

The Effect Of Nutrition Education By Cadres On Increasing Toddler Weight

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ABSTRACT

Introduction: Malnutrition among children under five remains a major public health concern because it contributes to impaired growth and development. Community-based nutrition interventions have been implemented to improve child nutritional outcomes; however, evidence regarding the effectiveness of nutrition education delivered by community health cadres on objective anthropometric outcomes remains limited. **Objective:** This study aimed to evaluate the effect of nutrition education delivered by community health cadres on increasing toddler body weight. **Methods:** This study used a quantitative quasi-experimental design with a one-group pretest–posttest approach without a control group. The study was conducted at BHP Telagawaru Posyandu, Labuapi Community Health Center, West Lombok, Indonesia, from January to March 2026. Participants were recruited using total sampling and involved 56 mother–toddler pairs. Nutrition education was delivered through face-to-face educational sessions using materials adapted from the Maternal and Child Health Handbook. Toddler body weight was measured before and after the intervention using digital scales. Data were analyzed descriptively and inferentially. Data normality was assessed using the Shapiro–Wilk test and differences were analyzed using the Wilcoxon Signed Rank Test with a significance level of $p < 0.05$. **Results:** The mean toddler body weight increased from 10.93 ± 2.13 kg before intervention to 11.56 ± 2.14 kg after intervention, with an average increase of 0.63 kg. Statistical analysis showed a significant difference in toddler body weight before and after the intervention ($p < 0.001$). **Conclusion:** Nutrition education delivered by community health cadres was associated with improved toddler body weight and may serve as a feasible community-based strategy to support better child nutritional outcomes. Further studies using controlled designs and longer follow-up periods are recommended.

Introduction

According to the Great Dictionary of the Indonesian Language, nutrition is defined as the main component of food that plays a role in supporting growth and maintaining body health. (Wiyono, 2016) states that nutrition functions as a source of energy for activities and is an important factor in child growth and development. Nutritional status describes the condition of the body as a result of the consumption and utilization of nutrients, which can be classified as poor nutrition, good nutrition, and excess nutrition (Almatsier, 2010). Referring to the Regulation of the Minister of Health of the Republic of Indonesia Number 2 of 2020, one form of nutritional disorder in children is malnutrition, namely a condition of nutritional deficiency due to the failure to meet nutritional needs. This condition most often occurs in toddlers aged 0–59 months,



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because during this period children are in a phase of very rapid growth. Therefore, fulfilling adequate nutrition during this period is very important to support optimal growth.

Nutritional problems in mothers and children, including malnutrition and micronutrient deficiencies, are currently a global health issue that impacts almost half the world's population. In children, these nutritional disorders can appear in various forms, such as intrauterine growth retardation, low birth weight, energy-protein malnutrition, and micronutrient deficiencies such as iron, vitamin A, iodine, and zinc (Ahmed T, 2012). Malnutrition in children is a serious problem that requires attention because it plays a role in causing approximately 3.1 million deaths in children under five (Bhutta ZA, 2013).

Toddlerhood is a golden age period in a child's growth and development, crucial for the quality of their future human resources. During this period, physical growth is rapid and requires optimal nutritional intake. Nutrition education provided by cadres is an effective and sustainable strategy because cadres have close social ties with the community and understand local environmental conditions. In addition to increasing toddler weight, nutrition education provided by cadres also has a positive impact on changes in feeding behavior, such as increased meal frequency, menu variety, and the provision of animal protein sources. This study aimed to measure toddler weight before and after receiving nutrition education from cadres. (Anggraeni, 2010).

According to the Health Office (Widati, 2012), 85,779 (62.02%) preschool-aged children experience developmental disorders. The Basic Health Research (Riskesdas, 2013) found that the prevalence of stunted growth in toddlers in West Nusa Tenggara was 24.5%. Data obtained from the Mataram City Health Office in 2013 showed that 1,136 toddlers experienced growth and developmental disorders. According to the (RISKESDAS, 2013), 12.6% of children in West Nusa Tenggara (NTB) experienced fine motor delays.

