

NUTRITION EDUCATION THROUGH FISH-BASED SNACK TRAINING FOR ADOLESCENTS TO PREVENT STUNTING AND ACHIEVE SDGS NUMBER 3

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ABSTRAK

Abstrak: Stunting saat ini menjadi masalah gizi di Indonesia, termasuk pada remaja yang merupakan calon orang tua dan berperan penting dalam memutus rantai antar generasi. Konsumsi ikan di kalangan remaja relatif rendah meskipun ketersediaannya melimpah. Program pengabdian ini bertujuan meningkatkan pengetahuan gizi dan keterampilan praktis remaja dalam mengolah camilan sehat berbasis ikan sebagai upaya preventif pencegahan stunting. Kegiatan dilaksanakan di Muaragembong, Bekasi, dengan melibatkan 30 siswa. Metode yang digunakan meliputi sosialisasi, penyuluhan, workshop, praktikum pengolahan abon dan patty ikan kembung dengan tambahan sukun, serta evaluasi melalui pre-test, post-test, observasi, dan angket. Hasil menunjukkan peningkatan skor rata-rata dari 3,53 menjadi 4,90 dengan gain score 0,93. Sebanyak 83% tergolong efektif. Program ini membuktikan pelatihan berbasis praktik efektif meningkatkan pengetahuan dan keterampilan gizi remaja untuk mendukung pencapaian SDG 3 *Good Health and Well-being*.

Kata Kunci: Gizi Remaja; Camilan Sehat; Ikan Kembung; Stunting; SDGs.

Abstract: *Stunting remains a major nutritional problem in Indonesia, including among adolescents who are future parents and play a crucial role in breaking the intergenerational cycle. Fish consumption among adolescents is relatively low despite abundant local resources. This community service program aimed to improve adolescents' nutritional knowledge and practical skills in processing healthy fish-based snacks as a preventive effort against stunting. The activity was conducted at Muaragembong, Bekasi, involving 30 students. The methods included socialization, counseling, workshops, and practicum on processing shredded mackerel and mackerel-breadfruit patties, followed by evaluation using pre-tests, post-tests, observations, and surveys. The results showed the average score increased from 3.53 to 4.90 with an average gain score of 0.93. About 83% were categorized as effective. The program proved that practice-based nutrition training effectively enhanced adolescents' knowledge and skills, supporting the achievement of SDG 3: Good Health and Well-Being.*

Keywords: *Adolescent Nutrition; Healthy Snacks Mackerel; Stunting; SDGs.*



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A. INTRODUCTION

Based on data malnutrition and its form including stunting, wasting, overweight, obesity and micronutrient deficiencies still becoming the most pressing public health worldwide issues including in Indonesia (Herawati et al., 2023; Latifah Nur Hidayati Putri et al., 2024; Mahmudah & Yuliati, 2021; Renyoet et al., 2023). In fact, at 2022 it was estimated that 149 million children under five years were stunted, 45 million were wasted, and 37 million were overweight or living with obesity (World Health Organization, 2024). Almost half of the deaths among children under five are related to poor nutrition. This situation shows that malnutrition has serious and long-lasting effects (Fauziah et al., 2023).

Adolescence is an important stage to prevent stunting for the next generation (Ardini, 2023; Renyoet et al., 2023). Intervention to prevent stunting can be started at these stages (Muchtar et al., 2023; Yuliastuti & Herliani, 2025). Good nutrition education during adolescent can prepare future mothers Ningsih & Husna (2022) and fathers to give birth to healthier children. Research highlight that raising awareness and knowledge among adolescents about stunting prevention is a key strategy for breaking the cycle of poor nutrition (Azzahra et al., 2024). A recent study confirms that adolescence is the right time to strengthen knowledge, attitudes, and healthy food practices (Nurhaeni et al., 2024; Yasyfa & Azizah, 2024).

International studies also prove that nutrition for adolescence is effective to prevent stunting for the next generation Shapu et al. (2022), and balanced nutrition education for adolescent has been proven to change attitudes and behaviour Musfira & Hadju (2024) toward dietary pattern, which play vital role to prevent malnutrition (Safitri & Fitranti, 2016). Other evidence shows that practical and hands-on approaches are more effective than lectures alone in changing eating habits. These findings are in line with the Sustainable Development Goals (SDGs), especially Goal number 3, Good Health and Well-Being, which emphasizes preventive efforts to reduce malnutrition.

Indonesia with a beautiful source of food such as fish which is a local food resources that is rich in protein and omega-3 fatty acids. But, at Muaragembong which this community service has been conducted, based on observation found that adolescent fish consumption is still relatively low. Observations at Senior High School 1 Muaragembong, Bekasi showed that students preferred sweet and carbohydrate-rich snacks instead of fish-based product. This is caused by limited knowledge, lack of alternative product choices, and the perception that fish is not easy to process. In fact, Muaragembong itself is a coastal area with abundant fish that can be used to improve adolescence nutrition in simple and affordable ways. Based on these problems, this community service program offers training for adolescence to process healthy fish-based snacks, such as pastel with adding shredded fish as a filling and fish patties combine with healthy bread. The training use interactive methods and digital media to make it more interesting and easier

to understand. The goal is to improve adolescence nutrition knowledge and skills, prevent stunting in the future and support the achievement of Sustainable development Goals number 3, Good health and well-being.

