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Community-Based Intervention through Posyandu Cadre Training and Assistance for Mothers Under Five to Reduce Stunting in Genaharjo Village, Tuban

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ABSTRACT Nutrition problems are still a major public health challenge, especially stunting which has a long-term impact on child growth and development. Based on the 2022 report of the Tuban Regency Health Office, the prevalence of stunting in the work area of the Kawa Health Center reached 24.43%. Genaharjo Village is the focus of attention because the number of stunted toddlers has increased from 40 children (2023) to 45 children (14%) in 2024, while 66.7% of pregnant women are at high risk of experiencing Chronic Energy Deficiency (CED). This condition shows the need for intervention to support the achievement of the national target of reducing stunting by 14%. This Community Service aims to evaluate pre-post changes in the knowledge of cadres and mothers of toddlers, anthropometric skills of cadres and the processing of toddler menus by mothers after a two-session intervention in Genaharjo". The activity was carried out in August-September 2025 with evaluation through pre-test and post-test for knowledge, observation of cadre skills, assessment of mothers' ability in food processing, and urine examination of toddlers using *the pyridinium crosslink rapid test*. The results showed an increase in cadre knowledge from an average of 9.25 to 11.25 and mothers of toddlers from 9.6 to 11.1. Cadres are able to perform anthropometric measurements correctly, while mothers of toddlers are skilled in planning menus and processing 20 nutritious recipes based on local ingredients. Of the 20 urine samples of stunted toddlers, two showed positive results. This intervention is effective in increasing community capacity, but a comprehensive approach is needed including nutrition education, health monitoring, and sanitation improvement for the sustainability of stunting prevention.

INDEX TERMS Cadres; toddler mother; nutrition education; community empowerment; integrated service post.

I. INTRODUCTION

Nutrition issues are still one of the major challenges in public health, especially in developing countries. One form of chronic malnutrition that is of global concern is stunting, which is failure to grow in children due to long-term malnutrition, recurrent infections, and lack of psychosocial stimulation during the critical period of the first 1,000 days of life (HPK). The World Health Organization (WHO) defines stunting as a condition of a child's height that is lower than the age standard according to the WHO growth curve. Stunted children not only experience impaired physical growth, but also degenerative diseases later in life (3) (4)(5).

Globally, about 22% of children under five in the world mengalami stunting pada tahun 2022, dengan the highest prevalence in South Asia and Sub-Saharan Africa. In Indonesia, although the prevalence of stunting shows a downward trend, the figure is still quite high. Based on data from the Indonesian Nutrition Status Survey (SSGI) The national stunting prevalence decreased from 24.4% in 2021 to 21.6% in 2022, but is still far from the national target of 14% in 2024 as stated in the National Medium-Term Development Plan (RPJMN). (6) (7) (8) Tuban Regency is one of the regions in East Java that faces quite serious nutritional problems. Based on the 2022 Tuban Regency Health Office report, the prevalence of stunting in the Wire Health Center work area reached 24.43%, exceeding the national average. In Genaharjo Village, the number of stunting cases fluctuated, as many as 59 toddlers in 2022, decreasing to 40 toddlers in 2023, but increasing again to 45 toddlers (14%) in 2024. In addition, of the 21 pregnant

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women recorded, 14 people (66.7%) are at high risk of experiencing Chronic Energy Deficiency (SEZ). This condition shows that there is a gap between the target of accelerating stunting reduction and the real situation on the ground that still requires special attention and continuous intervention (5). According to UNICEF's conceptual framework (9), the causes of stunting are divided into direct factors, such as inadequate food intake and infectious diseases, as well as indirect factors, such as suboptimal feeding and parenting practices, limited access to health services, low maternal education levels, and unfavorable socioeconomic and environmental conditions (10) (11) (12). This framework emphasizes that handling stunting requires a multi-sectoral approach that not only focuses on nutrition interventions, but also touches on behavioral, educational, economic, and environmental aspects.

