



## MEDIA CONVERGENCE USING LOCAL FOOD (TINUTUAN) TO IMPROVE MOTHERS' KNOWLEDGE, ATTITUDES, AND BEHAVIORS FOR STUNTING PREVENTION IN KEMA, NORTH MINAHASA

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### ABSTRACT

*Stunting is a health issue in children that can be avoided by providing appropriate nutrition intervention and improving nutritious locally sourced meals. Manado porridge, known as tinutuan, is a nourishing traditional cuisine from North Sulawesi, Indonesia. It can be used as a supplementary diet to reduce stunting in children under the age of five. However, due to a lack of information among mothers, tinutuan is primarily taken by adults. Media Convergence is an effective way to increase knowledge, attitude, and behavior related to stunting prevention. The purpose of this study was to analyze the effect of media convergence based on local foods on mothers' knowledge, attitudes, and behaviors of stunting prevention in children under the age of five. A quasi-experimental design with a control group, pre, and posttest was used. The purposive sampling technique was used to recruit 30 respondents. The intervention was carried out by education using media convergence of booklet dan videos that contain about stunting and how to prevent it using locally sourced food, also how to cook the tinutuan. Mann-Whitney tests were used to analyze the effect on the treatment group before the intervention. The result shows that there is significant effect of media convergence based on local foods on mothers' knowledge, attitudes, and behaviors of stunting prevention ( $p < 0.005$ ).*

*Keyword: Booklet, Media Convergence, Stunting Prevention, Tinutuan, Video.*

### ABSTRAK

Stunting adalah masalah kesehatan pada anak-anak yang dapat dicegah dengan memberikan intervensi gizi yang tepat dan meningkatkan kualitas makanan bergizi yang berasal dari pangan lokal. Bubur Manado, yang dikenal sebagai tinutuan, adalah masakan tradisional bergizi dari Sulawesi Utara, Indonesia. Bubur ini dapat digunakan sebagai makanan tambahan untuk mengurangi stunting pada anak di bawah usia lima tahun. Namun, karena kurangnya informasi di kalangan ibu, tinutuan umumnya dikonsumsi oleh orang dewasa. Konvergensi media merupakan cara efektif untuk meningkatkan pengetahuan, sikap, dan perilaku terkait pencegahan stunting. Tujuan studi ini adalah menganalisis pengaruh konvergensi media berbasis pangan lokal terhadap pengetahuan, sikap, dan perilaku ibu dalam pencegahan stunting pada anak di bawah usia lima tahun. Desain quasi-eksperimental dengan kelompok control menggunakan pretest dan posttest. Teknik purposive sampling digunakan untuk merekrut 30 responden. Intervensi dilakukan melalui edukasi menggunakan konvergensi media berupa booklet dan video yang berisi informasi tentang stunting dan cara mencegahnya menggunakan makanan lokal, serta cara memasak tinutuan. Uji Mann-Whitney digunakan untuk menganalisis pengaruh pada kelompok perlakuan sebelum intervensi. Hasil menunjukkan bahwa terdapat pengaruh yang signifikan dari konvergensi media berbasis makanan lokal terhadap pengetahuan, sikap, dan perilaku ibu dalam pencegahan stunting ( $p < 0.005$ ).

Kata Kunci: Booklet, Konvergensi Media, Pencegahan Stunting, Tinutuan, Video.



## INTRODUCTION

Stunting is a chronic nutritional problem that has a broad impact on children's health, intelligence, and future (Mulyani et al., 2025; Roediger et al., 2020). UNICEF states that stunting is defined as a condition in which children aged 0-59 months are shorter than other children of the same age (Goudet et al., 2019). Stunting can be caused by chronic malnutrition from pregnancy to age two, recurrent infections, poor sanitation, inadequate parenting and maternal knowledge, low family economic status, limited access to food and health services, and other factors such as low birth weight, less than six months of exclusive breastfeeding, and parental education (Islam et al., 2020; Santoso & Pujianto, 2024; Wardani et al., 2023). One of the effects of stunting on children is cognitive problems and never reaching a height appropriate for their age, as well as problems with learning at school (UNICEF et al., 2018). Stunting can also cause nutritional deficiencies in children, weakening their immune systems and making them more susceptible to disease. In the long term, stunting can also have an impact on intellectual and behavioral abilities, school performance, economic productivity, and reproductive capacity. In addition, stunting can increase the risk of cardiovascular disease, metabolic disorders, and heart disease (Akseer et al., 2022; Alam et al., 2020; Crookston et al., 2010; Walker et al., 2007; Yolanda & Iskandar, 2024).