Based on the Indonesian Nutritional Status Study (SSGI), the prevalence of stunting in West Nusa Tenggara Province increased from 31.4 percent in 2021 to 32.7 percent in 2022. This figure indicates an increase in stunting cases within a year (Hailesslassie K, 2013) (HA, 2018). This prevalence is also higher than the national average of 21.6 percent. In addition, this achievement is still above the threshold set by WHO, which is less than 20 percent. This condition indicates that West Nusa Tenggara Province still faces a fairly high burden of chronic nutritional problems. In fact, this figure is still far from the national target of 14 percent in 2024 (Hailesslassie K, 2013) (HA, 2018). One of the factors contributing to the incidence of stunting is the condition of maternal health during pregnancy, especially anemia. Pregnant women who experience anemia are at risk of giving birth to babies with low birth weight and impaired fetal growth. Research by Nurlina et al. in 2023 also proved that mothers who have a history of anemia during pregnancy have a 12.6 times greater risk of giving birth to stunted children (Kesehatan, 2021) (Riezqy Ariendha DS, 2019) (RISKESDAS, 2013).

The chronology of nutritional problems in West Nusa Tenggara Province shows a worrying trend. Based on Riskesdas 2013 data, the prevalence of stunting in NTB was recorded at 24.5%, then increased to 31.4% in 2021, and rose again to 32.7% in 2022 (SSGI, 2022). This increase over a period of nine years illustrates a chronological obstacle in efforts to overcome malnutrition. These obstacles include the not yet optimal coverage of specific nutritional interventions at the household level, the low frequency of structured counseling, and the lack of periodic evaluation of the role of posyandu cadres. Without targeted, sustainable, and evidence-based interventions, stunting rates and other growth disorders are expected to continue to exceed WHO tolerance limits (20%) until 2030.

Malnutrition is a serious condition that occurs due to a mismatch between a person's food intake and the body's nutritional needs. Malnutrition occurs when the body does not obtain



enough nutrients. Causes include an unbalanced diet, digestive disorders, and the presence of comorbidities. Symptoms include fatigue, dizziness, and weight loss. If left untreated, malnutrition can lead to physical and mental disabilities. Furthermore, this condition can weaken the immune system, increase susceptibility to disease, inhibit physical and mental development, and reduce productivity. (Fatimah, 2020) states that nutritional problems frequently found in toddlers are inadequate nutrient intake, which leads to malnutrition, chronic energy deficiency (CED), protein energy deficiency (PED), and anemia.

The basic factors influencing a person's nutritional status consist of two things: external factors and internal factors. External factors are those influenced by factors outside of a person, including food consumption, education level, nutritional knowledge, environmental cleanliness, and sociocultural background. Internal factors, on the other hand, are the basic factors that determine a person's nutritional needs, including health status, gender, and age (Cahyaningrum, 2013).

This research must be conducted immediately because the problem of toddler nutrition is still acute, the role of cadres is very strategic but has not been scientifically tested, and the results will form the basis for efficient, measurable policies, and are relevant to national and global health development targets.

Strategies that can be implemented to reduce malnutrition and the resulting morbidity and mortality rates include promoting exclusive breastfeeding and balanced nutrition. Optimizing direct nutritional interventions is known to improve children's nutritional status, such as promoting appropriate breastfeeding and complementary feeding (MPASI), managing nutritional issues, supplementation, and increasing literacy and empowering women, especially in groups with high nutritional vulnerability.

