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Improving Knowledge and Self-Efficacy in Caring at Home for Parents with Low Birth Weight Babies

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A B S T R A C T

Low birth weight babies (LBWB) are more vulnerable to health problems. It is challenging to care them after discharge from the hospital. Mother knowledge and self-efficacy are essential components in determining the quality of care and health outcome of LBWB. However, research investigating mother's self-efficacy (consisting of self-efficacy in general care, performing KMC, and giving breastfeeding) in parents of LBWB is rare. We aimed to determine the effect of an audiovisual-based educational package on knowledge and self-efficacy in caring for LBWB at home. The study was a pre-post quasi-experimental research with a control group of 48 postpartum mothers with LBWB who met the inclusion criteria. Twenty-four of these mothers whose babies were cared for in the perinatology unit were provided an audiovisual-based educational package as an intervention group, and the rest of these were provided health education standards from the hospital from August to November 2023. Data were collected using a maternal knowledge questionnaire and a modified perceived maternal parenting self-efficacy (PMP-SE) questionnaire. The data were analyzed using the Paired t-test/Wilcoxon and Kruskall-Wallis tests. The analysis revealed that comparison of increasing post-test mean scores across groups (control compared to intervention group) were significantly different in Mother's knowledge (p<0,007) and self-efficacy in providing care of LBWB (p<0,021; p<0,001 and p<0,001). The mother's knowledge and self-efficacy significantly improve after received an audiovisual-based educational package. An audiovisual-based educational package for mothers with LBWB can be a helpful nursing intervention to improve mothers' knowledge and self-efficacy

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A B S T R A K

Bayi berat lahir rendah (BBLR) lebih rentan mengalami masalah kesehatan, sehingga perawatan BBLR di rumah menjadi hal yang sulit. Pengetahuan ibu dan efikasi diri merupakan komponen penting dalam menentukan kualitas asuhan dan status kesehatan BBLR. Namun penelitian yang mengidentifikasi efikasi diri ibu (yang terdiri dari efikasi diri dalam perawatan umum, melakukan KMC, dan memberikan ASI) pada orang tua dengan BBLR masih jarang. Peneliti bertujuan untuk mengetahui pengaruh paket edukasi berbasis audiovisual terhadap pengetahuan dan efikasi diri dalam merawat BBLR di rumah. Penelitian merupakan penelitian eksperimen semu pre-post dengan kelompok kontrol sebanyak 48 ibu nifas dengan BBLR yang memenuhi kriteria inklusi. Dua puluh empat ibu yang bayinya dirawat di unit perinatologi ini diberikan paket pendidikan berbasis audiovisual sebagai kelompok intervensi, dan sisanya diberikan

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pendidikan kesehatan standar dari rumah sakit. Penelitian dilakukan di rumah sakit pendidikan negeri di Jawa Timur dari Agustus hingga November 2023. Pengumpulan data dilakukan dengan menggunakan kuesioner pengetahuan ibu dan kuesioner perceived maternal parenting self-efficacy (PMP-SE). Data dianalisis dengan menggunakan Paired t-test/Wilcoxon dan Kruskall-Wallis. Hasil analisis menunjukkan bahwa perbandingan peningkatan skor rata-rata post-test antar kelompok (kontrol dibandingkan kelompok intervensi) berbeda bermakna, yaitu pada pengetahuan ibu nilai p<0,007 dan efikasi diri dalam memberikan perawatan BBLR dengan nilai p<0,021 (efikasi perawatan umum BBLR); p<0,001 (efikasi PMK) dan p<0,001 (efikasi menyusui). Pengetahuan dan efikasi diri ibu meningkat secara signifikan setelah mendapatkan pendidikan kesehatan menggunakan media audiovisual. Paket edukasi berbasis audiovisual untuk ibu dengan BBLR dapat menjadi intervensi keperawatan yang bermanfaat untuk meningkatkan pengetahuan dan efikasi diri ibu

INTRODUCTION

The neonatal mortality rate in Indonesia was 11.7 deaths per 1,000 live births showing a decline from the previous year, 2020, which was 12.2 per 1000 live births and is still the highest among Southeast Asian countries (Kapti et al. 2022; UNICEF 2021). However, when compared with the countries of the Southeast Asian region (Association of Southeast Asian Nations/ASEAN), Indonesia's infant mortality rate ranks fifth highest out of 10 countries (Kusnandar 2022). Preterm birth and low birth weight (LBW) babies have been reported to be the leading cause of neonatal death (Olack et al. 2021). LBW (Babies born weighing less than 2500 grams) can be related to premature delivery and associated with the restriction of intrauterine growth or the relationship between both situations (Olack et al. 2021).