From the perspective of public health, the theory of determinants of health emphasizes that a child's nutritional status is influenced by the interaction between biological factors, behavior, health services, and physical and social environment (5) (13) (14) In addition, the theory of community empowerment in community nursing explains that increasing the capacity of the community, especially health cadres, can strengthen independence in recognizing problems, finding solutions, and maintaining the sustainability of programs (5). In this context, Posyandu cadres play an important role as the spearhead of primary health services in monitoring the growth and development of toddlers, providing nutrition education, and assisting mothers in the implementation of parenting and the provision of balanced nutritious food (15). Seeing the complexity of the causative factors and challenges in reducing stunting, community-based interventions are needed that focus on improving the knowledge and skills of cadres as well as empowering mothers under five. Institution memiliki peran strategis dalam mendukung upaya This is through community service activities oriented to knowledge transfer, training, and continuous mentoring. Therefore, training activities for Posyandu cadres and assistance for mothers under five were carried out in Genaharjo Village, Semanding District, Tuban Regency, as a form of implementation of an educational and participatory approach to strengthen community capacity in stunting prevention.

II. METHODOLOGY

The Service Team from the Health Polytechnic, Ministry of Health Surabaya, consisting of 5 lecturers assisted by 6 students, carried out joint activities in Genaharjo village, Semanding District, Tuban Regency in the form of Community Service which was held from August 18 to September 2025. The number of participants in community service activities was 40 targets, namely 20 Posyandu cadres and 20 mothers under five. The training of posyandu cadres in anthropometry measurement and assistance of stunted mothers under five in the processing of healthy menus is expected to yield significant results, both in terms of knowledge and skills of participants, so that a comprehensive approach is needed that includes nutrition education, health monitoring, and sanitation improvement to make stunting prevention more effective Sustainable. Some of the results of this activity include.

A. INCREASING PUBLIC KNOWLEDGE (POSYANDU CADRES AND MOTHERS UNDER FIVE) ABOUT STUNTING

Public knowledge about stunting is very important because it is an initial factor in shaping preventive behavior. According to the Health Belief Model (HBM), understanding the risks and long-term impacts of stunting will increase the perception of threats and motivate people to take preventive measures, such as improving nutrition and clean living practices (16),(15). This is in line with Lawrence Green (PRECEDE-PROCEED Model) who emphasizes that knowledge is a predisposing factor underlying changes in public health behavior (10) (17). UNICEF's Conceptual Framework also emphasizes that parents' knowledge of parenting, nutrition, and sanitation is an important factor that can break the chain of indirect causes of stunting (18). In addition, in health behavioral theory, Notoatmodjo explained that behaviors based on knowledge will last longer than behaviors that do not have a strong cognitive basis (19). Thus, increasing public knowledge is a strategic step in efforts to accelerate stunting reduction.

B. TRAINING ON ANTHROPOMETRY MEASUREMENT FOR TODDLERS BY POSYANDU CADRES

Training on anthropometric measurements of toddlers for Posyandu cadres is important because the skills of cadres in monitoring child growth are the key to early detection of nutritional problems, including stunting. According to (20) theory, knowledge and skills are predisposing factors that affect health behaviors so that cadre training becomes the basis for sustainable behavior change. This is in line with (9) which emphasizes that child growth monitoring through measurement Accurate anthropometry is a key strategy for malnutrition prevention. (21) also emphasized that skills are the result of knowledge that is practiced repeatedly, so that trained cadres will be able to make measurements correctly. Cadres were chosen because they are the spearhead of health services in the community, closer to mothers under five, and have a strategic role in the sustainability of the Posyandu program (22) (23).

C. COUNSELING AND DEMONSTRATION OF HEALTHY MENU PROCESSING FOR TODDLERS

Counseling and demonstrations of healthy menu processing for toddlers are important because they not only increase knowledge, but also form practical skills of mothers in providing balanced nutritious food. According to (24), knowledge is the basis for the formation of behavior, so nutrition counseling can encourage changes in feeding

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practices for toddlers. The demonstration method is considered more effective than lectures because it involves the senses of sight, hearing, and motor so that it makes it easier for mothers to imitate and practice again at home (16) This is in line with which emphasizes that the practice of infant and Young Child Feeding (IYCF) has a great influence on nutritional status and stunting prevention. In addition, according to (25), mothers' knowledge and skills are important predisposing factors in changing health behaviors, so that through counseling and demonstrations, mothers can be empowered to process local food into healthy menus that support the growth and development of toddlers.