Various interventions for handling stunting and underweight in toddlers have been carried out, including: micronutrient supplementation (blood supplement tablets, vitamin A, zinc), supplementary feeding (PMT) based on local food, and nutrition education by professional health workers. However, supplementation and PMT interventions are often constrained by distribution sustainability and dependence on the government budget. Meanwhile, education by professional health workers is effective but difficult to reach remote areas due to the imbalance in the ratio of health workers to the number of toddlers. Compared to these approaches, nutrition education by cadres has advantages in terms of sustainability because cadres are community members who reside in the location, lower costs because they do not require professional incentives, social and cultural proximity so messages are more easily accepted, and time flexibility not tied to the puskesmas schedule. Thus, this approach is very contextually relevant for the NTB region which has remote geographical characteristics and limited resources.

Despite numerous studies reporting the effectiveness of nutrition education in improving maternal knowledge and feeding practices, most interventions have been delivered by healthcare professionals such as nutritionists, nurses, or midwives. Evidence regarding the effectiveness of community health cadres as providers of nutrition education remains limited, particularly in rural and resource-limited settings. Furthermore, previous studies have predominantly focused on knowledge improvement and behavioral outcomes rather than objective anthropometric indicators such as body weight gain among toddlers.

Therefore, a research gap exists regarding the effectiveness of cadre-based nutrition education programs in improving toddler nutritional outcomes. The novelty of this study lies in evaluating the impact of nutrition education delivered directly by community health cadres on toddler weight gain using a quasi-experimental pretest-posttest design in a high-risk area of West Nusa Tenggara Province. The findings provide evidence for the utilization of community-based cadres as a sustainable strategy to improve child nutritional status.



Methods

Study Design

This study employed a quantitative quasi-experimental design using a one-group pretest-posttest approach without a control group. The study aimed to evaluate changes in toddlers' body weight following nutrition education delivered by trained community health cadres.

Setting

The study was conducted at BHP Telagawaru Posyandu, under the Labuapi Community Health Center, West Lombok, Indonesia, from January to March 2026. Nutrition education sessions and anthropometric measurements were carried out during routine Posyandu activities.

Research Subjects

Participants were recruited using a total sampling technique. The study included all eligible mother-toddler pairs attending the Posyandu during the study period, resulting in a total sample of 56 participants. The inclusion criteria were mothers with toddlers aged 0–59 months who agreed to participate, attended all nutrition education sessions, and completed both pre- and post-intervention measurements. Exclusion criteria included toddlers diagnosed with chronic diseases or congenital abnormalities, participants who did not complete the intervention sessions, and those with incomplete anthropometric data. Since all eligible participants during the study period were included, no formal sample size calculation or power analysis was performed.

Instruments

Toddlers' body weight was measured using calibrated digital weighing scales with measurements recorded in kilograms (kg). Nutrition education materials were adapted from the Maternal and Child Health (KIA) Handbook published by the Ministry of Health of Indonesia. The educational content covered balanced nutrition, appropriate complementary feeding practices, growth monitoring, and healthy feeding behaviors for toddlers.

Intervention

Nutrition education was delivered face-to-face by trained community health cadres during routine Posyandu sessions. The intervention consisted of interactive lectures and group discussions based on the Maternal and Child Health (KIA) Handbook. Participants received education on balanced nutrition, infant and young child feeding practices, growth monitoring, and practical recommendations for improving toddlers' nutritional status. Body weight measurements were performed before the intervention (pretest) and after completion of the education program (posttest).

Data Analysis

Data were analyzed using the Statistical Package for the Social Sciences (SPSS) version XX. Descriptive statistics were used to summarize participants' demographic characteristics. Data normality was assessed using the Shapiro–Wilk test because the sample size was fewer than 50–100 participants and the test is recommended for small samples. As the body weight data were not normally distributed ($p < 0.05$), differences between pre- and post-intervention body weight were analyzed using the Wilcoxon Signed Rank Test. Statistical significance was established at $p < 0.05$.