LBW babies are more vulnerable compared to normal babies due to low birth weight and the body systems that are still immature because most LBW are born with a gestational age of fewer than 37 weeks (Bowden and Greenberg 2010). Therefore, LBW babies have special characteristics that cause them to be more at risk of health problems, so they require special care and positive interactions between Mother and baby (Prabhakaran 2015). Some of these characteristics, namely LBW are more susceptible to hypothermia, infection, immature ability to drink (feeding difficulties, hypoglycemia, hyperbilirubinemia, and respiratory problems) (Benitz et al. 2015; Mohamed, Abo-Seif, and Machaly 2017). These conditions can persist after discharge from the hospital and hospital readmission within the first two weeks of life (Mohamed et al. 2017). These conditions require parents to adapt to their caring process at home (Suyami, Rustina, and Agustini 2014). This needs to be understood by the family, especially by the mother or primary caregiver of the baby.

Knowledge of mothers about LBW babies and caring for LBW babies is an important foundation and perform a main role in the care of LBW at home (Prabhakaran 2015; World Health Organization 2022). Lack of mother knowledge regarding care of LBW at home can harm and increase their mortality and morbidity, so the mother, as a close caregiver, and other caregivers should have the proper knowledge to deliver the appropriate care and identify the warning signs (Prabhakaran, 2015). The mother's knowledge determines the level of self-efficacy in caring for LBW babies, where a higher level of knowledge correlates with higher maternal self-efficacy (Amaliya et al. 2022). A mother's self-efficacy is an aspect of parenting that contributes to a parent's capacity to be responsive and attentive to their child's needs (Vance et al. 2021). Self-efficacy refers to the mother's internal belief of their ability to manage a task effectively and successfully (efficacy) and will influence how much effort the mother will put into a given task so it can predict actual competence at the given task (Botha et al. 2020; Pennell et al. 2012). Therefore, a mother's self-efficacy contributes to infant development and health status (Vance et al. 2021).

Research by Premji *et al.* (2016) et al. reported that mothers with LBW babies had low parenting confidence until 6~8 weeks after delivery which is similar to another study that stated in the initial period that postpartum mothers had low self-efficacy (Sugiarti, Rustina, and Efendi 2020; Vance et al. 2021). They also faced obstacles in carrying out their roles, both internal and external, including insufficient knowledge, stress, economic problems, and family and social support (Astuti et al. 2019). Therefore, an intervention is needed to increase the knowledge and self-efficacy of mothers through education which is part of discharge planning.

Health education for mothers as a part of discharge planning is integral to baby care in hospitals and enhances the awareness and practice of care for LBW babies (Bhoknal 2018). Components of the education include nutrition, kangaroo care, baby hygiene, umbilical cord, skincare, and recognition of signs of infection. This is suitable with the components in LBW care recommended by WHO (World Health Organization 2022). A study in 2018 about a health education package showed that this program could improve the knowledge and practice on the care of low birth weight babies of post-natal mothers effectively (Bhoknal 2018). In addition, structured health education for mothers with LBW can increase the knowledge, confidence, and readiness of mothers to care for their tiny babies (Indrayati 2020; Indrayati and Santoso 2021; Sugiarti et al. 2020).