In 2022, there were approximately 148.1 million children under the age of 5 who were found to be stunted, 83.6 million of whom were in Asia (WHO, 2022). According to data from the 2022 Indonesian Nutrition Status Survey, 21.6% of children in Indonesia suffer from stunting, with North Sulawesi at 20.5%. Based on data from the North Sulawesi National Population and Family Planning Agency, North Minahasa Regency still has 110 cases of stunting, with 23 cases originating from the Kema Community Health Center working area (BKKBN, 2023). Some obstacles to accelerating stunting prevention include poor dissemination of information about stunting prevention, which has resulted in many people not fully understanding stunting prevention programs, difficult demographic conditions in the region, and a lack of knowledge among mothers, coupled with a lack of stunting prevention behaviors (TNP2K, 2018).

Tinutuan, or Manado porridge, is a typical dish from North Sulawesi known as porridge made from various local vegetables. In addition to being a culinary icon of Manado, tinutuan also plays an important role in the diet of both urban and rural communities, as well as in efforts to meet nutritional needs (Langi et al., 2021). Tinutuan is a nutritious food whose benefits are still not widely known by parents of toddlers (Ghanny et al., 2022). In making tinutuan or Manado porridge, there are several types of ingredients, including rice (*Oryza sativa* L) as a carbohydrate that serves as the main source of energy for toddlers (Widhyasari et al., 2017). Lemongrass (*Cymbopogon citratus*) can function as an antiprotozoal, anti-inflammatory, antimicrobial, antibacterial, antidiabetic, anticholinesterase, molluscicidal, and antifungal agent (Adiguna & Santoso, 2017). Corn (*Zea mays* L) is a carbohydrate consisting of starch, crude fiber, and pentosans. Young corn has lower fat and protein levels than mature corn (Lalujan et al., 2017). Pumpkin (*Cucurbita moschata* Duch) contains protein, vitamins, minerals, fiber, beta-carotene, and so on (Wahyono et al., 2018). Water spinach (*Ipomoea reptans* Poir) contains high nutritional value, especially vitamin A, vitamin C, iron, calcium, potassium, and phosphorus (Hidayati et al., 2017). Protein, carbohydrates, minerals, vitamins, micronutrients are the nutrition that toddlers need to prevent and reduce stunting (Fikawati et al., 2021; Venn, 2020; Wulandary & Sudiarti, 2021; Zaidi et al., 2020).

This lack of knowledge about tinutuan nutrition may be due to low awareness of nutrition, which helps prevent stunting in toddlers (Huicho et al., 2020). Mothers' knowledge about



proper nutrition is related to the incidence of stunting in toddlers. Mothers who are unaware of the nutritional content of the food they provide cause nutritional imbalances. Providing balanced nutrition is related to mothers' knowledge (Manoppo, 2024). A mother who knows about nutritious food intake for toddlers has participated in the prevention and control of stunting (Kuswanti & Azzahra, 2022). Nutrition education using local food wisdom is one of the ways that can be done as an effort to prevent stunting (Manoppo, 2023; Manoppo & Huriah, 2022; Tendean et al., 2022). Media convergence, which is the combination of media, is expected to have a greater impact than providing information through only one medium. Booklets, as a visual medium containing images and text, have a more appealing effect, while videos, as an audiovisual medium, are easily accepted because they engage two senses, hearing and sight, thus having a significant impact (Herawati et al., 2022; Manalu & Hasibuan, 2024; Said et al., 2020). The combination of two media, namely video, which is an electronic technology medium, and a booklet, which is a print medium, is a convergence of media that can increase knowledge and behavior (Fadyllah & Prasetyo, 2021; Hirani et al., 2021; Sukmawati et al., 2021).

