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Effectiveness of Modelling in Stunting Intervention to Improve Teenage Mothers' Knowledge About Exclusive Breastfeeding

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ABSTRACT

Stunting remains a persistent public health problem in Indonesia, strongly associated with early marriage, teenage pregnancy, and inadequate breastfeeding practices. Exclusive breastfeeding for the first six months of life is a key strategy for stunting prevention; however, adolescent mothers often face knowledge and experience barriers. This study aimed to evaluate the effectiveness of a modelling-based intervention in improving adolescent mothers' knowledge of exclusive breastfeeding in Poso Regency, Central Sulawesi. A quasi-experimental one-group pretest–posttest design was applied, involving 31 adolescent mothers recruited through purposive sampling. The intervention consisted of a 60-minute session, including a 30-minute educational video and a 30-minute live demonstration covering the benefits of exclusive breastfeeding, breastfeeding techniques, breast care, and common breastfeeding challenges. Data were collected using a validated questionnaire (Cronbach's Alpha = 0.612) and analyzed using paired t-tests with a significance level of $p < 0.05$. Results showed a significant increase in knowledge scores from pretest (mean = 5.81) to posttest (mean = 6.97), with a mean difference of -1.16 ($p = 0.003$), indicating improved understanding after the intervention. The findings suggest that modelling-based education integrating visual and practical components effectively enhances knowledge among adolescent mothers. Nevertheless, the absence of a control group and the small sample size limit causal inference and generalizability. These results provide preliminary

evidence that modelling interventions are potentially useful pending further research in supporting exclusive breastfeeding promotion and stunting prevention programs.

Keywords
Exclusive breastfeeding
Knowledge
Modeling
Stunting
Teenage mothers

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Introduction

Exclusive breastfeeding is the provision of only breast milk without any additional fluids or solid foods except for vitamins, minerals, and medications in the form of syrups and drops until the baby is six months old [1]. Exclusive breastfeeding can minimize the risk of stunting because breast milk contains the immune components, antibodies, and calcium needed by babies [2]. Inadequate nutrition, such as suboptimal breastfeeding, is a cause of stunting [3]. According to data from the Poso Regency Health Office (2023), the prevalence of stunting was 36.5%, with exclusive breastfeeding coverage recorded at only 34.9%, far below the national target of 80%. These figures highlight the ongoing challenge of improving breastfeeding practices to support stunting reduction efforts [4]. The prevalence of stunting in Poso Regency in 2023 was 36.5% and in 2024, it is estimated to be 6.1%, still far from the set target of 14%. The World Health Organization (WHO) global target for exclusive breastfeeding is 50% by 2025 and 70% by 2030 [5]. Low coverage of exclusive breastfeeding contributes to the high prevalence of stunting in Poso Regency. In 2023, 36.5% of toddlers were stunted, dropping to 6.1% in 2024. This figure has not yet reached the national target of 14%[6]. Poso Regency, one of the areas facing stunting in 2023 and 2024, has many adolescent mothers experiencing challenges in exclusive breastfeeding, driven by a lack of experience and understanding of the importance of breastfeeding. Furthermore, low socioeconomic status also hinders the success of exclusive breastfeeding [6].

Low education levels correlate with low understanding of the importance of exclusive breastfeeding [7]. Maternal knowledge also impacts fetal and infant health. Efforts to improve nutrition should begin before pregnancy, not after [8]. Stunting prevention interventions can be provided through preventive efforts to target groups with a health education-based approach that includes marriage planning and education about the first 1,000 days of life [9]. Exclusive breastfeeding during the first 6 months of life provides benefits for both mother and baby [10]. One of the causes of stunting in toddlers is early pregnancy. This factor is predicted to cause low birth weight (LBW) and infant mortality [11]. This is caused by insufficient nutritional intake due to concerns about body shape during adolescence and a lack of

education about nutrition [12]. A woman who becomes pregnant at an older age will receive less early prenatal care. Research suggests a link between exclusive breastfeeding and infant breastfeeding among teenage mothers.

One effective strategy for increasing adolescent mothers' knowledge is through a modelling approach, which involves learning by imitating the behavior of others demonstrated and video [13]. This approach is considered more effective than conventional lectures or counselling methods, which tend to be easily forgotten and less engaging [14]. Research shows that audio-visual-based education, such as videos, is more effective than print media like leaflets in conveying information [15]. Exclusive breastfeeding not only impacts infants' physical growth but also supports their cognitive development [16]. Exclusive breastfeeding provides essential nutrients needed by infants for optimal growth and protection from infection [17].

