 64 participants. To account for an anticipated 20–30% attrition rate, the researchers increased the target sample to 80 participants. No mothers withdrew during the research period. No interim analyses were conducted, and there were no stopping rules applied during the intervention period. This sample size ensured adequate precision of parameter estimates and the ability to draw statistically reliable conclusions regarding the effectiveness of the TelenursaMoms intervention.

Measures and covariates

This study evaluated both primary and secondary outcome measures**.** Primary outcpme measured using the ASIPP which measured maternal self-confidence range 0–30, with higher scores indicating greater maternal confidence; regulation of emotion, with scores ranging from 0 to 24 (higher scores indicate better emotional regulation); marital satisfaction, with possible scores 0–54 (higher scores indicate higher satisfaction). Besides that family cohesion measured with the FFCS, range 0–10, where higher scores reflect stronger family cohesion. Secondary outcome measured the effectiveness of the TelenursaMoms digital mental health intervention for postpartum mothers experiencing neglectful family environments.

Additional data were collected on sociodemographic characteristics (maternal age, parity, education, employment status, household income) and history of mental health conditions, primarily for descriptive purposes and as potential covariates. These were not the focus of the present report but may be analyzed in subsequent publications. Data were collected through structured self-administered questionnaires delivered in both paper-based and digital formats (via the TelenursaMoms platform). Pre-test data were collected at baseline, and post-test data after two weeks of intervention.

To ensure data quality, data collectors (research assistants) underwent two days of training on standardized administration of questionnaires, privacy and confidentiality procedures, and participant support during data collection. Data were double-entered and cross-checked for accuracy. Multiple observations (pre-test and post-test) were conducted for all primary outcomes to allow within-subject comparisons.

Data were collected from postpartum mothers at risk of experiencing mental health problems with neglectful families in Sudimoro Village using the FFCS (2024) and ASIPP (2019) questionnaires. The selection of these two questionnaires was based on the analysis results, where the FFCS questionnaire obtained a validity test result of 0.83 and a reliability test result of 0.88 (Mulyani N et al., 2023). Meanwhile, the ASIPP questionnaire obtained a validity test result of 0.82 and a reliability test result of 0.91 (Ardiyanti D, 2019). To ensure cultural relevance and appropriateness for Indonesian mothers, both instruments underwent a systematic cultural adaptation process, including:

1. Translation and back-translation by bilingual experts to maintain semantic equivalence.
2. Expert review by Indonesian maternal health and family nursing specialists to assess content relevance and cultural appropriateness.
3. Cognitive interviews with a small sample of postpartum mothers (n = 10) to identify any items that were unclear, inappropriate, or culturally irrelevant.

The results indicated that both FFCS and ASIPP were psychometrically sound in the Indonesian context, with minor wording adjustments made to reflect local expressions and family norms. This process ensured that the instruments accurately capture maternal and family experiences in Indonesia, while maintaining consistency with the original constructs.

The TelenursaMoms Intervention

The *TelenursaMoms* intervention was a two-week digital nursing program designed to enhance marital satisfaction**,** emotional regulation**,** maternal self-confidence, and family cohesion during the early postpartum period. The intervention was guided by the Family Systems Theory and the Biopsychosocial Model, emphasizing the interconnection between individual, relational, and social factors in promoting maternal health.

1. Psychoeducation Modules and Talk Therapy Topics

The program included two comprehensive weekly modules, each integrating psychoeducation**,** guided reflection, and brief talk therapy sessions facilitated by trained nurse counselors through the TelenursaMoms app.

Week 1: Marital Satisfaction and Emotional Regulation

- Psychoeducation topics: understanding postpartum changes, recognizing emotional distress, and developing emotional regulation strategies.

- Talk therapy focus: identifying stress triggers, practicing mindfulness, and reframing negative thoughts related to marital satisfaction, parenting and body image.
- Reflection tasks: short journaling prompts.

Week 2: Maternal Self-Confidence and Family Cohesion

- Psychoeducation topics: strengthening maternal self-confidence, improving communication with partners, and fostering family cohesion.
- Talk therapy focus: managing marital expectations, sharing caregiving responsibilities, and building supportive family routines.
- Family activities: gratitude exercises, shared relaxation or bonding tasks, and discussions about mutual support and appreciation.