Previous studies have been conducted on providing education related to stunting prevention, such as through videos, digital pocket books, and handbooks, which have been shown to increase knowledge and behavior related to stunting prevention (Carin et al., 2024; Effendy et al., 2020; Manoppo, 2023). Media convergence is the result of the integration of information and communication technology, which combines various forms of media into one, to maximize knowledge and behavior change to prevent stunting (Ichsan et al., 2024). This study is novel in that the nutrition education provided focuses on locally processed foods, specifically tinutuan, which is a traditional dish from North Sulawesi. The booklet and video will cover stunting and its prevention using local food wisdom in the form of locally processed foods called tinutuan. The booklet and video contain recipes and instructions for making tinutuan based on age, adjusting the texture of the food for toddlers. Media convergence is the result of the combination of information and communication technology, which combines various forms of media into one so that it is hoped that it can maximize the increase in knowledge and behavior in preventing stunting, in this case video and booklet. The nutrition education provided is based on the nutrition of locally processed food, tinutuan, a typical North Sulawesi dish. The convergence of booklets and videos will cover stunting and stunting prevention using local food wisdom, specifically in the form of locally processed food called tinutuan. The booklets and videos contain recipes and instructions for making tinutuan based on age, adapting the texture of food for toddlers. The education provided goes beyond distributing videos and booklets to include community support. The purpose of this study was to analyze the effect of media convergence based on local foods on mothers' knowledge, attitudes, and behaviors of stunting prevention

## MATERIALS AND METODES

This study is a quantitative analytical study with a quasi-experimental research design, which involves pre-test and post-test measurements in two groups, namely the treatment group and the control group. There was no randomization, so the groups may not have been completely equal (Handley et al., 2018; Miller et al., 2020). The treatment group was given an intervention in the form of education on stunting prevention through booklets and videos, while the control group was not given any education by the researchers.

Before the intervention was given to the treatment group, measurements of stunting prevention behaviors were taken from mothers with children aged 6 to 59 months. After the intervention was given,



measurements of stunting prevention behaviors were taken again. The results of the final test between the treatment and control groups were compared, as were the pretest and posttest results for each group. The treatment group in this study was given education through booklets and videos containing information about stunting, its prevention, and tinutuan as a local food, which was carried out for 2 months. In the first month, education was provided through videos and booklets, and in the second month, assistance was provided in making tinutuan. Meanwhile, the control group will receive standard interventions in the form of health posts for toddlers. The sample in this study consists of mothers who have toddlers aged 6-59 months in the Kema Community Health Center Working Area.

The population in this study consisted of mothers of toddlers aged 6 to 59 months in Kema Satu Village, North Minahasa. Based on the sample calculation results, the sample in this study consisted of 15 subjects for the control group and 15 subjects for the treatment group. The sampling technique used in this study was purposive. The inclusion criteria in this study were mothers of toddlers aged 6 to 59 months who had a personal smartphone and were willing to follow instructions until the study was completed. The exclusion criteria was the mother who does not live with her child.

The instruments used were a knowledge measurement questionnaire containing 13 questions, an attitude questionnaire containing 11 questions, and a behavior questionnaire containing 12 questions. Researchers made modifications to the instruments that had been adapted, so that the instruments needed to be tested for reliability and validity. In this study, 3 questionnaires were used that had been tested for validity with the results of calculated  $r > r$  table or calculated  $r > 0.312$ . The method used by researchers in testing the reliability of the knowledge questionnaire used the Cronbach alpha reliability test using SPSS. An instrument is said to be reliable if the coefficient is  $> 0.60$  (Sastroasmoro & Ismael, 2014). After administering a pretest, the intervention was given, and a posttest was conducted one month later to compare the knowledge, attitudes, and behaviors of mothers of toddlers regarding stunting prevention. Data analysis used the Wilcoxon Test to examine the knowledge, attitudes, and behaviors of mothers of toddlers before and after the intervention, and used the Mann-Whitney test to examine media convergence based on local foods on mothers' knowledge, attitudes, and behaviors of stunting prevention in children under the age of five. This research has received ethical approval from the Muhammadiyah University Purwokerto Ethics Committee with the number: KEPK/UMP/88/VII/2025. The researcher received an award as a recipient of the State University Operational Assistance Program for research for the 2025 fiscal year, funded by the Director of Research and Community Service with number 0419/C3/DT.05.00/2025.

### HASIL

The study included 30 participants, including 15 in the treatment group and 15 in the control group. All participants followed the instructions from the pretest to the posttest.