Although previous studies have demonstrated the effectiveness of modelling interventions in improving maternal knowledge, little is known about their impact among adolescent mothers, who face distinct barriers such as limited experience and social support. This study addresses this gap by examining the effectiveness of a modelling-based educational approach in enhancing adolescent mothers' knowledge about exclusive breastfeeding as a preventive measure against stunting. This study used a modelling-based educational approach, packaged through educational videos and social media, as an effective solution for increasing adolescent mothers' understanding of exclusive breastfeeding. This study, entitled "Effectiveness of Modelling in Stunting Interventions to Increase Knowledge of Adolescent Pregnant Women Regarding Exclusive Breastfeeding in Poso," aims to evaluate the effectiveness of modelling in increasing adolescent pregnant mothers' knowledge about exclusive breastfeeding as a preventive intervention for stunting.

Material and Methods

A. Study Design

This study employed a quantitative approach using a quasi-experimental one-group pretest–posttest design. The design was chosen to assess the effectiveness of modelling interventions in improving the knowledge of pregnant adolescent women about exclusive breastfeeding. This study used a one-group pretest–posttest design, which limits causal inference because there was no control or comparison group. Therefore, the observed changes in knowledge should be interpreted with caution, as other factors may have contributed to the improvement.

B. Study Site and Population

The research was conducted in Poso Regency, Central Sulawesi, specifically within the working areas of Kayamanya Health Center and Tokorondo Health Center. The study population consisted of all pregnant adolescent women registered at both health centers during the research period (May–June 2025).

C. Sampling Technique and Sample Size

A purposive sampling technique was applied to select respondents who met the inclusion criteria: (1) adolescent pregnant women aged 14–19 years, (2) residing within the working areas of Kayamanya and Tokorondo Health Centers, and (3) willing to participate voluntarily. A total of 31 respondents were included, representing the entire accessible population. The sample size (n=31) represented the total number of eligible adolescent mothers available during the study period at the selected health centers. Therefore, all eligible participants were included through purposive sampling to maximize representativeness within this limited population. Although this relatively small sample restricts generalizability, it provides valuable preliminary evidence for the effectiveness of modelling interventions in similar community settings.

D. Informed Consent

All respondents provided informed consent prior to participation. Participation was voluntary, and confidentiality was assured.

E. Data Collection Instruments

Data collection was carried out using a questionnaire to assess adolescent mothers' knowledge about exclusive breastfeeding with a modelling approach. The modelling intervention was conducted in a single 60-minute session consisting of a 30-minute educational video and a 30-minute live demonstration. The video included key messages on the definition and benefits of exclusive breastfeeding, correct breastfeeding positions, breast care, and solutions to common breastfeeding problems. All participants received the same content, and the sessions were led by the same trained facilitator to ensure standardization across participants. Assessment of adolescent mothers' knowledge was carried out with a pre-test and post-test before the modelling approach was carried out. This questionnaire had previously been validated, and its reliability test consisted of 2 answers: 0 (wrong answer), 1 (correct answer). The questionnaire was measured using a reliability test with an alpha decomposition value of 0.000, less than 0.60. The reliability test showed a Cronbach's Alpha value of 0.612, which met the reliability criteria

(Cronbach's Alpha > 0.6), indicating that the instrument was consistent and reliable for data collection (16). Cronbach's Alpha value of 0.612 indicates moderate reliability, which is acceptable for exploratory studies and newly adapted instruments in health education research. This level of internal consistency reflects the multidimensional nature of the questionnaire items, which covered various aspects of knowledge related to exclusive breastfeeding. The high validity and reliability of this questionnaire ensured that the data collected was accurate and consistent. Data were analyzed using SPSS version 25.0 and Microsoft Excel. The statistical tests used were the Chi-square test and, where necessary, the paired t-test. The independent variable in this study was adolescent mothers, while the dependent variable was exclusive breastfeeding.

F. Data Sources

Primary data were obtained directly from respondents through pretest and posttest questionnaires. The intervention was delivered using a modelling approach through demonstration and educational videos about exclusive breastfeeding. Secondary data, such as local health statistics, were also reviewed to contextualize the findings.