Health education, as a component of discharge planning, is the responsibility of health workers, making a major contribution to improving the quality of services. Proper discharge planning and adequate discharge readiness reduce the length of stay at the hospital, readmission rates within 30 days of hospital discharge, health costs, and post-discharge complications (Subasinghe, Deepanie, and Pathiranage 2021). Nurses play an important role in

providing health education in discharge planning which aims to prepare babies and their mothers to leave health services (hospitals) to the home environment to ensure continuous care (Julianti, Rustina, and Defi 2019). Health education can be carried out through various media so that it can be more effective and suitable for the goals and objectives of education. The education-based video is appropriate for mothers as they need to have a role model when they care for their babies (Ra and Lim 2012). Thus, the main purpose of this present study was to determine the effectiveness of the audiovisual health educational package on knowledge and mother self-efficacy in caring for their low birth weight babies at home.

METHODS

Participant characteristics and research design

This study used a quasi-experimental design by a two-group pre-posttest design at the perinatology unit of a state hospital in East Java, Indonesia, to investigate the effect of audiovisual health educational package on improving knowledge and mother self-efficacy in caring at home for parents of low birth weight babies. We involved postpartum mothers with these inclusion criteria: 1) postnatal mothers with low birth weight babies (< 2500 grams), 2) mothers' ability to read and write in stable health conditions; 3) the mother has been allowed by the doctor to direct-breastfeed and perform KMC and 4) mothers willing to participate in this study. Exclusion criteria included 1) postnatal mothers with low birth weight babies with any congenital abnormalities; 2) readmission of Mother and infant at the hospital for any reason; and 3) did not complete the questionnaires. Calculating sample size using the minimum sample calculation formula for interventional studies, which comparison between two groups (formula 1) (Charan and Biswas 2013). The sample size estimation was done based on previous research by (Kapti, Rustina, and Widyatuti 2013) that used 24 respondents in each group. This research compared audiovisual dan leaflet media on increasing the knowledge and attitude of mothers in diarrhea management and got a result standard deviation of 12.5. The mean difference between groups considered significant (effect size) was 10,78. Accordingly, our calculated minimum sample size per group was 22, and our research used 24 respondents.

$$Sample\ size = \frac{2SD^2(Z_{\frac{\alpha}{2}}+Z_\beta)^2}{d^2}$$ (Formula 1)

$$SD^2 = \frac{(n1-1)S1^2+(n2-1)S2^2}{n1+n2-2}$$ (Formula 2)

Description:

SD	: combined standard deviation from previous studies
Z_α	: 1.64 from Z table
Z_β	: 0.842 (From Z table) at 80% power
n1 and n2	: respondents' groups 1 and 2
S1 dan S2	: standard deviation from groups 1 and 2

Intervention (kelompok intervensi dan control)

The intervention of this research was an audiovisual-based educational package as a discharge education program in a small group (2-5 parents). It was delivered in the breastfeeding room at the perinatology unit. The discharge education program is delivered in a session of approximately 25-30 minutes. The program was provided at least on the third postpartum day. The content of discharge education in this study was based on these reported parents' needs: characteristics of LBW, performing kangaroo mother care (KMC) to keep the baby warm, how to swaddle correctly, how to bathe, breastfeed LBW and prevent infection.

Instrument

Maternal knowledge of caring for LBW

The dependent variable in this research was the knowledge of parents and their self-efficacy in caring for low birth-weight babies at home. The parents' knowledge was measured by a questionnaire made by the researcher from some literature consisting of 17 multiple choice questions with three answer choices with five domains: Keeping warm, bathing, prevention of infection, and care of the umbilical cord. The correct answer was given a score of 1, and the wrong answer was a score of 0. The highest score was 17, and the lowest score was 0, and a higher score indicates greater parental knowledge of caring for LBW. This questionnaire was tested on 20 eligible participants and had good internal consistency. The Cronbach's coefficients were r = 0,775, which indicates that the questionnaire is declared reliable or consistent.

Self-Efficacy of a parent with LBW

The self-efficacy variable in caring for LBW consists of the self-efficacy in providing general care of LBW, the self-efficacy in providing Kangaroo Method Care, and the self-efficacy in breastfeeding. We used the Perceived Maternal Parenting Self-Efficacy (PMP-SE) questionnaire to measure self-efficacy in providing general care for LBW. The self-efficacy in providing Kangaroo Method Care was measured by modified perceived maternal parenting self-efficacy consisting of 20 items. The self-efficacy in breastfeeding was measured by Breastfeeding Self-Efficacy Scale–Short Form/BSES-SF questionnaire. All questionnaires have been tested for validity and reliability.