D. STUNTED TODDLER URINE TEST

Urine examination in stunted toddlers is important because stunting not only impacts physical growth, but is also related to metabolic disorders and susceptibility to infectious diseases. According to (26), quoted by (27) nutritional status assessments must be carried out comprehensively by considering the interaction between food intake, health, and environmental conditions, so that urine examination is one way to detect metabolic problems, urinary tract infections, and kidney function disorders that can worsen children's nutritional status. This is in line with UNICEF (2015) which emphasizes that children's health is affected by infectious diseases as an indirect cause of malnutrition, so health monitoring through urine examination is an important part of stunting prevention efforts. In addition, (28) (29) recommends simple laboratory tests, including urine, as an early detection step to complement nutritional interventions to make the handling of stunted toddlers more effective.

III. RESULT

Based on TABLE 1 the results of community service activities, the average score of cadres increased from 9.25 to 11.25, while mothers under five increased from 9.6 to 11.1. The maximum score of the increase in target knowledge is the highest achievement benchmark that can be achieved by the participants, so that the results of improvement can be compared between groups (cadres and mothers of toddlers) as well as against the expected competency standard, this maximum score provides meaning in the evaluation of the Posyandu Cadre program more easily absorbing material, perhaps because of the background of initial knowledge or active involvement in the Posyandu. Meanwhile, mothers of toddlers are also increasing, but relatively smaller, possibly due to educational factors, experience, or limited time to understand the material.

TABLE 1. INCREASING THE KNOWLEDGE OF POSYANDU CADRES AND MOTHERS UNDER FIVE IN GENEHARJO VILLAGE TUBAN REGENCY AUGUST 2025

Participant	n	Average Pre-test ±	Average Post-test ±	SD Increased(%)
Posyandu Cadre	20	9,25±1,06	11,25±0,97	21,6%
Toddler Mother	20	9,60±1,25	11,10±1,03	15,6%

The increase in the pre-post test results showed an increase in knowledge of 21.6% in cadres and 15.6% in mothers under five, which means a statistically significant difference before and after the intervention. The aspects of knowledge that have experienced the highest increase include the recognition of signs and risk factors for stunting, understanding balanced nutrition, and infant and child feeding practices. These findings indicate that practice-based training and direct mentoring are able to strengthen participants' knowledge in recognizing and preventing stunting.

TABLE 2. SKILLS OF POSYANDU CADRES IN ANTHROPOMETRIC EXAMINATIONS IN TODDLERS IN GENEHARJO VILLAGE, TUBAN REGENCY, AUGUST 2025

Assesment Aspects	Before(%)	After(%)	Increased(%)
Tool preparation and calibration	62,5	91,7	±29,2
Length and weight measurement techniques	58,3	91,7	±33,4
Recording and reporting of results	66,7	100,0	±33,3
Communication of results to mothers of toddlers	58,3	83,3	±25,0

Based on TABLE 2 the results of skill observation showed that all cadres were able to prepare anthropometric tools (digital scales, microtoises, and KMS) correctly, as well as accurately measure the child's height and weight according to WHO standards. After the training, as many as 90% of cadres were able to record and interpret measurement results correctly. In addition, cadres also showed improvements in nutritional communication skills, including educating mothers about diet, sanitation, and prevention of infectious diseases.

Cadre skills also show a noticeable improvement after training. Before the training, only 60% of cadres were able to perform anthropometric measurements correctly, increasing to 95% after training. Significant improvements occurred in the aspects of tool calibration, accuracy of length and weight measurements, recording results, and communication of results to mothers under five.