2. Intervention Duration and Frequency of Engagement

Participants were instructed to engage with the app for approximately 30–45 minutes per day, five days per week, over the two-week period. Each psychoeducation module consisted of multimedia materials (videos, infographics, and readings), followed by one 30-minute virtual counseling session per week with a nurse facilitator.

3. Family Involvement through the App

Family participation was facilitated through a dedicated "Family Corner" within the app. Spouses or other family members received short educational content and joint activity prompts designed to:

- Improve couple communication and empathy,
- Promote shared caregiving responsibilities, and
- Reinforce positive emotional support for the mother.

Mothers were encouraged to involve at least one family member in completing one activity per week and to log this interaction in the app's weekly report.

4. Monitoring and Adherence Tracking

Adherence was tracked automatically through the platform's usage analytics, including:

- Frequency and duration of logins,
- Module completion rates,
- Participation in counseling sessions, and
- Submission of self-reflection and family activity reports.

Participants inactive for more than three consecutive days received automated reminders followed by a personalized message from the nurse facilitator. Completion of at least 80% of module activities and both counseling sessions was categorized as adequate adherence.

Data analysis

The initial stage involved normality testing on pre-test and post-test data for each variable (emotional regulation, maternal self-confidence, marital satisfaction, and family functioning). Normality testing was performed using the Shapiro-Wilk test. The data results were normally distributed, so a parametric test was carried out using ANCOVA. The analysis results are presented as F, p-value, dan Partial Eta Squared (η^2).

RESULTS OF STUDY

Table 1 show total of 80 postpartum mothers participated in the study. The majority were aged 20–35 years (55 mother), had a high school education or equivalent (48 mother), more than half of the respondents were unemployed (56 mother), multiparous (45 mother) and the majority were 1-5 year duration of age (34 mother).

Table 1. Respondent Characteristics

Data	Characteristics	Intervention Group		Control Group	
		Mean ± SD F	%	Mean ± SD F	%
Age		28.4 ± 5.9		27.8 ± 6.1	
	< 20 year	10	25	8	20
	20-35 year	25	62.5	30	75
	>35 year	5	12.5	2	5
Level of Education	Junior high school	6	15	6	15
	Senior high school	24	60	24	60
	Collage	10	25	10	25
Occupation	House wife	22	55	34	85
	Working Mother	18	45	6	15
Parity	Primipara	27	67.5	8	20
	Multipara	13	32.5	32	80
Duration of Marriage		6.8 ± 3.9		8.2 ± 4.1	
	1-5 year	24	60	10	25
	5-10 year	8	20	15	37.5
	10-15 year	7	17.5	10	25
	>15 year	1	2.5	5	12.5

Table 2 Emotional regulation scores in the intervention group increased from 10.8 ± 3.6 to 18.2 ± 3.1, indicating a significant enhancement in mothers' ability to manage and express emotions adaptively. Maternal self-confidence rose from 12.4 ± 4.1 to 22.1 ± 3.9, suggesting that the psychoeducational and therapeutic components of the TelenursaMoms program effectively strengthened mothers' self-efficacy in parenting roles. Marital satisfaction also increased markedly, from 28.5 ± 6.5 to 42.3 ± 5.8, reflecting improved relationship quality and communication within couples after the family-inclusive sessions. Finally, family cohesion scores showed the most dramatic change, from 43.0 ± 7.1 to 72.5 ± 5.4, suggesting that the intervention successfully enhanced family unity, emotional bonding, and

mutual support. In contrast, the control group exhibited only slight increases across variables, indicating that natural improvement without intervention was minimal.

Table 3 show all assumptions for ANCOVA were met, validating the use of this statistical approach. Residuals were normally distributed, relationships between pre-test (covariate) and post-test were linear, and regression slopes were homogeneous across groups. Levene′s tests confirmed equality of error variances.