Data Collection

All the data were collected between Agustus – November 2022. Data was collected before the mother breastfed her baby (09.30 or 12.30). After the Ethical Committee approval was obtained, the researcher contacted potential participants to provide a detailed explanation of the study and obtain written informed consent. All the participants were asked to complete the demographic data dan pre-test questionnaire. Based on their order of entering the study, parents were assigned to either the intervention or control groups. In the perinatology room, mothers can breastfeed directly and perform KMC three times a day, namely at 9.30 am, 12.30 am, and 3 pm. Parents in the intervention group received an audiovisual-based educational package at least on the third postpartum day in addition to standard education from the hospital. In contrast, the control group will only receive standard education from the hospital. All the parents were asked to complete the post-test questionnaire the day before hospital discharge.

Data Analysis

Data management and analysis were performed using SPSS 21.0. Descriptive analysis was used to explore the current status of the mother (age, level of education, occupation, and parity) and babies (sex, gestational age when birth, birth weight). The Shapiro-Wilk test was used to test for normality of knowledge and self-efficacy scores and shown data were abnormal. Wilcoxon and Mann Whitney tested the differences in knowledge and self-efficacy scores with the level of significance set at $p < 0.05$ in all tests. SPSS 21 was used to analyze the data.

RESULTS AND DISCUSSION

Table 1 Personal Characteristics of Mothers in Intervention and Control Groups

Characteristics of mothers	Study Group (n=24) (%)	Intervention Group (n=24) (%)
Mother's Age		
<20 years	1 (4,1)	3 (12,5)
20-<35 years	15 (62,5)	16 (55,7)
≥35 years	8 (33,3)	5 (20,8)
Education		
Basic education	6 (25)	14 (58,3)
Intermediate education	15 (62,5)	6 (25)
Higher Education	3 (12,5)	4 (16,7)
Occupation		
Employed	3 (12,5)	12 (50)
Unemployed	21 (87,5)	12 (50)
Parity		
Primipara	12 (50)	15 (62,5)
Skundipara	6 (25)	5 (20,3)
Multipara	6 (25)	4 (16,7)
LBW history		
No	21 (87,5)	21 (87,5)
Yes	3 (12,5)	3 (12,5)

Table 2 Characteristics of Low birth weight babies in Intervention and Control Groups

Characteristics of mothers	Control Group (n=24) (%)	Intervention Group (n=24) (%)
Sex		
Male	11 (45,8)	12 (50)
Female	13 (54,2)	12 (50)
Gestational age (week)	21 (87,5)	17 (70,8)
moderate to late preterm	3 (12,5)	7 (29,2)
very preterm	0	0
extremely preterm		
Birth Weight		
< 1000 grams (ELBW)	1 (4,2)	1 (4,2)
1000-1500 grams VLBW	6 (25)	13 (54,2)
1500-2500grams (LBW)	17 (70,8)	10 (41,6)

Table 3 Comparison of mothers' knowledge and self-efficacy mean scores within groups

Variable	Control (n=24) Mean SD/median (min-max)	p-value	Intervention (n=24) Mean SD/median (min-max)	p-value
Mother's knowledge				
Pre-intervention	9,96 (4,26)	0,106[a]	11,5 (1-15)	0,001[b]
Post-intervention	11 (3,9)		14 (10-17)	
Self-efficacy in general care				
Pre-intervention	57 (44-79)	0,064[b]	60 (34-77)	0,001[b]
Post-intervention	59 (49-78)		74 (58-80)	
Self-efficacy in KMC				
Pre-intervention	34,17 (6,68)	0,013[a]	28,96 (9,32)	0,001[b]
Post-intervention	37,92 (4,41)		45 (6,49)	
Self-efficacy in breastfeeding				
Pre-intervention	48 (34-52)	0,001[b]	51 (38-55)	0,001[b]
Post-intervention	53 (46-59)		64 (50-67)	

a: paired t-test; b: Wilcoxon-test

Table 4 Comparison of mothers' knowledge and self-efficacy mean scores across groups (control and intervention group)

