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Empowering Cadres in Optimizing Pregnant Women's Nutrition and Monitoring Fetal Well-Being Through Maternal Neonatal Education Model Family Culturally Based

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Abstract

Background: Pregnancy is a significant and eagerly anticipated event within families, closely tied to the cultural values they uphold. As the primary support system for pregnant women, families influence key health behaviors, particularly nutrition and monitoring of fetal well-being. Health workers play a vital role in assisting pregnant women and their families to adapt cultural practices in support of maternal and fetal health.
Aims: This study aims to enhance the role of health workers in optimizing maternal nutrition and monitoring fetal well-being through the implementation of a culturally sensitive Family Maternal-Neonatal Education (EMN) model. The specific objective is to empower community health volunteers (cadres) to improve maternal nutrition and monitor fetal well-being effectively.
Methods: The implementation adopted a Community Nursing Approach and utilized Community Development (CD) strategies. Cadres participated in persuasive and educational training programs tailored to cultural contexts. These sessions focused on key competencies in maternal nutrition during pregnancy and breastfeeding, as well as techniques for monitoring fetal well-being.
Result: Following the training, cadres showed a significant improvement in knowledge related to maternal nutrition and breastfeeding, with an average increase of 10 points in knowledge assessment scores. This improvement supports broader efforts to reduce maternal and infant mortality and prevent stunting in children.
Conclusion: Continuous training using a culturally based EMN model is necessary to further strengthen cadre competencies in supporting maternal nutrition and fetal well-being. This approach contributes to sustainable improvements in maternal and neonatal health outcomes within culturally diverse communities.

A. Introduction

Pregnancy is an important event for pregnant women and their partners. In addition to pregnancy causing physical and psychological changes, the fact faced by pregnant women is that pregnancy conditions can be normal or pathological (Zahra et al., 2024). One of the physiological pregnancy factors is the mother's nutritional status in normal conditions (Karemoi et al., 2020; Parrettini et al., 2020). Adequate nutrition will

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support the well-being of both the mother and the fetus. This is because nutrition is a component that is very necessary for maternal health, as well as supporting fetal growth during intra-uterine life (Zuhra & Farisni, 2022).

According to the Chairperson of the Scientific Committee of the International Conference on Indonesia Family Planning and Reproductive Health (ICIFPRH) until 2019, Indonesia's MMR is still high at 305 per 100,000 live births. Through the Sustainable Development Goals (SDGs), the MMR target is 70 per 100,000 live births in 2030 (Fristiwi et al., 2023; Sulistyorini, 2019). In addition, the MMR in Indonesia is still high compared to neighboring countries such as Malaysia and Singapore, which are already below 10 deaths per 1,000 births. Infant mortality is a sensitive indicator for determining the level of health and progress of a country (Khobragade et al., 2021; Sriyanto et al., 2023). The high infant mortality rates up to 1 year of age indicate the low quality of the health sector in the country (Amelia & Martanti, 2023).

Concerning the above explanation, data from the Bengkulu Provincial Health Office (2021), obtained information that Bengkulu City is a city with MMR ranked third in Bengkulu Province, and AKB is ranked second in Bengkulu Province. The most significant case for infant mortality (IMR), consecutively from the last 3 years, namely 2018-20 2 1, was caused by babies being born with low birth weight (LBW). Based on this, it is necessary to make efforts in the form of promotive and preventive measures in the form of health education, so that the risk of pregnancy that impacts on the health of the mother and fetus can be reduced. In order for existing problems to be minimized, the role of health workers is crucial in educating pregnant women including families, so that they have positive perceptions and behaviors in reducing MMR and AKB, one of which is through optimizing the nutrition of pregnant women and monitoring fetal well-being (Amelia & Martanti, 2023; Jauhar & Lestari, 2021).