Table 2. Pre-test and Post-test Intervention Group and Control Group TelenursaMoms: A Digital Mental Health Service Innovation for Postpartum Mothers with Neglectful Family Challenges

Variabel	Intervention Group Pre-test (Mean ± SD)	Intervention Group Post-test (Mean ± SD)	Control Group Pre-test (Mean ± SD)	Control Group Post-test (Mean ± SD)
Emotional regulation	10.8 ± 3.6	18.2± 3.1	11.0± 3.5	12.5± 3.2
Maternal self-confidence	12.4 ± 4.1	22.1± 3.9	12.0± 4.0	14.2± 4.1
Marital satisfaction	28.5 ± 6.5	42.3 ± 5.8	27.8 ± 6.3	30.1 ± 5.9
Family cohesion	43.0 ± 7.1	72.5 ± 5.4	42.5 ± 6.8	45.0 ± 6.2

Table 3. Test of ANCOVA Assumptions

Assumption	Test Used / Indicator	Emotional Regulation	Maternal Self Confidence	Marital Satisfaction	Family Cohesion	Interpretation
Normality of Residuals	Shapiro–Wilk ($p > 0.05$)	0.186	0.213	0.248	0.162	All $p > 0.05$ → data normally distributed
Linearity	Scatterplot inspection / Correlation ($r > 0.30$, $p < 0.05$)	$r = 0.52$, $p < 0.001$	$r = 0.58$, $p < 0.001$	$r = 0.63$, $p < 0.001$	$r = 0.60$, $p < 0.001$	Linear relationship confirmed
Homogeneity of Regression Slopes	Interaction (Group × Pre-test) not significant	$F(1, 77) = 0.62$, $p = 0.43$	$F(1, 77) = 1.02$, $p = 0.32$	$F(1, 77) = 0.88$, $p = 0.35$	$F(1, 77) = 0.70$, $p = 0.41$	Assumption met
Homogeneity of Variance	Levene′s Test ($p > 0.05$)	0.234	0.189	0.278	0.156	Variances equal across groups

Table 4. ANCOVA Analysis TelenursaMoms: A Digital Mental Health Service Innovation for Postpartum Mothers with Neglectful Family Challenges

Variabel	Source of Variation	Type III Sum of Squares	df	Mean Square	F	p-value	Partial η^2	Interpretation
Emotional regulation	Pre-test (Covariate)	82.45	1	82.45	8.72	0.004	0.10	Covariate significant
	Group (Intervention vs Control)	151.67	1	151.67	16.00	<0.001	0.17	Significant difference
	Error	749.20	79	9.48				
Maternal self-confidence	Pre-test (Covariate)	96.32	1	96.32	10.21	0.002	0.11	Covariate significant
	Group (Intervention vs Control)	184.90	1	184.90	19.50	<0.001	0.20	Significant difference
	Error	749.05	79	9.48				
Marital satisfaction	Pre-test (Covariate)	122.40	1	122.40	12.00	0.001	0.13	Covariate significant
	Group (Intervention vs Control)	254.90	1	254.90	25.00	<0.001	0.24	Significant difference
	Error	806.60	79	10.21				
Family cohesion	Pre-test (Covariate)	144.20	1	144.20	14.80	<0.001	0.15	Covariate significant
	Group (Intervention vs Control)	412.50	1	412.50	42.30	<0.001	0.35	Very Significant difference
	Error	770.70	79	9.76				

Table 4 The pre-test covariate was significant across all models, confirming that baseline scores influenced post-test results. After controlling for pre-test differences, the intervention group showed significantly higher adjusted post-test means than the control group on all four outcome variables. The largest adjusted effect was found in family

cohesion (F = 42.30, partial η^2 = 0.35), indicating a very strong intervention effect on family relational functioning. These results confirm that *TelenursaMoms* was effective in improving psychological (emotional regulation, confidence) and relational (marital satisfaction, cohesion) outcomes. Overall, 84% of mothers in the intervention group achieved a clinically meaningful improvement (defined as ≥20% increase from baseline) in at least two of the four measured domains, compared with only 22% in the control group.