Variable	Control Group Mean SD	Intervention group Median (min-max)	p-value
Mother's knowledge			
Pre-intervention	9,96 (4,26)	11,5 (1-15)	0,2
Post-intervention	11 (3,9)	14 (10-17)	0,004*
Self-efficacy in general care			
Pre-intervention	57 (44-79)	60 (34-77)	0,16
Post-intervention	59 (49-78)	74 (58-80)	0,00
Self-efficacy in KMC			
Pre-intervention	34,17 (6,68)	28,96 (9,32)	0,08
Post-intervention	37,92 (4,41)	45 (6,49)	0,00
Self-efficacy in breastfeeding			
Pre-intervention	48 (34-52)	51 (38-55)	0,04
Post-intervention	53 (46-59)	64 (50-67)	0,00

Table 5 Comparison of increasing knowledge and efficacy mean scores across groups (control and intervention group)

Variable	Mean SD/median (min-max)	p-value
Mother's knowledge		
Intervention group	2 (0-11)	0,007
Control Group	1 ((-3) – 8)	
Self-efficacy in general care		
Intervention group	10,5 ((-13) – 40)	0,021
Control Group	3 ((-22)-30)	
Self-efficacy in KMC		
Intervention group	16,04 (10,07)	0,001
Control Group	3,75 (7,18)	
Self-efficacy in breastfeeding		
Intervention group	14 (4-28)	0,001
Control Group	5 (1-18)	

Characteristics of Mother and Low Birth Weight Babies

Table 1 shows that the majority age of mothers was 20-35 years in both groups. 35,7% of mothers in the control group are at high risk for pregnancy (< 35 years or < 20 years), and in the intervention group, one-third of the mothers of the study and control groups are at high risk for pregnancy. More than half of the mothers in the control group had secondary education as homemakers. In contrast, more than half of the mothers in the intervention group had primary education (elementary and junior high school). The number of working mothers and homemakers was the same in the intervention group (50%). Most mothers in the control and intervention group had first parity and did not have a history of giving birth to LBW. The homogeneity between characteristics of preterm infants in the study and control group has been proven, as there are no significant differences between the two groups.

Table 2 shows that 54,2% of the control groups were females with gestational age between 32 weeks and less than 37 weeks (moderate to late preterm) and had birth weights of 1500 grams up to less than 2500 grams. The intervention group had the same number of males and females, with more than half of the babies born at gestational ages between 32-37 weeks and birth weights of 1000-1500 grams.

Mother's Knowledge and Self-Efficacy in Caring LBW Babies at Home

Table 3 shows significant statistical differences between the control and intervention groups regarding the mean pre-test and post-test mother knowledge and self-efficacy. The control group's results indicated significant differences between the pre-test and post-test in self-efficacy in KMC dan self-efficacy in breastfeeding (p-value: 0,013 and p-value 0,001); vice versa in Mother's knowledge and self-efficacy in the general care of LBW babies (p-value 0,106 and p-value 0,064). It means that the standard education program from the hospital can increase self-efficacy in KMC dan self-efficacy in breastfeeding but cannot significantly increase the mother's knowledge and Mother's self-efficacy in providing general care to LBW. In the results of the intervention group, there were significant statistical differences between the mean score pre-test and post-test regarding all variables (Mother's knowledge, self-efficacy in general care, KMC, and breastfeeding). It means that the audiovisual-based educational package can significantly increase the mother's knowledge, self-efficacy in providing general care, self-efficacy in KMC, and self-efficacy in breastfeeding.

Parents need as much information as possible while discharging their preterm infant from the hospital about basic infant care skills, health problems and management, and the infant's characteristics and interaction (Mohamed et al. 2017; Ra and Lim 2012). Providing information to the mothers during their time in the hospital is an essential component of preparation for a safe transition to discharge, especially in the first month after discharge (Mohamed et al. 2017). The results of this study indicate that standard health education from the hospital given to the control group can increase the efficacy score in KMC and breastfeeding but cannot significantly increase the mean score of mothers' knowledge and efficacy in basic LBW care. This is because the contents of standard health education from the hospital contain the characteristics of LBW, the implementation of KMC, and breastfeeding using leaflet media with the lecturer method. Health education about basic home care for LBW is not provided in detail, so it has not been able to increase the efficacy of mothers in caring for LBW at home. This is different from the intervention given to the intervention group, which was given an educational package with audiovisual media containing basic care for LBW, KMC, breastfeeding, and infection prevention which could increase the mean post-test score in all variables. This result is in line with other studies that stated health education for mothers with LBW can improve significantly and influences the knowledge and self-confidence of mothers with LBW and mothers-infant interaction (Ra and Lim 2012; Sugiarti et al. 2020).

