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Research Article

Kanggoroo Mother Care as a Method to Increase the Weight of Premature Babies with Fenton Chart Monitoring: A Health Promotion Program

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ABSTRACT
Background: Premature birth is defined as the birth of a baby before 37 weeks gestation. Kangaroo Mother Care (KMC) is a care technique, particularly beneficial for premature infants, that emphasizes skin-to-skin contact between the mother and her baby. Research shows that KMC significantly reduce the number of neonatal deaths, preventing hypothermia, reducing the occurrence of infections, increasing baby growth and development, increasing breastfeeding and bonding between mother and baby. **Objective:** To emphasize the importance of Kangaroo Mother Care for premature infants and address the barriers that may affect its implementation. **Methods:** A review of current literature and research findings related to Kangaroo Mother Care was conducted, focusing on health benefits and common challenges to its application in different settings. **Results:** KMC significantly reduce neonatal deaths, prevent hypothermia, reduce infections, and support baby growth and development. It also increases breastfeeding and bonding between mother and baby. However, some beliefs may restrict physical contact with newborns or dictate other types of care that do not involve close, continuous contact. **Conclusion:** Kangaroo Mother Care is an effective method for improving outcomes in premature infants. Therefore, it is important to educate healthcare workers and mothers the importance of Kangaroo Mother Care to promote its adoption and overcome cultural barriers.

Keywords: kangaroo mother care, neonatal outcomes, premature birth

1. Introduction

Premature birth is defined as the birth of baby before 37 weeks gestation. (WHO, 2022) About 1 million children die every year due to complications from premature birth.(Ghaemmaghami et al., 2024; Ying et al., 2024) Preventing death and complications from premature birth starts with a healthy pregnancy. (Abasalizadeh et al., 2024; Abuhammad et al., 2024; Aziz, 2024; Cai et al., 2024)) Kangaroo Mother Care (KMC) is method used for low-birth-weight babies or premature babies by making direct contact between the baby's skin and the mother's skin or skin-to-skin contact, where the mother uses her body temperature to warm the baby. This treatment method has also been proven to make breastfeeding easier, thereby increasing the length and duration

of breastfeeding. Kangaroo Mother Care (KMC) is an alternative to incubators in treatment for low-birth-weight babies (WHO, 2022, IDAI, 2013).

Research shows KMC significantly reduce the number of neonatal deaths, preventing low birth weight babies from getting cold (hypothermia), stabilizing babies, reducing the occurrence of infections, increasing baby growth and development, increasing breastfeeding, and increasing bonding between mother and baby (IDAI, 2013). There is significant research into what factors influence the uptake and sustainability of KMC, barriers often include lack of knowledge among healthcare providers, inadequate hospital policies, cultural beliefs, and resource limitations. (Kirbas et al., 2024; Kritzinger et al., 2024; Kwesiga & Wanduru, 2024) Facilitators include strong policy support, education and training programs, and cultural adaptations of KMC practices. (Li et al., 2024; Mukhola et al., 2024; Nimbalkar et al., 2024)

Looking at the conditions and situations above, the problems currently being faced are the incidence of growth and development disorders in babies and the care of premature babies using the KMC method in children's health services is still not optimal. This situation can result in longer treatment rates for premature babies, which can increase infant morbidity and mortality. Therefore, education is needed for health workers and the general public regarding the importance of caring for premature babies using the KMC method.

2. Methods

This research is a cross sectional analytical study with pre-test and post-test design. Research was conducted to determine the demographic characteristics of the level of community knowledge regarding the Kangaroo Mother Care method and the correlation of factors that influence the level of community knowledge in Pematangsiantar City, North Sumatra. This research is part of the Perintis program community service carried out by the Faculty of Medicine, Universitas Sumatera Utara, funded by Dean's Decree no 07/UN5.2.1.1/SK/PPM/2023. Total of 3 lecturers involved in this program consist of 2 lecturers from the Department of Paediatrics and 1 from the Department of Obstetrics and Gynaecology, Faculty of Medicine, Universitas Sumatera Utara in collaboration with Pematangsiantar city government.

In preparation of the community service, Pematang Siantar city government was contacted and a letter of permission to carry the community service was sent. In return, Pematangsiantar city government sent invitations to mothers and health workers to attend on the appointed date to participate in the community service. Community service took place on August 24th 2023, from 09.00 to 14.00. The event took place at the Bappeda Building, Pematangsiantar city. Community service began with opening remarks by moderator, welcoming remarks from team leader and the mayor of Pematangsiantar city. Next, baby scales and plaques were handed over as a sign of gratitude to the Pematangsiantar city government.

Material presentation by the speaker were carried out, followed by questions and answers session. Pre test and post test questionnaires were distributed to assess mothers and healthcare workers level of knowledge of regarding KMC method before and after material presentation. The questionnaire consists of 10 questions with yes or no answers. Each yes answer was given a value of 1 and each no answer was given a value of 0.