Table 1. Analyze the knowledge, attitude, and behavior of mothers before and after the intervention in the treatment group

| Research Variable | Before (n: 15) |    | After (n: 15) |      | P*    |
|-------------------|----------------|----|---------------|------|-------|
|                   | F              | %  | F             | %    |       |
| Knowledge         |                |    |               |      | 0.001 |
| - High            | 0              | 0  | 4             | 26,7 |       |
| - Moderate        | 6              | 40 | 8             | 53,3 |       |
| - Low             | 9              | 60 | 3             | 20   |       |





|            |    |      |   |    |       |
|------------|----|------|---|----|-------|
| Attitude   |    |      |   |    | 0.003 |
| - High     | 2  | 13,3 | 9 | 60 |       |
| - Moderate | 12 | 80   | 6 | 40 |       |
| - Low      | 1  | 6,7  | 0 | 0  |       |
| Behavior   |    |      |   |    | 0.001 |
| - High     | 1  | 6,7  | 6 | 40 |       |
| - Moderate | 9  | 60   | 9 | 60 |       |
| - Low      | 5  | 33,3 | 0 | 0  |       |

According to the table, the respondents' knowledge was mostly in the low knowledge and moderate in attitude and behavior level category before the intervention, but it increased after the intervention to mostly in moderate level of knowledge and high in attitude and behavior. The treatment group experienced a significant effect to knowledge, attitude and behavior after receiving a media convergence intervention (p-value < 0.05).

Table 2. Analyze the knowledge, attitude, and behavior of mothers before and after posttest in the control group

| Research Variable | Before (n: 15) |    | After (n: 15) |    | P*    |
|-------------------|----------------|----|---------------|----|-------|
|                   | F              | %  | F             | %  |       |
| Knowledge         |                |    |               |    | 0.578 |
| - High            | 3              | 20 | 3             | 20 |       |
| - Moderate        | 9              | 60 | 11            | 73 |       |
| - Low             | 3              | 20 | 1             | 7  |       |
| Attitude          |                |    |               |    | 0.647 |
| - High            | 7              | 47 | 6             | 40 |       |
| - Moderate        | 8              | 53 | 9             | 60 |       |
| - Low             | 0              | 0  | 0             | 0  |       |
| Behavior          |                |    |               |    | 0.906 |
| - High            | 7              | 53 | 5             | 33 |       |
| - Moderate        | 8              | 47 | 10            | 67 |       |
| - Low             | 0              | 33 | 0             | 0  |       |

According to the table, the respondents' knowledge, attitude and behavior was mostly in the moderate in level category, but there was an increase in knowledge after the posttest measurement. Based on p value there is no significant effect to knowledge, attitude and behavior of mother before and after test (p-value > 0.05).

Table 3. Analyze the difference of knowledge, attitude, and behavior of mothers after the posttest in both group

| Research Variable | Treatment Group (n: 15) |    | Control Group (n: 15) |    | P*    |
|-------------------|-------------------------|----|-----------------------|----|-------|
|                   | F                       | %  | F                     | %  |       |
| Knowledge         |                         |    |                       |    | 0.233 |
| - High            | 4                       | 27 | 3                     | 20 |       |
| - Moderate        | 8                       | 53 | 11                    | 73 |       |
| - Low             | 3                       | 20 | 1                     | 7  |       |
| Attitude          |                         |    |                       |    | 0.080 |
| - High            | 9                       | 60 | 6                     | 40 |       |
| - Moderate        | 6                       | 40 | 9                     | 60 |       |
| - Low             | 0                       | 0  | 0                     | 0  |       |



|            |   |    |    |    |       |
|------------|---|----|----|----|-------|
| Behavior   |   |    |    |    | 0.901 |
| - High     | 6 | 40 | 5  | 33 |       |
| - Moderate | 9 | 60 | 10 | 67 |       |
| - Low      | 0 | 0  | 0  | 0  |       |

Based on the table, there is no significant difference in posttest of knowledge, attitude and behavior of mother between treatment group dan control group with p value > 0.05.

### DISCUSSION

The results showed that there was an increase in mothers' knowledge following the intervention (p-value = 0.001). Health education can alter the learning process; by providing health education to a person, knowledge can be increased (Fadyllah & Prasetyo, 2021). Changes will occur if someone has a broader understanding. This is supported by research findings, which revealed disparities in understanding before and after receiving a health education intervention. Although there is no quality standard for tinutuan, the nutrition of the ingredients can be used to avoid stunting (Anggraini et al., 2019; Ghanny et al., 2022). The integration of local foods in nutrition education allows mothers to link theoretical concepts of balanced nutrition with their everyday cooking practices. This approach integrates scientific nutrition knowledge with everyday food behavior, enhancing understanding and motivation to implement the information in household meal preparation (Buksh et al., 2023; Gumelar & Tangpukdee, 2022).