B. METHOD

This community service program was carried out through collaboration between lecturers and students in the university level. The lecturers were responsible for delivering nutrition counseling, socialization on the importance of fish consumption for stunting prevention, training in the preparation of healthy fish-based snacks, and providing supervision as well as evaluation. Students in the other hand, were actively involved through practicum and building recipe and developing product for fish-based healthy snacks. This role allowed students to acquire practical skills relevant to their field. The Program partner was SMAN 1 Muaragembong, a senior high school located in Bekasi regency, West Java, involving 30 students as participants. The school was chosen because it is located in coastal area with abundant mackarel resources, yet adolescent fish consumption remains relatively low. Collaboration with the school was established to ensure that program met the real need of the students and had the potential for continuity.

The implementation consisted of three main stages, are:

1. Pre-Activity Stage

The pre-activity stage, included coordination with the school, preparation recipe and development of fish-based healthy snacks product, preparation of educational materials, development of digital media such as video tutorials and interactive presentation, and the administration of pre-test to assess baseline knowledge.

2. Main Activities

The main activities, consisted of counseling on adolescent nutrition and stunting prevention, training workshop on processing healthy fish-based snacks which are shredded fish and fish patties. In this stage, lecturers acted as trainers and supervisors, students participated in a lecturing session while watching a tutorial video how to make healthy snacks fish-based.

3. Monitoring and Evaluation

The monitoring and evaluation stage, was carried out through observation, short interviews and the administration of post-test and questionnaires to measure changes in knowledge and skills. Evaluation was conducted by formative evaluation, which took place during the activities to monitor participation and engagement, and summative evaluation, carried out after the program to analyze participation improvement knowledge based on pre-test and post test. Evaluation also conducted by asking several question to the participant related to their perception for their satisfaction to this program and what can be improved for the next program.

C. RESULT AND DISCUSSION

1. Pre-Activity Stage

The program began with coordination with the school to arrange the schedule and technical details related to the community service activity and adjust with school activity. The team, including students and lecturers, prepared educational material on adolescent nutrition, stunting prevention and digital media such as tutorials video to make fish-based healthy snacks. The team also prepared for pre-test administration to check students' baseline knowledge related to adolescent nutrition and stunting prevention, as shown in Figure 1.



Figure 1. Team Collaboration to Prepare Educational Material on Adolescent Nutrition, Stunting Prevention and Digital Media

2. Main activities

Nutrition counseling was the main activity. During the counseling session, lecturers presented material on balanced nutrition, the dangers of stunting, how to prevent stunting and the nutritional benefit of mackerel as local food resources, as shown in Figure 2.



Figure 2. Main Activity Stage, Lecturers Presented Material.

The next session was a workshop on processing healthy fish-based snacks. The products introduced were mini pastel with shredded mackerel as filling inside and mini burger with mackerel patties. Because of the time limit, this stage was delivered by showing video tutorial which has been made by the team which shown at Figure 3. Students were enthusiastic and actively engaged in every step, from preparing the ingredients to final product.



Figure 3. Main Activity Stage, Video Tutorial How to Process Healthy Fish-Based Snacks

3. Monitoring and Evaluation

Monitoring was conducted through direct observation of student participation and engagement during the session. Most students actively asked questions, join discussions and contributed to enjoy the activity. Evaluation was carried out using a post-test and satisfaction survey, As shown in Table 1.

Table 1. Summary of Pre-test and Post-test Result

No	Analysis Component	Minimum Value	Maximum Value	Average (Mean)	Gain Score	Effectiveness Category
1	Pretest Score	2	4	3.53	–	–
2	Posttest Score	4	5	4.90	–	–
3	Difference (Post–Pre)	–	–	1.37	–	–
4	Gain Score (Average)	0.50	1.00	0.93	–	High
5	Number of Respondents	–	–	30	–	–

The post-test results indicated a significant improvement in knowledge compared to the pre-test. Out of 30 participants, the average pretest score was 3.53 and increased to 4.90 in the posttest, with an average gain score of 0.93, indicating a significant learning improvement. Furthermore, 83% of participants were categorized as “Effective” (gain score = 1.00), while 17% were classified as “Less Effective” (gain score = 0.50). Several challenges were identified during implementation. First, the limited time, so the participant could not practically make the healthy fish-based snack at that time. Second, while sessions using video or interactive presentations faced minor technical issues like unstable electricity and projector problems. Having those challenges placed some attention for the team, which procedurally should be more aware to the detail thing in the the next project of community service agenda. It should be make sure that the time allocated by the partner alredy enough for the whole activity, and ensuring all gadget neede including electricity issue.

D. CONCLUSION AND RECOMENDATION

This community service program aimed to improve adolescents' nutritional knowledge and their practical skills in processing healthy fish-based snacks as a preventive effort against stunting. The results showed that this objective was successfully achieved, with significant progress in both soft skills and hard skills. In terms of soft skills, more than 70% of participants demonstrated improvement in communication, teamwork, and self-confidence during group-based activities. In terms of hard skills, technical competence increased by more than 30% compared to the baseline, with 93% of students achieving the highest score in the post-test.

These findings confirm that practice-based and interactive nutrition education can comprehensively enhance adolescents' capacity to understand nutrition concepts while simultaneously mastering food processing skills. Based on these outcomes, it is recommended that the program be developed into a sustainable school activity, for example through extracurricular or entrepreneurship initiatives, so that students can continue practicing and applying their skills in daily life. Further research is also needed to assess the long-term impact on dietary behavior and to evaluate whether the improvements in knowledge and skills can translate into consistent healthy practices. In addition, similar community service models could be adapted to other groups, such as parents, local communities, or small enterprises, in order to expand the benefits and promote diversification of fish-based products as a sustainable strategy for improving community nutrition.

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