3. Results

This program aims to provide education to mothers and health workers about Kangaroo Mother Care so that this method can be applied to premature babies in everyday situations. The number of participants, including both mother and health workers was 109 people. Topics presented beside Kangoroo Mother Care are Woman's Reproductive Health and Congenital Heart Disease in Children (Figure 1 and 2).

Figure 1. Education for mothers and healthcare workers on Kangoroo Mother Care

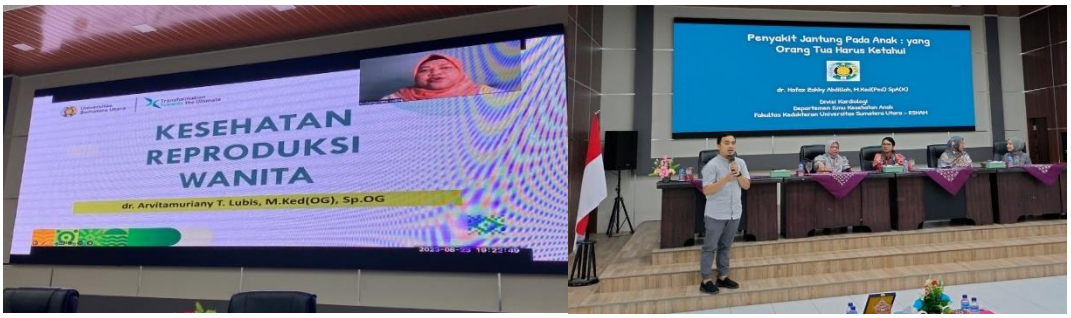

Figure 2. Education for mothers and health workers on women's reproduction health and congenital heart disease in children

After all the materials presented, anthropometric measurements, health examinations and consultations were carried out. Next, souvenirs were distributed to the participants as a sign of gratitude (figures 3).

Tabel 1. Characteristics of respondents

Characteristic	Respondents (n=109)
Age	
<20 years	2(1,8%)
20-35 years	35(32.1%)
>35 years	72(66.1%)
Education	
Non educational	0(0%)
Elementary school	2(1.8%)
Junior high school	7(6.4%)
Senior high school	42(38.5%)
College	58(53.2%)
Occupation	
Unemployed	48(44%)
Employed as healthcare workers	49(44.9%)
Employed as non-healthcare workers	12(11,0%)

Based on Table 1, it shows that of the 109 paticipants, the majority were in the age group over 35 years, namely 72 respondents (66.1%). The second largest age group in this study was the age group between 20-35 years, namely 35 respondents (32.1%). A total of 2 respondents (1.8%) were in the age group less than 20 years. Furthermore, the results of observations based on educational history, it was found that the majority of respondents had a recent educational history of tertiary education as many as 58 respondents (53.2%), 42 respondents (38.5%) with a recent educational history of senior high school, 7 respondents (6.4%) with a recent education of junior high school and 2 respondents (1.8%) with primary school education. Among all

respondents, none had history of not attending formal education. Furthermore, based on the respondents employement status, it was found that the majority of respondents were currently employed. A total of 49 respondents (44.9%) worked in the health sector, while 12 respondents (11.0%) worked in non-health sectors. A total of 48 respondents (44.0%) are currently unemployed. Subsequently, an assessment was carried out on the pretest questionnaire that had been distributed. The results obtained are listed in Table 2.

Table 2. Respondent level of knowledge based on *pre-test* result.

Level of Knowledge	N	%
Good	94	82.2
Sufficient	11	10.1
Poor	4	3.7
Total	109	100.0

Based on the pretest results listed in Table 2. It was found that the majority of respondents had fairly good knowledge regarding Kangaroo Method Care (KMC) before the material presentation was carried out, with a total of 94 respondents (82.2%) having a good level of knowledge. A total of 11 respondents (10.1%) had sufficient level of knowledge and only 4 respondents (3.7%) were found to have poor level of knowledge.

Table 3. Respondent level of knowledge based on *post-test* result.

Level of Knowledge	n	%
Good	104	95.4
Sufficient	5	4.6
Poor	0	0
Total	109	100.0

After the educational material presented, the respondent's level of knowledge regarding the topic of Kangaroo Care Method (PMK) was reassessed. Based on Table 3. there was an increase in respondent's knowledge with 104 respondents (95.4%) in the good category and 5 respondents (4.6%) having sufficient knowledge. There were no respondents with poor level of knowledge after the presentation was carried out.

4. Discussion

An analysis was carried out on the results obtained from the pre-test and post-test questionnaires. The impact of providing education on respondent's level of knowledge before and after the educational material was presented was assessed by conducting a bivariate analysis test, using the paired T hypothesis test. Significant difference was found in the groups that had received the educational material with p value 0.016 ($p<0.05$). This shows that providing education about Kangaroo Mother Care method (KMC) had an impact on respondent's level of knowledge in Pematangsiantar City, North Sumatra.