The ability of cadres to carry out posyandu activities increased from the category of sufficient to good, shown by accuracy in preparing tools, carrying out measurement procedures, recording results, and providing education related to the nutritional status of children to mothers under five. Of the 20 posyandu cadres who participated in the last education community service activities, half were in high school, a small part of them were 31-40 years old, almost half of them were 6-10 years old and almost all 26 Posyandu cadres had participated in training. Overall, the results of this score increase show that community-based cadre training and assistance for mothers under five are effective in improving knowledge and skills of stunting prevention in Genaharjo Village. This program has succeeded in strengthening the capacity of cadres as posyandu implementers and empowering mothers under five in the processing of healthy food based on local ingredients as a real effort to reduce the stunting rate in the region.

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TABLE 3. SKILLS OF TODDLER MOTHERS IN PROCESSING HEALTHY MENUS FOR TODDLERS IN GENAHARJO VILLAGE, TUBAN REGENCY, AUGUST 2025

Assesment Aspects	Skor Pre-test ±	Skor Post-test ±	SD Increased(%)
Menu planning	1,20±0,41	11,25±0,97	33,3%
Food selection	1,10±0,31	11,10±1,03	37,5%
Processing techniques	1,05±0,22	1,70±0,32	38,0%
Food serving	1,15±0,28	1,80±0,29	36,5%
Assessment of nutritional value	1,00±0,36	1,65±0,40	39,5%
Nutrition education for children	0,95±0,33	1,70±0,31	43,0%
Total average	**1,08±0,32**	**1,73±0,33**	**35,5%**

Based on TABLE 3 the results of the observation showed an improvement in the skills of mothers under five after mentoring, with the average score increasing from 1.08 ± 0.32 to 1.73 ± 0.33. All participants achieved the good category (≥75%), which showed mastery of basic competencies independently in accordance with the competency-based training criteria. Skill assessment was carried out using observation sheets with six main aspects, namely: 1) Menu planning 2) Food selection 3) Processing techniques 4) Food serving 5) Nutritional value assessment, and 6) Nutritional education skills to children.

Each aspect was assessed on a scale of 0–2 (0 = not capable, 1 = capable, 2 = capable, 2 = capable). The total score is then converted into a percentage of skill achievement, Based on the competency assessment guide (34).

The aspect with the highest improvement was the ability to educate children (43%), followed by nutritional value assessment (39.5%), processing techniques (38%), and food selection (37.5%). Meanwhile, the aspect of menu planning increased by 33.3%, with most mothers under five having been able to compile a balanced daily menu consisting of carbohydrates, animal protein, vegetable protein, vegetables, and fruits.

As concrete results, participants produced 20 healthy menus for toddlers based on local food such as corn rice, catfish, tempeh, moringa leaves, and yellow pumpkin. This variety of menus reflects the improvement of mothers' skills in combining nutritious food ingredients according to the principles of balanced nutrition and local food potential.

TABLE 4. RESULTS OF URINE EXAMINATION OF STUNTED TODDLERS IN GENAHARJO VILLAGE, TUBAN REGENCY AUGUST 2025

Inspection Categories	Number of Toddlers
Checked	13 (2 positive, 11 negative)
Not checked	7
Total	**20**

Based on TABLE 4 the results total of 20 urine samples of stunted toddlers were examined using the rapid pyridinium crosslink test to detect the risk of tissue damage due to chronic malnutrition. The results showed that 13 children were examined (2 positive, 11 negative) and 7 children were absent during the examination. Although knowledge and skills outcomes have improved significantly, the findings of positive outcomes suggest that nutrition interventions are not fully optimal and require a follow-up approach that includes improved nutritional intake, sanitation, and routine health monitoring.

FIGURE 1. Posyandu Cadre Counseling and Training Activities

FIGURE 2. Toddler menu counseling and urine examination

FIGURE 3. Provision of medical equipment and door prizes

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FIGURE 4. **Community service team**

IV. DISCUSSION

The results of this activity show that community-based interventions through posyandu cadre training and mentoring of mothers under five have a real positive impact on improving knowledge and skills in stunting prevention. The increase in knowledge and skill scores in both cadres and mothers of toddlers strengthens the evidence that structured, contextual, and practice-oriented nutrition education is able to improve healthy behaviors and family nutrition care skills.