It is because pregnant women in meeting nutritional needs are greatly influenced by many factors, including the role of health workers in changing the perception of pregnant women to behave healthily (Thornburg & Valent, 2024). Pregnant women with malnutrition are at high risk of threatening the health of the mother and fetus, which has an impact on the condition of illness, complications and even death (Parmawati et al., 2020; Utomo et al., 2024; Zuhra & Farisni, 2022). About solving the problems above, one of them is by trying to increase the role of health workers through the Family-Cultural-based Maternal Neonatal Education Model (EMN) in strengthening the nutrition of pregnant women and monitoring fetal welfare which is focused on pregnant women by involving the family as social support, also paying attention to the culture that develops in the community. The problem studied is related to the role of health workers in pregnant women in optimizing nutrition during pregnancy and monitoring fetal welfare (Kung'u et al., 2018; Sukmawati et al., 2024; Zuhra & Farisni, 2022).

Several government and community-based interventions have been carried out to address these issues. Programs such as ANC (Antenatal Care) revitalization**,** Pregnancy Class (Kelas Ibu Hamil)**,** Supplementary Feeding for Pregnant Women (*PMT Bumil*), and the use of the MCH Handbook (*Buku KIA*) have been widely promoted. In addition, the Ministry of Health has implemented the Program for the Acceleration of Stunting Reduction**,** which includes improving maternal and child nutrition, especially in the first 1,000 days of life. Cadre empowerment and integrated service post (*Posyandu*) revitalization have also become key strategies. While these programs have shown some positive impacts such as increased ANC visit coverage, improved awareness of pregnancy danger signs, and greater community participation, challenges remain in sustainability, quality of service delivery, and cultural alignment (Town et al., 2024; Zahra et al., 2024).

Preliminary findings from a study conducted at the Lempuing Health Center involving 10 second-trimester pregnant women showed low knowledge regarding maternal nutrition during early pregnancy. Four out of the 10 participants reported reduced appetite during early pregnancy. Body weight and BMI checks revealed that two women had a BMI of under 18, indicating undernutrition. In the Lempuing sub-district, community health cadres play a vital role in improving healthcare services. Interviews with health officers at the Lempuing Health Center revealed that these cadres are highly active in supporting health workers at integrated service posts (Posbindu and Posyandu) (Majid et al., 2015; Sukmawati et al., 2024). However, current routine cadre activities at the integrated health posts are still limited primarily to antenatal care (ANC) check-ups for pregnant women, with limited educational outreach. Failure to implement appropriate interventions, such as enhancing the role of health workers and applying a culturally sensitive family-based education model, can have serious consequences. Without targeted health education and nutritional guidance, pregnant women may continue to experience poor nutritional status, leading to an increased risk of complications such as anemia, low birth weight, preterm birth, and even maternal and neonatal mortality. Additionally, inadequate fetal monitoring at home may result in delayed detection of danger signs,

preventing timely medical intervention. In the long term, this could contribute to persistently high maternal and infant (Zuhra & Farisni, 2022).

Mortality rates and a greater prevalence of childhood stunting, which can impair cognitive development, reduce educational attainment, and limit economic productivity in adulthood (Ekholuenetale et al., 2020; Soliman et al., 2021). Therefore, without strategic promotive and preventive efforts, the cycle of poor maternal and child health outcomes may continue, hindering national progress toward achieving the Sustainable Development Goals (SDGs), particularly those related to health and well-being (Parmawati et al., 2020; Sulistyorini, 2019).

Study results preliminary work done at Lempuing Health Center in 10 mothers' pregnant trimester 2 obtained that knowledge Mother pregnant about nutrition Mother pregnant in early pregnancy Still less, even 4 out of 10 mothers pregnant state that lust eat at the beginning pregnancy down, when done BB and BMI examination showed two mothers pregnant with BMI <18. In the Lampuing sub-district, cadres from the community are representatives in improving health services. Based on interviews with Lempuing Health Center officers, health cadres at the Health Center are very active in assisting health workers in providing health services at Posbindu and Posyandu. Currently, activities are active and routine from the cadre at the integrated health post / integrated health post are limited to activities such as ANC examination for pregnant mother (Amelia & Martanti, 2023; Zahra et al., 2024).