Several studies have explored the long-term impact of KMC on neurodevelopmental outcomes. Findings suggest that children who received KMC exhibit better cognitive, emotional, and social development compared to those who received conventional neonatal care. (Ramaiah et al., 2024; Sofia, 2024; Tas Arslan et al., 2024; Tian et al., 2024) This is possibly due to enhanced bonding and reduced stress for both the infant and the mother. (Sofia, 2024; Tas Arslan et al., 2024) Research has also focused on the psychological effects of KMC on parents, particularly mothers. KMC can reduce maternal anxiety, increase confidence in caregiving skills, and strengthen the maternal-infant bond. (Abasalizadeh et al., 2024; Abuhammad et al., 2024; Aziz, 2024) However, the emotional demands and the physical commitment required can sometimes be challenging, especially without adequate support.

The mechanism behind improved thermoregulation during KMC is believed to involve several physiological factors, including increased skin temperature, enhanced cardiorespiratory stability, and reduced energy expenditure by the infant. (Gajula et al., 2024; Ghaemmaghami et al., 2024; Kirbas et al., 2024; Kritzinger et al., 2024) The close, continuous contact is thought to enhance the infant's own physiological mechanisms for maintaining body heat. (Ghaemmaghami et al., 2024; Kirbas et al., 2024)

Basic thermoregulation of KMC involves continuous skin-to-skin contact between the mother and the infant. (Fernandez-Medina et al., 2024; Gajula et al., 2024) This direct contact is found to provide a warm, stable thermal environment which mimics the in-utero conditions that a premature baby would have experienced. (Ouyang et al., 2024; Ramaiah et al., 2024; Sofia, 2024) The mother's body naturally adjusts to

regulate the baby's temperature more effectively than most artificial warming devices. Studies have shown that KMC can help stabilize the infant's core temperature.(Sofia, 2024; Tas Arslan et al., 2024) Research indicates that the thermal synchrony between the mother and the infant during KMC results in fewer fluctuations in the infant's body temperature compared to when the infant is placed in an incubator. (Tumukunde et al., 2024; Veeraiah et al., 2024; Yilgor Becerikli & Sayin, 2024) This stability is crucial for promoting the survival and healthy development of premature and low birth weight infants. (Tas Arslan et al., 2024; Tian et al., 2024; Tumukunde et al., 2024) Research comparing KMC with traditional incubator care consistently finds that KMC is at least as effective, if not superior, in maintaining appropriate body temperature in preterm newborns. (Veeraiah et al., 2024; Yilgor Becerikli & Sayin, 2024; Ying et al., 2024) Some studies suggest that infants in KMC adapt better to the external environment and exhibit improved thermal control.(Tumukunde et al., 2024; Veeraiah et al., 2024) Beyond immediate temperature stabilization, KMC has been associated with better long-term thermoregulation capabilities in infants. (Yilgor Becerikli & Sayin, 2024; Ying et al., 2024) This is thought to be due to the enhancement of the physiological and endocrine responses which aid in better energy balance and thermal regulation as the infant grows. (Veeraiah et al., 2024; Yilgor Becerikli & Sayin, 2024; Ying et al., 2024).

5. Conclusion

Kangaroo Mother Care (KMC) method is an alternative to incubators for babies with low birth weight with several advantages. KMC can reduce the incidence of infections, serious illnesses, breastfeeding problems and maternal dissatisfaction as well as improve the relationship between mother and baby and increase baby growth and development.

The research that has been carried out, significant differences were found in respondents, mother and healthcare workers, level of knowledge before and after material presentation on Kangaroo Mother Care provided with p value of 0.000 ($p<0.05$). It is hoped that providing educational presentation on Kangaroo Mother Care as part of community service activities in the city of Pematangsiantar will provide benefits to healthcare workers and mothers in dealing with small or premature babies in the future. It is also hoped that healthcare workers will be able to educate more people in the community regarding kangaroo mother care method for low birth weight and premature babies so that it can be used widely in society.

6. Data Availability Statement

The datasets generated and analyzed during the current study are not publicly available due to privacy and ethical considerations but are available from the corresponding author upon reasonable request.

7. Ethical Statement

Sumatera Medical Journal (SUMEJ) is a peer-reviewed electronic international journal. This statement below clarifies ethical behavior of all parties involved in the act of publishing an article in Sumatera Medical Journal (SUMEJ), including the authors, the chief editor, the Editorial Board, the peer-reviewer and the publisher (TALENTA Publisher Universitas Sumatera Utara). This statement is based on COPE's Best Practice Guidelines for Journal Editors

8. Author Contributions

All authors contributed to the design and implementation of the research, data analysis, and finalizing the manuscript.

9. Funding

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10. Conflict of Interest

Authors declares no conflict of interest.

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