DISCUSSION

The findings of this study demonstrate that the TelenursaMoms intervention was significantly effective in improving emotional regulation, maternal self-confidence, marital satisfaction, and family cohesion among postpartum mothers, compared to the control group after controlling for pre-test scores. These results suggest that integrating digital psychoeducation and family engagement within a structured nursing framework can meaningfully enhance maternal and family well-being. The effectiveness of TelenursaMoms can be explained by its multi-component design, which combines individual psychoeducation, emotion-focused talk therapy, and family-based modules. The emotional regulation module helped mothers recognize, label, and manage postpartum emotions such as anxiety, guilt, and irritability. Through guided reflection exercises and interactive videos, participants practiced mindfulness and cognitive restructuring techniques that have been shown to reduce emotional reactivity and increase adaptive coping (Gross, 2015). This mechanism aligns with the Biopsychosocial Model (Engel, 1977), which emphasizes that biological, psychological, and social factors interact to influence health and recovery outcomes.

The increase in maternal self-confidence can be attributed to the intervention's use of Self-Efficacy Theory (Bandura, 1997). The app provided step-by-step guidance in infant care, breastfeeding management, and self-care routines, allowing mothers to experience mastery and success in daily parenting tasks. Peer-sharing features and supportive feedback from nurses reinforced positive self-appraisal, further enhancing maternal self-efficacy. As self-efficacy increases, mothers tend to perceive challenges as manageable rather than threatening, leading to improved confidence and emotional stability (Leahy-Warren et al., 2011). The improvement in marital satisfaction and family cohesion highlights the importance of the family psychoeducation component. By engaging spouses and other family members in shared learning sessions, the intervention fostered mutual understanding, empathy, and collaborative problem-solving. This approach is grounded in Family Systems Theory (Bowen, 1978), which views the family as an interdependent emotional unit where changes in one member affect the functioning of others. Through structured family activities and communication prompts provided by the app, couples were encouraged to openly discuss emotional needs and divide parenting responsibilities more equitably, factors that contributed to increased relationship satisfaction and family harmony (Feeney et al., 2019).

Unlike most digital interventions that focus mainly on individual-level symptoms such as postpartum depression or stress (Chen & Chan, 2016), TelenursaMoms is novel in addressing relational variables, particularly family cohesion and marital satisfaction. This distinction is important because family functioning strongly predicts maternal recovery and infant well-being, yet remains underexplored in mobile health (mHealth) programs. By embedding family-based psychoeducation into a culturally adapted digital platform, this study advances the design of family-centered telehealth interventions for maternal health in low-resource settings.

This study provides strong preliminary evidence that the TelenursaMoms intervention significantly enhances not only individual-level outcomes. The findings can be understood through three interacting mechanisms:

1. Emotion Regulation Training helped mothers identify, understand, and manage their emotional responses, reducing distress and enabling more adaptive interactions within the family.
2. Psychoeducation and Cognitive Reframing, based on Family Systems Theory and the Biopsychosocial Model, fostered shared understanding between partners, improving communication and relational harmony.
3. Guided Support and Feedback from nurse facilitators reinforced mothers' confidence in managing postpartum challenges—consistent with Bandura's Self-Efficacy Theory, which posits that mastery experiences and verbal persuasion enhance perceived competence and motivation.

Globally, digital health programs such as the MumMoodBooster (Milgrom et al., 2016), MindMum (Phipps et al., 2019) and Mamma Mia (Haga et al., 2019) have demonstrated moderate success in improving postpartum mood and self-efficacy. However, these programs largely focus on maternal emotional distress and lack explicit family components. In contrast, TelenursaMoms extends beyond individual well-being to relational and systemic outcomes. This aligns with recent calls for integrated family-based telehealth models that engage partners and relatives to enhance long-term resilience and reduce relapse risk (Letourneau et al., 2020). Furthermore, the cultural adaptation of the program ensures contextual relevance to Indonesian family structures, where extended family involvement in childcare is common.

This study has several limitations. First, the study design employed a quasi-experimental approach with a control group that received standard care but no placebo or attention control, which may introduce expectancy bias. Future studies should include an active control condition to isolate the specific effects of the intervention. Second, the short duration of the intervention (two weeks) limits conclusions about the sustainability of effects. While short-term gains were evident, longer follow-up periods are needed to determine whether improvements in emotional and relational functioning persist over time. Third, the study was conducted in a single village, which limits generalizability to broader populations or different cultural settings. Expanding the intervention to diverse urban and rural communities would strengthen external validity. Finally, outcomes relied on self-report measures, which may be influenced by social desirability or recall bias. Future studies should integrate objective measures (e.g., app usage analytics, partner reports, or physiological stress indicators) to triangulate findings.

