



(RESEARCH ARTICLE)



## Empowering families: Innovative modules for postpartum support and disaster preparedness in vulnerable communities

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### Abstract

**Introduction:** Maternal mortality remains a global concern, particularly in low to middle-income countries. In Indonesia, despite efforts to reduce maternal mortality rates (MMR), challenges persist. This study addresses the critical intersection of postpartum support and disaster preparedness, emphasizing the involvement of husbands and families. Culturally-based innovative modules are introduced to empower families in high-risk contexts, aiming to enhance postpartum care and resilience to disasters.

**Aims:** This research evaluates the impact of innovative modules on postpartum support and disaster preparedness in vulnerable communities. Specifically, the study assesses improvements in husband support, family support, and disaster response readiness among postpartum mothers within 0-42 days after childbirth.

**Methods:** Adopting a quantitative approach, the study utilizes a quasi-experimental design with experimental and control groups in Pesisir Selatan Regency, West Sumatera, Indonesia. The sample size comprises 140 postpartum mothers, with the experimental group receiving innovative modules and the control group conventional care. Structured questionnaires measure variables, ensuring validity and reliability. Independent t-tests analyze differences between groups.

**Results:** Univariate analysis provides participant characteristics, and bivariate analysis demonstrates significant positive impacts of module utilization on emotional, informational, appreciative, and instrumental support from husbands and families. Disaster response readiness is notably higher in the module-utilizing group.

**Conclusion:** Culturally-based innovative modules effectively enhance postpartum support and disaster preparedness in vulnerable communities. Findings underscore the importance of involving husbands and families, presenting a basis for targeted interventions in disaster-prone areas.

**Keywords:** Postpartum Mother; Family Support; Husband Support; Disaster Preparedness; Innovative Modules.

### 1. Introduction

Maternal mortality rate (MMR) is a crucial parameter for evaluating global maternal health. Despite advancements, maternal mortality remains a global concern. According to data from the World Health Organization (WHO) in 2020, approximately 287,000 women died during pregnancy, childbirth, and the postpartum period. Nearly 95% of these deaths occurred in low to middle-income countries, including Indonesia, and most were preventable [1,2]. Indonesia, as one of the most populous countries, faces significant challenges in maternal health. Despite the government's target to reduce MMR to 102 per 100,000 live births by 2015, the data indicates a failure to achieve this goal. In 2015,

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Indonesia's maternal mortality rate was three times higher than the Millennium Development Goals (MDGs) target, emphasizing the urgent need for more effective strategies and interventions[3].

Accelerating efforts to reduce the Maternal Mortality Rate (MMR) involves ensuring that every mother has access to quality maternal health services. This includes care during pregnancy, skilled delivery assistance at health facilities, postpartum care for both mother and baby, specialized care, referrals for complications, and family planning services, including postpartum contraception[3,4]. The postpartum period is crucial for reducing maternal and infant mortality in Indonesia. Global experiences in combating maternal and infant mortality indicate that standardized postpartum care should be provided to mothers from 6 hours to 42 days after childbirth by healthcare professionals. Postpartum care is essential as 60% of maternal deaths occur after childbirth, with 50% of postpartum deaths occurring within the first 24 hours. The neonatal period is also a crisis time for infants, with two-thirds of infant deaths occurring within 4 weeks of childbirth, and 60% of newborn deaths happening in the first 7 days [5,6].

Minimum postpartum maternal health services should be provided at least three times to ensure that postpartum mothers are healthy and free from complications. Complications during the postpartum period include bleeding in the birth canal, swelling in the face, hands or feet, seizures, fever, swollen and red breasts, accompanied by pain. Complications during the postpartum period can impact breastfeeding, closely related to the baby's health [7,8]. The postpartum period, covering the days and weeks after childbirth, is a critical phase in a woman's life marked by significant adjustments and challenges [9].