Based on the results of community service activities, the average score of cadres increased from 9.25 to 11.25, while mothers under five increased from 9.6 to 11.1. According to (10) Knowledge is one of the main determinants of health behavior change. Improving knowledge is the first step in shaping better health attitudes and practices. Thus, the success of the education of posyandu cadres and mothers under five in this community service activity can be understood as the starting point for the formation of healthy behavior, both in monitoring the growth and development of children and the practice of feeding toddlers. The Ministry of Health of the Republic of Indonesia (2) (21) emphasized that increasing the capacity of cadres through continuous training is a key pillar in the national strategy to reduce stunting.

The skills of posyandu cadres in anthropometric measurement have reached a success standard of ≥75%. (20) (19) states that skills are formed as a result of knowledge practiced over and over again. This means that the increased knowledge of post-educational cadres demonstrated in pre-test and post-test scores contributes directly to the improvement of practical skills in anthropometry. The results of this activity are also posyandu cadres who receive training can improve the accuracy of nutritional status data for toddlers. The accuracy of anthropometric data is very important because it is the basis for the early detection of nutritional problems, which ultimately determines how quickly or slowly the intervention is carried out. So that program interventions can be more targeted. Strengthening cadre capacity through continuous training needs to be the main strategy in public health programs.

Success In mentoring activities for mothers under five, the achievement of the success of mother's skills was obtained in the good category (≥75%), by producing 20 healthy toddler menus based on local ingredients. The success of the achievement of skills of mothers under five is assessed from six aspects, namely menu planning, ingredient selection, processing techniques, presentation, nutritional value assessment, and educational ability. In the aspect of menu planning, mothers of toddlers can prepare a varied daily menu for children, consisting of carbohydrates, animal protein, vegetable protein, vegetables, and fruits. This variety of menus is essential to prevent micro and macronutrient deficiencies. This is in accordance with the Balanced Nutrition guidelines (2) which emphasize food diversification for nutritional fulfillment for toddlers. In terms of material selection, mothers can choose fresh foodstuffs, which are easy to get at the local market, and according to the family's purchasing power. This reflects the mother's skill in considering aspects of nutrition as well as affordability. (7) through Sustainable Healthy Diets – Guiding Principles emphasizes that accessibility, affordability, and quality of food are the keys to the sustainability of household nutrient consumption. The aspect of processing techniques also shows progress. Most mothers process food with the right methods (boiling, steaming) to reduce nutrient loss. In addition, according to (30), infant and young child feeding (IYCF) must pay attention to timely, adequate, safe, and adequate nutrition. In this context, the mother's skills in (15) preparing a healthy menu show that they are beginning to be able to apply the right companion food principle, which is to provide companion food that is age-appropriate, nutritionally balanced, hygienic, and attractive to children. Studies on (31) show that the sensory and visual aspects of food presentation have a significant effect on early childhood appetite. The ability to assess nutritional value is also beginning to develop. Mothers can already identify sources of protein, vitamins, and minerals in the menu. This shows an increase in nutritional literacy. (32) emphasizing that maternal nutritional literacy is an important determinant of toddler feeding practices because it affects the variation in children's diets

This finding is also in line with (30) which emphasizes that maternal nutritional knowledge has a great influence on feeding practices, so that toddlers get adequate and balanced nutritional intake. In the context of stunting prevention, mothers not only play the role of caregivers, but also as the main managers of family food sources. (18) (15) added that increasing family nutritional literacy is one of the main strategies to accelerate stunting reduction, because mothers with good nutritional literacy tend to provide more diverse and nutritious food.

Practically, improving maternal skills in menu planning and local food processing is an important finding because it shows the potential for community independence in providing nutritious food without dependence on fortification products or foreign food assistance. This is in line with the national strategy for accelerating stunting reduction which emphasizes the optimization of local food potential and the role of the family as the main actors of