In this study, the intervention supplied in the form of video media and booklet is very beneficial and effective, which has favorable implications for improving knowledge (Manalu & Hasibuan, 2024; Sančanin, 2018). Mothers' formal education influences their nutritional knowledge, which in turn influences how they pay attention to the nutritional status of their children and households. Parental education is a significant element in child development (Sari, 2021). This convergence facilitated the comprehensive delivery of educational content by integrating the benefits of printed visual materials with audiovisual demonstrations. The booklet presented organized, written content for repeated review, whereas the video delivered dynamic, illustrative explanations that enhanced comprehension through visual and auditory engagement (Yorganci, 2022; Yuan & Yang, 2024).

In this case, nutrition education is provided through the use of a video that, according to Nuraini et al., (2021) can increase the mother's knowledge . Video and booklet are powerful to provide information, especially nutrition education (Said et al., 2020). Studies conducted by Mbogori & Murimi, (2019) reinforce the importance of nutrition education, as the findings revealed that mothers' nutritional awareness rose following the nutrition education intervention, and mothers became more conscious of healthful food intake for their children. A good mother's knowledge can influence behavior and even a mother's attitude to prevent stunting in children at an early stage, starting with maintaining nutrition during pregnancy until the baby is born, and starting with early initiation of breastfeeding, exclusive breastfeeding, giving complementary food, and providing nutritious food according to the toddler's needs.

The results revealed that there was a significant increase in attitude (p-value = 0.003). Attitude is a person's reaction to a specific stimulus. Changes in positive attitudes toward behavior and lifestyle, as well as eating patterns, might alter the choice of various types and amounts of food



ingested. Research conducted by Meidiana et al., (2018) shows that there is a change in the attitude of respondents in a better direction when given health education through audio-visual media. There are various factors that can cause a change in attitude, there is a person's beliefs, habits, willingness, and desire to understand something, including in relation to stunting prevention (Susiloretni et al., 2021). A good mother's attitude leads to good behavior. Mothers must pay attention to their food intake throughout pregnancy to avoid having a low birth weight. Consumption of food with balanced nutrition is critical, such as providing nutritious supplementary meals. Nutritious supplementary meals can be made utilizing local food products accessible in the respondent's country of origin.

The results of the study showed that there was a significant effect of media convergence based on local food wisdom. According to Glorioso et al., (2020) effective nutrition education can be carried out 2 times a week for 3 months. By carrying out intense education according to research conducted, stunting prevention attitudes can be improved. The results showed that there was increase in action with  $p\text{-value} = 0.001$ . Behavior is a manifestation of the actions taken by someone. These actions can come from the knowledge gained. In accordance with research conducted by Kirana et al., (2022) found that indicated providing moms with health education about stunting prevention was extremely effective because there appeared to be a positive shift in the mother's behavior following the intervention.

Nutrition education provides knowledge to the population, particularly mothers. It is thought to raise awareness of maternal conduct. Increased knowledge causes people to behave in accordance with their knowledge. According to Fadyllah & Prasetyo, (2021) that the provision of health education to mothers by the audiovisual approach has a positive influence, specifically a change in mothers' behavior in providing nutrition to their children. The behavioral improvements revealed were also in the form of mothers recognizing the fulfillment of protein, which can satisfy the nutritional demands of children in reducing the prevalence of stunting, and being able to enhance the habit of maintaining cleanliness and environmental hygiene. In this study, there was a significant effect on behavior improvement, and the more duration of the intervention and a long period of time can demonstrate maximum changes (Syihab & Kumalasari, 2020). High knowledge of stunting prevention without a dissertation on stunting prevention behavior due to busy working women who cannot play a direct role in food selection and production (Tarigan, 2021). As with increasing stunting prevention attitudes, effective nutrition education can be delivered twice a week for three months. Research has shown that intensive instruction can increase psychomotor stunting preventive behavior (Glorioso et al., 2020).

Based on Table 2 and 3, the results show no significant difference between the treatment and control groups. This is because, based on the researcher's analysis, there is a government program related to stunting prevention at the Community Health Center (Puskesmas) that is already running through the integrated health service post (Posyandu). Therefore, there was an increase in knowledge, but no increase in attitudes and behavior. However, the data shows that the increase only occurred in the knowledge of the control group. This indicates that a government program has been implemented to increase knowledge, but when compared to the treatment group, the increase in knowledge in this group was higher and more significant.



## CONCLUSION

This study found that the media convergence contains booklet and video-based education can improve mothers' knowledge, attitude and behavior of stunting prevention. The health center officer can give the mothers more local food convergence media in Posyandu and suggestions for future researchers include conducting a longer-term study and more participants.

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