If this issue is not addressed comprehensively and promptly, the negative impacts will be far-reaching. In the short term, pregnant women are at high risk of complications such as anemia, preeclampsia, preterm labor, and delivering babies with low birth weight or critical health conditions. Babies born to mothers with poor nutritional status are also more vulnerable to infections and neonatal mortality. In the long term, children born with stunting or malnutrition are likely to experience delays in physical growth, brain development, and academic achievement. It can result in reduced individual productivity in adulthood, increased economic burdens on families and the state, and hindered progress toward achieving the Sustainable Development Goals (SDGs) in health, education, and economic development sectors. Therefore, without proper and strategic interventions, the cycle of poverty and poor human resource quality will continue to repeat across generations.

B. Methods

Research Design:

The method of implementing community service activities to overcome problems found in the community is by using the concept of community nursing, which involves groups of health cadres in Lempuing City Village to be able to implement Nutrition for Pregnant Women and how to Conducting Fetal Welfare Monitoring Through Educational Models *Maternal Neonatal* (EMN) Based on Family Cultural to reduce MMR and IMR.

Study Area:

The focus area of this community service activity is carried out in the working area of the Lempuing Health Center, Bengkulu City.

Population and Sampling Technique:

The target population consists of Community members, Steps Program Cadre training in Devotion, this society is implemented in the Lempuing sub-district on August 13, 2024, from 09.00 to 16.00 WIB online. The number of cadres invited is 30.

Number, Criteria, and Characteristics of Targets

Number of Participants: 30 health cadres.

1. Criteria: Active community health cadres currently involved in maternal and child health programs at Posyandu or local health posts in Lempuing sub-district.
2. Characteristics: Mostly female, ages ranging from 25 to 55 years old, with varied educational backgrounds but all with basic training in community health.

Aspects Measured

1. Knowledge of cadres on nutrition during pregnancy and breastfeeding.
2. Skills and confidence in monitoring fetal well-being at home.

3. Ability to deliver culturally sensitive education to families.
4. Cadres' attitudes and motivation in conducting community outreach.

Instruments

1. Pre- and post-training knowledge tests were developed based on maternal nutrition and fetal monitoring topics.
2. Questionnaires to assess cadres' attitudes and self-reported skills.
3. Observation checklists for monitoring cadres during community outreach activities.
4. Training materials include presentations, leaflets, and culturally adapted educational modules.

Data Collection Methods:

Preparation Stage

1. Coordination with the Lempuing Urban Village, Bengkulu City, the Head of the Health Center, and the Person in Charge of the KIA Program at the Lempuing Urban Village, Bengkulu City, and Cadres at the Lempuing Urban Village, Bengkulu City.
2. Identification of health cadres to be trained.

Implementation Stage

1. Conduct training on Nutrition for Pregnant Women and how to monitor Fetal Welfare Through the Family Cultural-Based Maternal Neonatal Education Model (EMN) for cadres in the Lempuing Village area of Bengkulu City.
2. Evaluate the cadre's ability to understand and apply Nutrition for Pregnant Women and how to monitor Fetal Welfare Through the Family Cultural-Based Maternal Neonatal Education Model (EMN)
3. Prepare a schedule for mentoring cadres.
4. Form a group of pregnant women who will receive mentoring on optimizing maternal nutrition and how to monitor Fetal Welfare Through the Family Cultural-Based Maternal Neonatal Education Model (EMN)
5. Provide mentoring in the implementation during the activity.

Pregnant Women Group Mentoring Stage

1. Preparing a schedule for mentoring pregnant women groups
2. Cadres assist in implementing Nutrition for Pregnant Women and how to monitor Fetal Welfare Through the Family Cultural-Based Maternal Neonatal Education (EMN) Model

Monitoring and Evaluation Stage

1. Monitoring cadre mentoring for pregnant women groups
2. Conducting an evaluation of the implementation of cadre mentoring for pregnant women groups
3. Evaluating of the improvement in the nutritional status of pregnant women through calculating BB, LILA, and BMI for each mentoring implementation.

C. Results and Discussion

1. Results

This activity began with an exploration of the Lempuing Health Center and the Lempuing sub-district. The exploration was conducted to gather data on malnutrition among pregnant women. The results of the exploration showed that 23.4% of pregnant women in the last 2 years, from 2021 to 2022, experienced malnutrition, which could have an impact on the mother and fetus. Continued by Cadre Training held on August 13, 2024. The activities carried out were cadre training carried out in the Lempuing sub-district, as for theme Which carried in training the is Nutrition for Pregnant Women and how to Conducting Fetal Welfare Monitoring Through Educational Models Family Culturally Based Maternal Neonatal (EMN) was attended by 30 participants consisting of 25 cadres and five health workers at the Lempuing Health Center.