G. Data Analysis

Data were processed and analyzed using SPSS version 25.0 and Microsoft Excel. Descriptive statistics were used to summarize respondent characteristics. For inferential analysis, Chi-square tests and paired t-tests were applied to determine significant differences between pretest and posttest knowledge scores. A p-value of <0.05 was considered statistically significant.

H. Ethical Approval

This study received ethical approval from the Institute for Research and Community Service of Sekolah Tinggi Ilmu Kesehatan Husada Mandiri Poso (Approval Number: 099/LPPM/STIKES-HM/PS/V/2025). All procedures involving human participants adhered to the ethical standards of the institutional and national research committees and to the 1964 Helsinki Declaration and its later amendments.

Results and Discussions

A. Results

This study obtained data from 31 teenage mothers selected from two community health centers in the Poso district.

Table 1. Frequency Distribution of Respondent Characteristics (n=31).

Variable	Category	n	%
Education	Elementary School	2	6.3
	Junior High School	9	28.1
	Senior High School	17	53.1
	No Schooling	3	9.4
Age	14–16 years	10	32.26
	17–19 years	21	67.74

Based on Table 1. The majority of respondents were adolescent mothers with a senior high school education (53.1%), followed by those with junior high school education (28.1%). A small proportion had elementary education (6.3%) or no formal schooling (9.4%). In terms of age distribution, most respondents were in the 17–19 years old category (67.74%), while the remaining 32.26% were in the younger age group (14–16 years). This indicates that the sample predominantly consisted of late-adolescent mothers with relatively higher levels of formal education.

Table 2. Analysis of Average Knowledge of Adolescent Mothers in the Intervention Group (n=31).

Variable	Mean Difference	Std. Deviation	Std. Error Mean	95% CI (Lower–Upper)	t-value	Sig. (2-tailed)
Pretest–Posttest	-1.16129	2.00161	0.35950	-1.89549 – -0.42709	-3.230	0.003

Table 2 shows that there is a statistically significant difference between the pre-test and post-test after the intervention of adolescent mothers' knowledge about providing exclusive breastfeeding with a sig value of 0.003 < 0,05. The results show a statistically significant improvement in adolescent mothers' knowledge after the intervention using the modelling approach. The mean difference between the pretest and posttest was -1.16 with a p-value of 0.003 (<0.05), indicating a significant increase in knowledge about exclusive breastfeeding. The negative mean difference (-1.16) indicates an increase in knowledge scores from pretest to posttest, as posttest values were higher than pretest values. This negative sign results from the subtraction order used in the analysis (pretest–posttest). This suggests that the modelling-based intervention (educational video and demonstration) effectively enhanced the respondents' understanding and awareness of exclusive breastfeeding practices, which are crucial for stunting prevention.

B. Discussion

The findings of this study demonstrated that the modelling approach, particularly through the use of breastfeeding educational videos, was effective in increasing the knowledge of adolescent mothers regarding exclusive breastfeeding. The significant improvement in post-test scores compared to pre-test results ($p = 0.003$) indicates that modelling-based education can serve as an impactful intervention strategy for stunting prevention. This result is consistent with previous research, which highlighted the effectiveness of audio-visual media in improving maternal knowledge and breastfeeding practices compared to conventional methods such as lectures or printed materials.

One of the main challenges in addressing stunting in Poso Regency is the high prevalence of adolescent pregnancies, which often correlate with limited knowledge and practice of exclusive breastfeeding. The results of this study confirmed that many adolescent mothers initially lacked sufficient information on breastfeeding techniques, breast care, and the nutritional benefits of breast milk. The modelling intervention provided not only knowledge but also practical demonstrations, which are more easily understood and retained by young mothers compared to didactic counselling [18].

Furthermore, the findings align with evidence from other studies reporting that teenage pregnancy contributes to higher risks of low birth weight and stunting due to inadequate nutrition and insufficient prenatal care [19]. By equipping adolescent mothers with practical knowledge and confidence in exclusive breastfeeding, modelling interventions directly address these risk factors [20]. Another important aspect revealed by this study is the influence of education level on maternal knowledge. Most respondents with higher education levels demonstrated better improvements in understanding breastfeeding practices [21]. This suggests that future stunting prevention programs should consider tailoring educational interventions to different levels of maternal literacy, ensuring accessibility and comprehension for all groups [22].