Table 4 presents significant statistical differences across groups between the control and intervention groups. The result of the man-Whitney test found that the mean of the pre-test score was no significant difference in all variables except self-efficacy in breastfeeding. The mean pre-intervention baseline scores were homogeneous except for self-efficacy in the breastfeeding variable. Table 4 also shows significant differences in post-test mean scores between the control and intervention groups in all variables, where the mean post-test in the intervention group is higher than the control group. This finding is consistent with the results of several studies [16-18] reporting that after an educational intervention, the parenting confidence of mothers of preterm infants improved (Jang and Ju 2020).

We also analyzed the increase in mean scores between the control and intervention groups from the pre-test to the post-test. The result in table 5 indicated a significant difference in all variables (Mother's knowledge, self-efficacy in providing general care, performing KMC, and breastfeeding). The educational packages with audiovisual media given in the intervention group proved effective in increasing the mean score of mothers' knowledge and self-efficacy. The health education-based audiovisual (video) has the effect of memory improvement and the effect of video role modeling because videos can improve concentration, memory, content understanding, and practical application (Ra and Lim 2012). In addition, videos displaying appropriate behaviors and attitudes promote skill acquisition and strengthen motherhood adaptation. Besides that, the use of video in education results in increased short-term knowledge and adherence compared to other media, such as booklets or lectures. Thus, video education is an efficient teaching method for mothers of LBW babies who need to learn practical and detailed caring skills and take

responsibility for caring for tiny babies at home (Ra and Lim 2012). Self-efficacy refers to a mother's internal belief in their ability to manage a specific task effectively and successfully (efficacy) (Botha et al. 2020; Pennell et al. 2012), and it is acquired by repeatedly practicing specific infant-care activities (Jang and Ju 2020). Health education with audiovisual media (video) allows mothers to look back at this education with no limitation of time and place, especially in parts that are considered not yet mastered, so repeating these educational videos can increase mothers' self-efficacy (Ra and Lim 2012).

LIMITATION OF THE STUDY

We were not able to assess implementation of skills and knowledge in caring BBLR at home after discharge from hospital, so that the next research will be able to examine it. Second, the questionnaires completed in the postpartum period and were self-administered might have an effect on the results of the questionnaire because the mother might feel anxious about her baby's condition. The efforts have been made to minimize reporting errors provided favourable and unfavorable questionnaire and monitored examining consistency of maternal responses. Suggestion for the next research is made to evaluate the program in different clinical settings, evaluate the effect in home setting and to approve results of the study, a randomized controlled study should be conducted.

CONCLUSIONS AND SUGGESTIONS

The audiovisual-based educational package as a discharge education program effectively improved the mother's knowledge about the LBW baby and increased the mother's self-efficacy. Audiovisual (video) is appropriate media for educating mothers with LBW babies. Video has the effect of memory improvement, and the effect of video role modeling improved acquired skills and strengthened motherhood adaptation, increased short-term knowledge and adherence with no limitation of time and place. Finally, further study should be replicated on a larger representative sample in different hospital settings using an experimental design with randomization and control over extraneous variables for more robust results that could be generalized. Cooperation among multidisciplinary professional groups to develop standardized discharge education is necessary for the development process.

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ETHICAL CONSIDERATIONS

This study has received ethical approval from the ethics committee of the Dr. Saiful Anwar regional public hospital No. 235/EC/KEPK/08/2021. In addition, the researcher asked for informed consent from all respondents after explaining the purpose of the study and guaranteeing the confidentiality of the respondents' data

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Conflict of Interest Statement

Authors declare that this research has no confict of interest.

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