The event was opened with remarks from the head of the nursing department, ns. Septiyanti, S.Kep, M.Pd, was attended by the head of the Lempuing health center and the head of the Lempuing village. The main event, namely cadre training, then continued. The activity began with a pretest on the cadre's knowledge of nutrition during pregnancy, then continued with the first material presented by Dr. Nur Elly, S.Kp, M.Kes, a lecturer in maternity nursing. In this material, the importance of fulfilling nutritional needs in pregnant women was conveyed. She explained what nutrients must be met during pregnancy. Next, the second

material was given by Mrs. Ns. Rahma Annisa, S.Kp, M.Kep. She is a pediatric lecturer in the nursing department. She provided material and practice on how to monitor fetal well-being through educational models, including *Maternal Neonatal* (EMN) Models Based on Family Culture. After the presentation of the material, a discussion forum and Q&A session were held. From the two materials presented, there were six questions. Before the closing, the person in charge of KIA, Mrs. Era, provided a monitoring schedule and assistance in implementing the implications of this training activity for each cadre, then proceeded with a post-test. The event concluded by distributing souvenirs to cadres who had asked questions during the discussion.

This training activity is expected to optimize the role of cadres to educate on the fulfillment of nutrition for pregnant women in reducing maternal and neonatal mortality rates, increase the capacity of cadres through training activities, workshops, seminars, and others to support existing programs in Lempuing Village in particular and Bengkulu City in general, allocate funding sources to increase the capacity of cadres to be active in preventing stunting through monitoring the nutrition of pregnant women and allocate funding sources to improve nutrition for pregnant women to support stunting prevention programs and reduce maternal and neonatal mortality rates.

Figure 1. Opening Activities of Cadre Training in Lempuing Sub-district. The Opening was Attended by the Head of Department, Head of Lempuing Health Center, and Head of Lempuing Sub-district

Figure 2. Provision of Training Materials on Nutritional Needs of Pregnant Women by Dr. Nur Elly, S.Kp, M.Kes

Figure 3. Provision of Training Materials on Educational Models *Maternal Neonatal* (EMN) Based on Family Culture by. Ns. Rahma Annisa, S.Kep, M.Kep

Figure 4. Activity of Distributing Monitoring Schedules for Cadres by the Person in Charge of the Nurse Program

Assessment of Cadres' Cognitive Ability Related to Nutrition, Breastfeeding, and Stunting

Before participating in the training, the knowledge of the training participants was assessed using the provided training materials. After completing the pre-test questionnaire, the cadres received the training materials. Following the second training session, their knowledge was assessed again through a post-test. The results of the training showed a significant change in the cadres' knowledge, as summarized in the table below:

Tabel 1. Knowledge Number of Participants Average Score Difference

Knowledge	Total	Mean	Difference
Pre test	30	68	
Post test	30	78	10

Based on the results above, it can be concluded that after receiving the training, there was a significant 10-point increase in cadres' knowledge related to maternal nutrition from pregnancy through breastfeeding. This improvement is expected to contribute to reducing the risk of maternal and infant mortality as well as the incidence of stunting in children.

2. Discussion

The findings of this community service activity clearly demonstrate a significant improvement in the cognitive abilities of health cadres regarding maternal nutrition, breastfeeding, and stunting prevention. The average knowledge score increased by 10 points, from 68 in the pre-test to 78 in the post-test. This result indicates that the Family-Cultural-Based Maternal-Neonatal (EMN) education model effectively enhanced

cadres' understanding of key health topics, an essential development given their role in supporting pregnant women and monitoring fetal well-being. Several factors contributed to this improvement. Firstly, the training incorporated adult learning principles, which emphasize relevance, problem-centered approaches, and experience-based engagement (Kung'u et al., 2018; Utomo et al., 2024). By integrating family cultural values into the EMN model, the training bridged theoretical knowledge with real-life community practices, thereby enhancing understanding and relevance. Secondly, interactive learning methods such as group discussions, role-playing, and demonstrations facilitated active participation. These approaches are known to increase knowledge retention and learner engagement (Sukmawati et al., 2024; Suparji et al., 2024). Cultural adaptation of materials helped overcome local belief-related barriers, which is crucial in effective health education (Parmawati et al., 2020; Webb, 2023).