Factors contributing to these mortality rates involve a lack of support from husbands and families, socio-cultural factors, harmful gender norms, and inequality resulting in low priority for the rights of women and girls, including their right to safe, quality, and affordable reproductive health services. External factors such as climate and humanitarian crises also contribute to the instability and vulnerability of the health system. Additionally, socio-economic inequality, limited knowledge, and awareness of postpartum care play a crucial role in increasing the risk of maternal death. These challenges are further exacerbated in communities facing high risks due to socio-economic factors, geographical location, or vulnerability to natural disasters. In this period, the intersection of postpartum support and disaster preparedness becomes crucial for the well-being of mothers, infants, and families [10].

Postpartum support is a complex concept involving emotional, physical, or instrumental assistance, recognition support, and informational support provided to mothers as they navigate their new lives as mothers. However, in vulnerable communities, access to adequate postpartum support is often limited, leading to postpartum depression and potential adverse outcomes for both mothers and infants. Meanwhile, the threat of disasters adds an additional layer of complexity to the challenges faced by families in vulnerable communities. Families, especially those with newborns, require innovative strategies to ensure their preparedness and resilience in facing potential disasters. Conventional approaches to disaster preparedness may not be sufficient to address the unique needs and vulnerabilities of postpartum women and their families[12,13].

This research explores the integration of two critical aspects: enhancing postpartum support and strengthening disaster preparedness in vulnerable communities. This approach involves the use of innovative modules designed to empower families, with a specific focus on the involvement of husbands and families in the postpartum process and disaster preparedness. The involvement of husbands and families in the postpartum journey is recognized as a crucial factor but often overlooked in maternal well-being. Research indicates that meaningful participation by husbands positively influences the mental health of mothers, contributes to the formation of positive parenting patterns, and creates a supportive environment for both mothers and babies [11]. In the context of disaster preparedness, the conventional emphasis on individual readiness needs to evolve into a comprehensive family-centered approach. The innovative modules are expected to bridge the gap between postpartum support and disaster resilience, providing families, especially husbands, with the tools and knowledge needed to navigate these critical points effectively[14].

This study aims to holistically assess the impact of the innovative modules in improving husband support, family support, and the preparedness of postpartum mothers in disaster-prone areas. By addressing the unique needs of vulnerable communities, this research seeks to pave the way for solutions that can be seamlessly integrated into the framework of postpartum care for mothers in disaster-prone areas. The utilization of innovative modules symbolizes empowerment, providing families and husbands with ways not only to overcome the challenges of the postpartum period but also to endure unexpected disasters.

## 2. Materials and methods

This study adopts a quantitative approach, employing a quasi-experimental design that includes both a control group and an experimental group. The experimental group received an innovative module, while the control group did not. The research was conducted in disaster-prone areas, specifically Pesisir Selatan Regency, West Sumatera, Indonesia, covering the period from March to December 2021. The population consisted of postpartum mothers within 0-42 days in the operational areas of health centers in Pesisir Selatan Regency, West Sumatera, Indonesia. The sample size, calculated using the Slovin formula with a 5% margin of error, was rounded up to 70 samples to ensure unbiased representation.

$$n = \frac{N}{ND^2 + 1}$$

Seventy individuals in the experimental group and 70 in the control group, meeting inclusion criteria, were chosen from postpartum mothers in disaster-prone areas. An innovative module, designed, was provided to the experimental group. The variables included an independent variable of the provision of the innovative module and dependent variables such as husband's support, family support, and disaster response readiness.

Measurement of variables involved structured questionnaires to measure the levels of husband's support, family support, and disaster response readiness. The questionnaire underwent rigorous validation, resulting in a tabulated r-value > 0.361, indicating both validity and reliability. The Cronbach's alpha reliability value was 0.71. Subjects were randomly assigned to the experimental and control groups. The experimental group received the innovative module immediately after childbirth, while the control group received conventional care without the module. Data on husband's support, family support, and disaster response readiness were collected through questionnaires administered after the intervention. Data analysis involved independent t-tests to compare differences between the experimental and control groups.

## 3. Results and discussion

### 3.1. Univariate Analysis

**Table 1** Descriptive Statistics of Number of Children and Respondents' Age

Variable	N	Minimum	Maximum	Mean	Std. Deviation
Number of Children	140	1	6	2.21	1.128
Respondent's Age	140	18	41	29.06	4.628

In the table no 1, postpartum mothers, on average, have 2 children, with ages ranging from 18 to 41 years and a typical age of around 29 years.