Ethical Consideration

This study was conducted in accordance with the ethical principles of the Declaration of Helsinki. Ethical approval was obtained from the Health Research Ethics Committee, Faculty of Medicine, Al-Azhar Islamic University, Indonesia (Approval Number: 090/EC-04/FK06/UNIZAR/VIII/2025). Before data collection, written informed consent was obtained from all participating mothers after they received an explanation of the study objectives, procedures, potential benefits, and risks. Participation was voluntary, and participants were informed of their right to withdraw from the study at any time without any consequences. All personal information and study data were kept confidential and used solely for research purposes.

Results

Table 1. Mother's Characteristics

Characteristics	Frequency	(f) %
Mother's Age		
20-25 year	18	32,1
26-30 year	21	37,5
31-35 year	17	30,4
Total	56	100
Work		
Housewife	30	53,6
Private	18	32,1
government employees	8	14,3
Total	56	100
Education		
Junior High School	14	25,0
Senior High School	28	50,0
College	14	25,0
Total	56	100

Table 1 shows that most mothers of toddlers are in the 26-30 year age range, namely 21 people (37.5%). The 20-25 year age group is 18 people (32.1%), and the 31-35 year age group is 17 people (30.4%). The respondents' occupations are housewives (IRT), namely 30 people (53.6%), followed by private sector workers 18 people (32.1%), and civil servants 8 people (14.3%). Educational characteristics show that 28 people (50.0%) of mothers have a high school education, while 14 people (25.0%) each have a junior high school education and college education.

Table 2. Normality Test Results

Variable	Shapiro-Wilk Statistic	p-value
Weight before education	0,935	0,005
Weight after education	0,944	0,012
Difference (after-before)	0,933	0,004

The p-value for all variables is <0.05 , so H_0 is rejected. This means that the weight data before and after education, as well as the difference between the two, are not normally distributed. Therefore, non-parametric analysis using the Wilcoxon Signed Rank Test was used to compare toddler body weight before and after the nutrition education intervention.

Table 3. Paired Sample t-Test Results for Toddler Weight Before and After Education

Variable	Mean $\pm$ SD	Mean Difference	t	p-value
Before education	10,93 $\pm$ 2,13			
After education	11,56 $\pm$ 2,14	0,63	16,243	<0,001*

The Wilcoxon Signed Rank Test demonstrated a statistically significant difference in toddler body weight before and after the nutrition education intervention ($p < 0.001$). The mean body weight increased from 10.93 ± 2.13 kg at baseline to 11.56 ± 2.14 kg post-intervention, with a mean increase of 0.63 kg. These findings suggest that cadre-based nutrition education may contribute to improving toddler body weight.

Discussion

A mother's age within the productive range (20–35 years) indicates that she is physically and psychologically at an optimal stage for caring for and nurturing her child. Theoretically, mature mothers (26–30 years) tend to be more receptive to information, including nutrition education, and are better able to implement good parenting practices. This can be a contributing factor to the success of nutrition education interventions. Conversely, mothers who are too young (<20 years) or too old (>35 years) may face certain challenges, but this study did not find any mothers outside these age ranges.

According to (Pieter, 2010), the age range of 21–35 years is the peak period of a person's motor skills and a transitional period in adjusting to life and new social expectations, especially in carrying out the role of parent. This maturity is expected to improve mothers' abilities in terms of child nutrition knowledge. Furthermore, a person's age also influences their ability to grasp and think about the information they receive. (Irnani, 2017) adds that age is also a determining factor for a person's level of knowledge, experience, beliefs, and motivation.

The fact that some mothers work as housewives indicates that most mothers spend more time with their toddlers than mothers who work outside the home. This presents a good opportunity for implementing nutrition education, as mothers can directly apply the knowledge gained in daily care, particularly regarding feeding and monitoring their children's weight. However, mothers who work (both private and civil servants) also have the potential to implement nutrition education, even though their time with their children is more limited. Therefore, educational approaches need to be tailored to the mother's work situation. Mothers who work outside the home tend to have limited time to devote to their children. Conversely, mothers who are always at home are better able to provide continuous attention to their children, especially regarding nutritional needs (Suhardjo, 2012).