Supporting this, prior studies by Jauhar & Lestari (2021), showed that cadres trained using the EMN model demonstrated significant improvements in maternal health-related knowledge and skills ($p < 0.05$). Similar culturally adapted interventions have been proven effective in increasing acceptance and sustainability (Majid et al., 2015; Sukmawati et al., 2024).

2.1 Implications

The improvement in cadres' knowledge has direct implications for community health outcomes. Better-informed cadres can more effectively educate and support pregnant women, promoting practices that reduce the risk of maternal and infant mortality and stunting. Given their position as trusted community members, cadres can help reshape health-related cultural norms through respectful and culturally sensitive counselling. Furthermore, the success of this culturally adapted model suggests that similar interventions could be used in other regions facing comparable challenges. Strengthening grassroots capacity through community health workers is a crucial strategy for enhancing maternal and neonatal health, particularly in areas with limited healthcare access.

2.2 Research Contribution

This activity contributes to the growing body of evidence supporting culturally based, community centered health education. Specifically, it reinforces the effectiveness of the EMN model in increasing health cadres' knowledge in a relatively short time. It also demonstrates how adult learning theory and cultural contextualization can be combined to improve the impact of health training programs. Additionally, this study highlights the feasibility of implementing community education through online platforms, a consideration that is particularly relevant in the context of digital transformation and remote outreach needs.

2.3 Limitations

Several limitations must be acknowledged:

a. Delivery Mode: The online format may have limited interactive and hands-on components, potentially affected engagement and learning outcomes.
b. Short-term Evaluation: The assessment focused only on immediate post-training knowledge. Long-term retention and practical application were not measured.
c. Sample Size and Scope: The study involved only 30 cadres from a single sub-district, limiting the generalizability of the findings.
d. Contextual Factors: Broader determinants of maternal and child health, such as access to services and socioeconomic conditions, were not within the scope of the training.

2.4 Suggestions

To enhance the effectiveness and sustainability of future programs, the following suggestions are proposed:

a. Hybrid Training Models: Combine online modules with in-person workshops to allow for more interaction, practice, and direct feedback.
b. Follow-Up Assessments: Conduct longitudinal studies to assess knowledge retention, behaviour change, and impact on maternal-child health outcomes.
c. Scaling and Replication: Implement the EMN model in diverse settings to evaluate its applicability and adaptability across different cultural contexts.
d. Integrated Approach: Coordinate cadre training with improvements in healthcare infrastructure and access, and address socioeconomic barriers to ensure holistic improvements in maternal and child health.

The findings of this community service activity clearly demonstrate a significant improvement in the cognitive abilities of health cadres regarding maternal nutrition, breastfeeding, and stunting prevention. The average knowledge score increased by 10 points, from 68 in the pre-test to 78 in the post-test. This result indicates that the Family-Cultural-Based Maternal-Neonatal (EMN) education model training effectively enhanced cadres' understanding of key health topics, which is crucial for their role in supporting pregnant women and monitoring fetal well-being.

D. Conclusion

In summary, the community service activity successfully enhanced the cognitive abilities of health cadres related to maternal nutrition and fetal monitoring through a culturally based EMN educational model. This improvement lays a foundation for enhanced community health promotion and maternal-neonatal outcomes. To maximize and sustain these benefits, future programs should incorporate face-to-face components, ongoing training, regular follow-up evaluations, and comprehensive systemic support.

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F. Author Contribution Statement

RA, DW, and JL contributed to the design and implementation of the study. RA led the development of the culturally based EMN model and coordinated training for the cadre. DW was respons``ible for data collection and analysis. JL assisted with community engagement and interpretation of results. All authors contributed to the writing and revision of the manuscript and approved the final version.

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