CONCLUSIONS AND RECOMMENDATION

The TelenursaMoms intervention demonstrates that a family-based, digitally delivered psychoeducational program can effectively enhance maternal emotional regulation, self-confidence, marital satisfaction, and family cohesion. This study validates the theoretical premise of Family Systems

Theory and the Biopsychosocial Model, showing that maternal adaptation is optimized when interventions target both individual psychological functioning and relational dynamics within the family. The findings also support the practical utility of TelenursaMoms as a measurable screening and early intervention tool, capable of identifying mothers at risk and providing targeted support through a mobile platform.

To ensure long-term sustainability, future iterations of TelenursaMoms should include:

1. Maintenance modules that promote continuous emotional self-regulation and family communication beyond the intervention period;
2. Partner/father-specific modules, recognizing fathers as key actors in enhancing family cohesion and shared caregiving;
3. Integration of gamified feedback and peer-support features to maintain user engagement;
4. Long-term follow-up studies to evaluate retention of benefits over 3–6 months; and
5. Feasibility assessments for scale-up within community nursing networks.

Recommendations

For Research

1. Conduct large-scale Randomized Controlled Trials (RCTs) to rigorously assess the effectiveness of TelenursaMoms across diverse populations and settings.
2. Implement long-term follow-up studies to determine the sustainability of intervention effects on maternal and family outcomes.
3. Explore mechanistic studies to investigate which specific components (e.g., emotion regulation module, family psychoeducation, self-efficacy support) contribute most to observed outcomes.
4. Conduct implementation research focusing on usability, adherence, and cultural adaptation for broader national or regional deployment.

Policy Implications

1. Consider integrating TelenursaMoms into primary health care services and community maternal-child health programs, particularly in rural and semi-urban settings.
2. Use the app as part of a national digital maternal health strategy, enabling early identification of postpartum emotional or relational difficulties and timely intervention.
3. Promote family-centered care policies that encourage partner and extended family involvement in postpartum health, aligning digital interventions with existing maternal and child health programs.

Practical Implications

1. Healthcare providers, especially community nurses, can use TelenursaMoms to monitor maternal well-being and provide remote guidance without requiring extensive in-person visits.
2. The intervention offers a scalable and culturally adaptable model that can complement existing maternal mental health services and enhance family support systems.

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DECLARATION

Ethics approval and consent to participate

Description ethical approval No. 029/07/VI/EC/KEP/LCBL/2025. All procedures involving human participants were conducted in accordance with the ethical standards of the institutional and national research committees and with the 1964 Helsinki Declaration and its later amendments. Informed consent was obtained from all participants prior to their inclusion in the study.

Consent for publication

All participants provided written informed consent for the publication of anonymized data and findings derived from this study. No identifiable personal information is included in this manuscript.

Availability of data and materials

The datasets generated and analyzed during the current study are not publicly available due to participant privacy and confidentiality agreements but are available from the corresponding author on reasonable request.

Conflicts of Interest Statement

The authors declare that they have no conflicts of interest related to this study.

Statement on the Use of Artificial Intelligence (AI)

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AUTHORS' CONTRIBUTIONS

Rizqiana Dita Ekasari completed her Master's in Nursing at Brawijaya University in Malang. Her research focuses on

maternity and mental health nursing. She is also currently involved in a research investigation into cyberbullying.

Ika Arum Dewi Satiti completed her Master's in Biomedicine at Brawijaya University in Malang. Her research focuses on maternity and pediatric nursing. She is currently conducting research on mindfulness therapy for adolescent girls.

Ari Damayanti Wahyuningrum completed her doctoral degree in nursing at Airlangga University in Surabaya. Her research focuses on maternity and pediatric nursing. She is currently conducting research and developing an application for cyberbullying investigations.

ABOUT THE AUTHORS

Rizqiana Dita Ekasari completed her master's in nursing at Brawijaya University in Malang. Her research focuses on maternity and mental health nursing. She is also currently involved in a research investigation into cyberbullying.

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ADDITIONAL INFORMATION

Correspondence All inquiries and requests for additional materials should be directed to the Corresponding Author.

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