**Table 2** Support Categories from Husband Based on Module Condition

Husband Support Category	Module Condition	Number of Respondents	Mean	Standard Deviation	Standard Error Mean
Emotional Support	Not Using Module	70	17.13	1.817	0.217
	Using Module	70	24.99	2.732	0.327

The statistical analysis in the table 2 reveals significant differences between the group receiving the culturally-based innovative module and the control group that did not receive the module in the context of husband support during the postpartum period. In the category of emotional support, the group utilizing the module shows a significantly higher average compared to the control group, reflecting the positive impact of the module intervention on this aspect of

support. Similar patterns are observed in informational, appreciation, and instrumental support, where the experimental group consistently exhibits higher levels of support compared to the control group.

These findings suggest that the innovative module can be considered an effective strategy in enhancing husband support during the postpartum period. The implications highlight the importance of actively involving husbands by providing support that encompasses emotional, informational, appreciation, and instrumental aspects. These results provide a robust foundation for developing more focused and culturally relevant husband support programs, particularly in disaster-prone areas like Pesisir Selatan Regency.

**Table 3** Support Categories from Husband Based on Module Condition

Family Support Category	Module Condition	Number of Respondents	Mean	Standard Deviation	Standard Error Mean
Emotional Support	Not Using Module	70	17.94	3.379	0.404
	Using Module	70	23.71	1.287	0.154
Informational Support	Not Using Module	70	25.17	7.701	0.920
	Using Module	70	35.07	4.295	0.513
Appreciation Support	Not Using Module	70	22.01	6.080	0.727
	Using Module	70	28.90	2.709	0.324
Instrumental Support	Not Using Module	70	20.19	5.552	0.664
	Using Module	70	26.59	1.922	0.230

The statistical analysis in the table 3, reveals significant differences in the level of family support between the group receiving the culturally innovative module and the control group during the postpartum period. In the emotional family support category, the module group exhibits a significantly higher average compared to the control group, reflecting the positive impact of the module intervention on this support aspect. Similar patterns are observed in informational, appreciation, and instrumental support, where the experimental group consistently shows higher levels of support compared to the control group.

These results indicate that the culturally innovative module not only positively influences husband support but also significantly impacts the support provided by the family as a whole. The implication is the need for more active involvement of the family in providing support to postpartum mothers by offering necessary information, appreciation, and instrumental assistance. These findings provide a strong foundation for the development of family support programs that are more targeted and aligned with the needs of the local community, especially in disaster-prone areas such as Pesisir Selatan Regency.

**Table 4** Disaster Preparedness on Module Condition

Variable	Innovative Module	Number of Respondents	Mean	Standard Deviation	Standard Error Mean
Disaster Response Readiness	No	70	6.13	0.815	0.097
	Yes	70	9.51	0.989	0.118

This table 4 indicates that the group using the innovative module has a higher average disaster response readiness compared to the group not using the module. The relatively low standard deviation in both groups indicates a good level of consistency in disaster response readiness. These results support the hypothesis that providing an innovative module can positively contribute to enhancing disaster response readiness in disaster-prone areas.

### 3.2. Bivariate Analysis

**Table 5** The Impact of Module Utilization on Support on Husband's Support

Variable	F	Sig.	t-value	df	Sig.(2-tailed)	Mean Difference	Std. Error Difference	95% CI Lower	95% CI Upper
Informational Support (Husband)	17.908	0.000	-9.542	138	0.000	-8.471	0.888	-10.227	-6.716
Appreciative Support (Husband)	34.999	0.000	-9.076	138	0.000	-6.257	0.689	-7.620	-4.894
Emotional Support (Husband)	6.882	0.010	-20.035	138	0.000	-7.857	0.392	-8.633	-7.082
Instrumental Support (Husband)	89.519	0.000	-8.105	138	0.000	-4.600	0.568	-5.722	-3.478

The table 5, presents statistical analysis results on four types of support provided by husbands: informational, appreciative, emotional, and instrumental. Levene's test indicates significant variance differences between groups for each support type. Subsequently, the t-test assuming equal variance reveals significant mean differences, with postpartum mothers using the module showing higher spousal support compared to the non-module group. This finding is consistent across all support types, evident in highly significant F and t values.