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balanced nutrition in line with the research (21) which emphasizes that in terms of learning theory, (14) states that psychomotor is formed through a learning process accompanied by direct practice. The improvement of the skills of mothers under five in this activity is in line with the learning while doing approach, where mothers not only receive knowledge, but also practice it to produce real products in the form of healthy menus. In terms of educational ability, some mothers can explain the benefits of healthy food to fellow mothers or family members. These findings illustrate the existence of peer education processes at the community level. According to (10) in Health Behavior: Theory, Research, and Practice, peer education can strengthen the adoption of healthy behaviors in the community because the message is more easily received between individuals with Similar experience. Thus, the results of this community service activity strengthen the view that stunting prevention requires multisectoral intervention. (33) emphasizes the importance of integrating specific nutritional interventions (supplementation, breastfeeding/promotion of complementary foods for breast milk) with sensitive nutrition interventions (clean water, sanitation, clean and healthy living behaviors, basic health services). This means that the success of stunting reduction can only be achieved if families, cadres, health workers, and the village government work together to build a healthy environment while ensuring adequate nutrition for children.

In the urine examination of stunted toddlers using *the Rapid Test Pyridinium Crosslink*, 2 toddlers were found positive, the statement of results is an early warning that the stunting control program at the village level needs to be expanded (29). The results of the urine examination also showed that nutritional interventions in the form of supplementation were not enough. Children who live in environments with poor sanitation or are often infected are still at risk of growth action even if they have received additional nutrients. (3) report that recurrent diarrhea and chronic infections are significant risk factors for stunting in developing countries. In line with that, (4) emphasizes that unhygienic environmental conditions can lead to environmental enteric dysfunction (EED), which is a chronic intestinal disorder that inhibits the absorption of nutrients.

This suggests that supplementation as a single intervention is not enough to comprehensively improve the child's health status. (3) also shows that recurrent infectious diseases, particularly diarrhea, contribute significantly to the incidence of stunting even though nutritional interventions have been carried out. In addition, (18) through the Malnutrition Framework emphasizes that the causes of stunting are multifactorial: the direct causes include inadequate nutritional intake and recurrent infectious diseases; indirect causes include suboptimal parenting, family food security, and limited sanitation and access to health services; While the basic causes include socio-economic, education, and policy conditions. Therefore, the findings in Genaharjo reinforce the view that stunting prevention requires comprehensive interventions, not only focusing on supplementation (supplementary feeding) In Indonesia, the Ministry of Health of the Republic of Indonesia (2) emphasizes that stunting reduction must be carried out in an integrated manner through a family approach, improving balanced nutrition, increasing access to clean water and sanitation, and regular health check-ups.

V. CONCLUSION

This community service program aimed to strengthen community capacity in stunting prevention through education, skill enhancement, and health screening activities in Genaharjo Village. The findings demonstrate that the intervention was effective in improving both knowledge and practical competencies among posyandu cadres and mothers of children under five. Post-activity evaluations showed a measurable increase in participants' understanding of stunting, balanced nutrition, and child growth monitoring, accompanied by improved technical skills in accurate anthropometric measurements (weight, height/length, and nutritional status interpretation) as well as in the preparation of nutritious complementary foods using locally available ingredients. These outcomes indicate that community-based educational approaches can successfully enhance human resources at the grassroots level and support early detection of growth problems. However, despite improvements in knowledge and practices, urine examination results among stunted toddlers revealed that a proportion of children still showed positive indicators related to nutritional deficiencies, suggesting that supplementation-based nutritional interventions alone are insufficient. This finding highlights that stunting is a multifactorial condition influenced not only by dietary intake but also by infection, sanitation, hygiene, and access to clean water, requiring more integrated and sustained health strategies. Based on these results, several implications for future work can be drawn. First, the empowerment of posyandu cadres should be continued through regular and structured training to ensure consistent accuracy in growth monitoring and early referral of at-risk children. Second, efforts to improve nutritional literacy among mothers of toddlers should emphasize hands-on practice in preparing healthy, affordable, and culturally acceptable menus based on local food resources to ensure long-term dietary sustainability at the household level. Third, community participation needs to be strengthened through collective actions that promote clean and healthy living behaviors, starting from individual households and extending to the broader community environment. Finally, future programs should adopt a strong multi-sectoral approach involving village governments, health centers, posyandu cadres, and families, integrating education, routine health monitoring, sanitation improvement, and provision of clean water. Such comprehensive and collaborative interventions are expected to produce more sustainable impacts in reducing stunting prevalence and improving child health outcomes in rural communities.

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