The predominant education level of high school graduates (50%) indicates that mothers generally have fairly good literacy skills. Higher education tends to influence a person's ability to receive, understand, and apply new information, including nutrition education. Mothers with a high school education or above are expected to more easily understand educational materials on balanced nutrition, the impact of malnutrition, and how to increase toddler weight. However, mothers with a junior high school education (25%) still require special attention, for example with simpler and more practical delivery methods to ensure effective education. Research by (Atmarita, 2014) states that education level influences a person's level of knowledge. This is because education is closely related to mothers' attitudes and mindsets regarding toddler food intake, from seeking, obtaining, and receiving various information related to toddler food intake. Therefore, the higher a mother's education level, the greater her knowledge about toddler food intake, and the easier it is for her to process information related to toddler nutritional status.

According to (Wahyutomo, 2012), the role of Posyandu cadres is crucial and encompasses three main functions: as administrators who carry out activities, as educators who provide



counseling, and as motivators who encourage mothers of toddlers to actively attend Posyandu. Furthermore, (Wardhani, 2012) states that longer service periods correlate with increased cadre experience. As their service time increases, cadres will handle more cases, ultimately improving their expertise and skills. Integrated health post (Posyandu) cadres play a role in providing information to respondents regarding the program and implementation of Posyandu activities. This information delivery has an impact on increasing mothers' motivation to visit Posyandu, thereby increasing the number of visits by mothers with toddlers to reach the set target. Through toddler visits to Posyandu, mothers can assess their children's nutritional status, allowing for prompt intervention if necessary (Al Faiqah, 2022).

Before the intervention, the mean toddler body weight was 10.93 ± 2.13 kg. Most mothers were aged 26–30 years (37.5%), were housewives (53.6%), and had a senior high school education (50.0%). These characteristics may have supported mothers' ability to understand and receive nutrition information. According to Atmarita (2014), education level influences knowledge and understanding related to child nutrition.

After the nutrition education program delivered by community health cadres, the mean toddler body weight increased to 11.56 ± 2.14 kg. This improvement indicates that mothers were able to apply the information provided during the education sessions. The role of cadres as educators and motivators may have helped mothers improve feeding practices and pay greater attention to their children's nutritional needs (Wahyutomo, 2012).

The results showed a significant increase in toddler body weight, with an average weight gain of 0.63 kg ($t = 16.243$; $p < 0.001$). This finding suggests that nutrition education provided by community health cadres was effective in improving toddler weight. However, because this study did not include a control group, future studies should use a randomized controlled design to provide stronger evidence regarding the effectiveness of cadre-based nutrition education interventions.

This study has several limitations. First, the lack of a control group limits the ability to completely eliminate external factors that may influence toddler weight gain. Future researchers should use a randomized controlled design with a longer follow-up period to strengthen evidence regarding the effectiveness of cadre-based nutrition education interventions.

Conclusion

This study showed that nutrition education provided by community health workers significantly improved toddler weight gain. The average weight gain was 0.63 kg. Statistical analysis using a paired-sample t-test revealed a significant difference between pre- and post-intervention measurements ($t = 16.243$; $p < 0.001$). These findings suggest that community health workers-based nutrition education is an effective community-based strategy for improving toddler nutritional outcomes. Strengthening the capacity of community health workers to provide regular nutrition education can contribute to the prevention of malnutrition and support optimal child growth, particularly in resource-constrained settings. Further studies using randomized controlled designs and longer follow-up periods are recommended to confirm these findings and assess their long-term impact. It is hoped that future research will use stronger designs, larger samples, and longer follow-up.

Ethics approval and consent to participate

Ethical approval for this study was obtained from the Health Research Ethics Committee of the Faculty of Medicine, Al-Azhar Islamic University (Approval Number 090/EC-04/FK06/UNIZAR/VIII/2025).



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