This is in line with research conducted by [23], which shows that there is a significant difference in the knowledge of pregnant and postpartum mothers before and after being given health education with a modelling approach about breastfeeding techniques. In addition, according to [24], a significant increase in participant knowledge after the intervention, which indicates the effectiveness of the educational approach in increasing awareness of the importance of exclusive breastfeeding. One of the factors that influences stunting is mothers who marry as teenagers [25]. This study shows that most teenage mothers do not provide exclusive breastfeeding for several reasons, such as a lack of information about exclusive breastfeeding. This is in line with research [26] showing a

significant relationship between teenage pregnancy and stunting in toddlers (p = 0.016) with an odds ratio of 3.86.

Interviews with community health center staff revealed that the community health center had conducted outreach on exclusive breastfeeding for all pregnant teenage mothers [27]. This was done to support the government's efforts in providing exclusive breastfeeding. The results of the open-ended questionnaire given to mothers after receiving the modelling video showed that mothers benefited from this research. Mothers reported that the modelling video increased their knowledge about exclusive breastfeeding, how to prepare breast milk, how to care for their breasts, and how to breastfeed [28]. This is in line with research [29], which demonstrated the effect of contextual modelling counselling on the feeding practices of mothers of stunted toddlers aged 6-24 months.

The results showed an increase in mothers' knowledge scores regarding exclusive breastfeeding between before and after the video modelling. Nine respondents experienced a decrease in their scores, and after the video modelling, there was a shift in their answers. This research aligns with research conducted by (20) that found a statistically significant increase in mean knowledge scores in both groups at pre- and post-test levels after the pre- and post-test interventions [30]. Continuous breastfeeding for up to two years provides additional nutrition and emotional support while protecting children from disease. Inadequate breastfeeding duration can make children vulnerable to malnutrition and infection, both of which are associated with stunting. Infants and toddlers who are not exclusively breastfed are at higher risk of stunting [31].

One strategy for preventing stunting is exclusive breastfeeding for the first 6 months of life. This is in line with research [32], which suggests that good knowledge about exclusive breastfeeding is closely related to breastfeeding practices. Furthermore, according to [33], modelling is effective in improving breastfeeding knowledge and practices in adulthood. In this study, several factors supporting maternal readiness to provide exclusive breastfeeding include previous breastfeeding experience and the information mothers have received about exclusive breastfeeding. Breastfeeding is one technique for preventing stunting. In line with research [34], the effectiveness of educational videos on the level of knowledge and skills of cadres had a p-value of 0.000 (p>0.05). Knowledge is closely related to education level, with the assumption that a higher level of education leads to broader knowledge. In comparison, a lower level of education can result in less knowledge about something.

Related to the theory that the benefits of exclusive breastfeeding support infant growth, especially in terms of height, because the body more efficiently absorbs the calcium in breast milk than formula milk, babies who are exclusively breastfed tend to have heights

that are more in line with the growth curve compared to babies who are only given formula milk. Breast milk contains more calcium and is more easily absorbed, thus playing a role in maximizing growth, especially height, and reducing the risk of stunting. Lack of exclusive breastfeeding increases the risk of stunting, especially in early life. Another limitation of this study is the potential for social desirability bias, as the data were collected using self-reported questionnaires. Although participants were assured of anonymity and encouraged to answer honestly, their responses may have been influenced by the desire to provide socially acceptable answers.

Conclusion

This study showed that the modelling approach in stunting interventions was effective in significantly increasing adolescent mothers' knowledge about exclusive breastfeeding. The improvement observed between pre-test and post-test results highlights that video-based demonstrations can successfully deliver health information and motivate teenage mothers to adopt exclusive breastfeeding practices. Given the crucial role of breastfeeding in preventing stunting, the integration of modelling methods into maternal and child health programs is highly recommended. Health institutions and local governments should collaborate to incorporate modelling-based education as part of routine health promotion, ensuring that health workers are equipped to use these methods effectively. Expanding outreach through digital platforms and social media would further enhance accessibility, particularly for teenage mothers who face barriers to health education. Future research with larger populations is also needed to evaluate the long-term impact of modelling on breastfeeding practices and child development. Given the crucial role of breastfeeding in preventing stunting, the integration of modelling methods into maternal and child health programs may be potentially useful pending further research to confirm their effectiveness in broader populations.

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