Lower means in the non-module group, indicated by negative differences, suggest generally lower spousal support in each category. The significance is further supported by p-values < 0.05 in each type of support for the module group, emphasizing the effectiveness of module use in enhancing spousal support. Confidence intervals affirm the reliability of these findings. In conclusion, utilizing the module is significantly associated with increased spousal support for postpartum mothers in disaster-prone areas. Module use positively impacts various aspects of spousal support during the postpartum period, reflecting not only statistical significance but also the potential of the module as an effective strategy. This underscores the importance of innovative, evidence-based approaches in developing health interventions in high-risk contexts.

**Table 6** The Impact of Module Utilization on Support on Family's Support

Variable	(F)	Levene's Sig.	t-value	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% CI Lower	95% CI Upper
Emotional Family Support	46.526	0.000	-13.355	138	0.000	-5.771	0.432	-6.626	-4.917
Informational Family Support	25.810	0.000	-9.394	138	0.000	-9.900	1.054	-11.984	-7.816
Appreciative Family Support	36.711	0.000	-8.655	138	0.000	-6.886	0.796	-8.459	-5.313
Instrumental Family Support	73.422	0.000	-9.114	138	0.000	-6.400	0.702	-7.788	-5.012

The table 6, provides a comparison of mean values between the group utilizing the innovative module and the group not using the innovative module for each family support variable. The consistently positive impact of innovative module utilization on family support levels for postpartum mothers in disaster-prone areas is evident, with all variables showing significant differences. Levene's Test highlights significant variance differences between groups for each type of family support. Upon further analysis, emotional, informational, appreciative, and instrumental support all exhibit significant differences in means between groups. The module-utilizing group experiences statistically higher levels of family support compared to the non-module comparison group.

Specifically, for emotional, informational, appreciative, and instrumental support, both equal and unequal variance t-tests consistently confirm significant differences between groups. These findings indicate that the utilization of the module not only strengthens overall family support but also creates a positive impact in the dimensions of emotional, informational, appreciative, and instrumental support. It is crucial to acknowledge the very low p-values, less than 0.05, emphasizing the statistical significance of these findings. Therefore, it can be concluded that the utilization of the innovative module plays a significant role in enhancing family support levels for postpartum mothers in disaster-prone areas, illustrating positive potential for integration into broader intervention programs.

**Table 7** The Impact of Module Utilization on Disaster Preparedness

Variable	(F)	Sig.	t-value	df	Sig.(2-tailed)	Mean Difference	Std. Error Difference	95% CI Lower	95% CI Upper
Disaster Preparedness	7.462	0.007	-22.103	138	0.000	-3.386	0.153	-3.689	-3.083

This table 7, highlights the positive impact of module utilization on disaster preparedness among postpartum mothers in disaster-prone areas. The Levene's Test indicates a significant difference in variance between groups, with a Sig. value < 0.05. This suggests that the use of modules significantly enhances disaster preparedness among postpartum mothers in disaster-prone areas. Consequently, it can be concluded that there is a significant difference in disaster preparedness between the group of mothers utilizing the module compared to those who do not. These findings provide a foundation for the development of targeted strategies or interventions aimed at improving disaster preparedness among postpartum mothers in disaster-prone areas.

The postpartum period is a critical phase requiring substantial support, particularly from spouses and family members, to assist postpartum mothers in adapting to the physical and emotional changes they undergo. The utilization of innovative modules in this context can have a positive impact on the support provided by spouses and families. Aligned with research conducted by Albanese et al. (2022), this study highlights the significance of support for postpartum mothers, especially during the postpartum period[15]. The innovative approach through the use of modules has proven to positively affect various aspects of support, including emotional, instrumental, appreciative, and informational support.

### 3.3. Emotional Support

The module serves as a foundation for better understanding the emotional changes experienced by postpartum mothers. Stronger emotional support, such as attention, comfort, motivation, relaxation, and support during breastfeeding, can reduce stress levels and enhance the mental well-being of postpartum mothers [16]. These findings align with the previous research emphasizing the benefits of postpartum toolkits in improving accessibility and flexibility for parents and spouses. Research also indicates that the use of modules or guidebooks effectively reduces stress and depression scores in postpartum mothers, affirming that innovative modules not only enhance emotional support but also have a positive impact on mental well-being [15].

### 3.4. Instrumental Support

The module provides practical guidance for instrumental support, assisting spouses and families in providing physical care and handling daily tasks. This support helps postpartum mothers effectively adapt to their new roles[17]. Examples of instrumental support include providing meals, caring for the baby, offering transportation, providing financial assistance, and supporting personal hygiene.

### **3.5. Appreciative Support**

The module stimulates appreciation for the efforts of postpartum mothers in facing postpartum challenges. Full appreciative support, such as praise, accompanying mothers for health check-ups, helping address health issues, providing rest opportunities, and guiding mothers in postpartum exercises, can motivate and strengthen positive feelings in postpartum mothers [18]. These findings are consistent with previous research [19].

### **3.6. Informational Support**

The module provides rich informational resources, enhancing the understanding of spouses and families about the needs of postpartum mothers, possible changes, and the best ways to provide informational support [20]. Examples of informational support include knowledge about balanced nutrition, personal hygiene, early mobilization, sufficient sleep and rest, information about family planning and sexuality, exclusive breastfeeding, and details about health check-ups.

### **3.7. The Impact of Module Utilization on Disaster Preparedness**

The module not only increases support for postpartum mothers but also impacts the disaster preparedness of families in vulnerable areas. Increased participation in preparedness actions, such as emergency planning and equipment preparation, creates a community more prepared to face disaster risks [21]. The module plays a crucial role in shaping key factors in disaster preparedness, including emergency planning, storing essential documents, and preparing emergency supplies. Integrating modules into public health education programs proves to be an effective strategy to enhance understanding and tangible actions in preparing families for disaster risks [22].

The positive impact of modules on spousal and family support, as well as disaster preparedness, highlights significant potential for the development of holistic intervention programs. By integrating modules into community health and disaster education, these programs can create a supportive environment for postpartum mothers and their families in disaster-prone areas. This aligns with previous research emphasizing that tools or approaches developed for disaster preparation and response can support vulnerable populations, especially breastfeeding mothers and infants [23]. Therefore, these measures are expected to enhance overall family well-being and provide better resilience to postpartum stress and disaster threats [24].

This research provides valuable insights into the diverse impact of innovative modules on postpartum support and disaster preparedness, paving the way for comprehensive and effective intervention strategies. However, it has limitations, such as the need for broader and more diverse participant representation. Additionally, the study's duration may not fully reveal the long-term effects of the module, highlighting the importance of further longitudinal investigation.

Future research should consider conducting longitudinal studies to monitor the sustained effects of the module over an extended postpartum period. This approach would offer a more comprehensive understanding of the lasting impact of the module on maternal well-being and disaster preparedness. Furthermore, effective strategies should be developed to disseminate information about the module to healthcare professionals, families, and communities. Clear communication channels and educational campaigns can maximize the module's reach and impact.

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## **4. Conclusions**

This study demonstrates that culturally-based innovative modules significantly improve postpartum support from both husbands and families. The modules not only enhance emotional, instrumental, appreciative, and informational support but also contribute to increased disaster preparedness among mothers in disaster-prone areas. These findings underscore the potential of innovative modules in developing targeted and effective community interventions. While the study has limitations, including participant diversity and the need for long-term assessments, it provides valuable insights for shaping future public health strategies tailored to the needs of postpartum mothers in high-risk contexts.

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## **Compliance with ethical standards**

### *Acknowledgement*

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### *Disclosure of conflict of interest*

The authors declare they have no competing interests.

### *Statement of ethical approval*

Ethical considerations were addressed by providing participants with comprehensive information and asking for consent before participating, while participant privacy and security rights were strictly maintained. This research was approved by the ethical review board at Andalas University Padang with certificate number 388/UN.16.2/KEP-FK/2021.

### *Statement of informed consent*

Informed consent was obtained from all individual participants included in the study.

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