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NURTURING GROWTH WITH KNOWLEDGE: A FISH NUTRITION EDUCATION FOR SCHOOL-AGE CHILDREN

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Abstract

The nutritional development of school-age children in Indonesia, particularly through fish consumption, is vital for cognitive, mental, and physical growth. However, local surveys show that fish consumption remains below recommended levels. This project aimed to enhance children's knowledge and attitudes toward fish consumption through interactive educational activities and visual aids. This approach includes educational presentations, video screenings, and games-based education suitable for school-aged children. A total of 44 fourth- and fifth-grade students from SD Negeri 76 Kendari participated, engaging in these activities. Pre- and post-assessments showed significant improvements in their understanding of fish nutrients and willingness to consume fish regularly. The intervention successfully maintained student engagement, promoted active learning, and highlighted the effectiveness of focused, nutrition-specific education in improving dietary habits. These findings highlight the potential of practical, interactive approaches to foster long-term healthy eating behaviors among children.

Keywords: child nutrition, child development, educational intervention, fish consumption

Abstrak

Perkembangan gizi anak usia sekolah di Indonesia, khususnya melalui konsumsi ikan, merupakan aspek penting dalam mendukung pertumbuhan kognitif, mental, dan fisik. Namun, survei lokal menunjukkan bahwa tingkat konsumsi ikan masih berada di bawah rekomendasi yang disarankan. Proyek ini bertujuan untuk meningkatkan pengetahuan dan sikap anak-anak terhadap konsumsi ikan melalui kegiatan edukatif interaktif dan penggunaan media visual. Kegiatan mencangkup presentasi pendidikan, pemutaran video, dan permainan edukatif yang sesuai untuk usia anak sekolah. Sebanyak 44 siswa kelas empat dan lima dari SD Negeri 76 Kendari berpartisipasi dalam kegiatan ini. Penilaian sebelum dan sesudah program menunjukkan peningkatan yang signifikan dalam pemahaman siswa terhadap kandungan gizi ikan serta kesediaan mereka untuk mengonsumsi ikan secara rutin. Intervensi ini terbukti efektif dalam menjaga minat siswa, memfasilitasi pembelajaran aktif, serta menekankan pentingnya pendidikan yang terfokus dan spesifik pada gizi dalam meningkatkan kebiasaan pola makan yang sehat. Hasil ini menunjukkan potensi pendekatan praktis dan interaktif untuk mendorong perilaku makan sehat yang berkelanjutan pada anak-anak.

Kata Kunci: *nutrisi anak, perkembangan anak, intervensi pendidikan, konsumsi ikan*

INTRODUCTION

The growth and development of school-age children are profoundly influenced by their nutritional intake, with balanced nutrition playing a pivotal role in this stage,

impacting children's cognitive, mental and physical development (Akanbi & Fadupin, 2022; Saavedra & Prentice, 2023). Proper nutrition at this age can help reduce risks of chronic diseases, enhance immune function, and improve cognitive capacities necessary for learning and concentration in school (Ghosh et al., 2024; Peni et al., 2020). Concerns have emerged globally regarding the negative influence of inadequate nutrition on children's school performance, behavior, and physical development (Black et al., 2017). Therefore, ensuring adequate nutrition particularly from animal protein sources like fish, is essential for brain development and overall health in school-age children. Regular consumption of fish can significantly support children's developmental needs. In addition, promoting a varied diet that includes eggs, dairy products, legumes, fruits, and vegetables can help meet daily nutritional requirements. Practical efforts such as incorporating nutrition education into school programs, encouraging healthy meals at home, and improving access to nutritious food in local communities are also key to supporting optimal child development. (Sheffield et al., 2024; Zhao et al., 2023).

Fish, recognized as a high-quality source of nutrients essential for child development, contains omega-3 fatty acids, particularly DHA (docosahexaenoic acid), which supports brain function and structure. DHA is particularly important during the school-age years, as it helps improve memory, learning ability, and concentration. Recent studies have emphasized that regular intake of omega-3s from fish is associated with enhanced cognitive performance and better overall health in children, making fish a crucial dietary component for children in their schooling years (Van Der Wurff et al., 2020; Stonehouse, 2014; Zhao et al., 2023). Additionally, fish provides high-quality protein, vitamin (such as vitamin D and B-complex), calcium, iron, and zinc, all of which are essential for physical growth, immune function, and bone health (Maulu et al., 2021; Viana et al., 2023). To help children benefit from these nutrients, it is recommended that fish be included in their meals at least three times a week. Varieties such as salmon, sardines, mackerel, and local freshwater fish are excellent choices due to their high nutrient content. To encourage regular consumption, fish can be prepared in child-friendly ways—

grilled, made into fish nuggets, or added to soups and rice dishes—making it both nutritious and appealing for young eaters (Mahmudiono et al., 2020).

In Indonesia, fish consumption is a part of the traditional diet, particularly in coastal and riverine communities where it serves as a readily available and affordable source of animal protein. Traditional Indonesian meals often feature dishes such as *pepes ikan* (spiced steamed fish in banana leaves), *ikan bakar* (grilled fish), and *pindang* (spiced fish soup), reflecting both the cultural familiarity and culinary versatility of fish. Despite its longstanding role in local cuisine, dietary surveys indicate that fish consumption among children remains below recommended levels in many regions. This issue is particularly pronounced within certain communities in Indonesia, where economic and educational barriers limit families' awareness of the dietary importance of fish and its accessibility (Gibson et al., 2020; Rahmawaty et al., 2021). A survey conducted in Indonesia highlighted that, although local fisheries are abundant, only 30% of school-age children consume fish at least twice a week, which is far below the recommended intake of three servings per week. Studies in community settings reveal that food preferences, economic constraints, limited knowledge, and lack of awareness regarding the nutritional benefits of fish often lead families to prioritize other food sources over fish. This tendency contributes to unbalanced diets in children, which may potentially hinder their physical and cognitive development (Gibson et al., 2020; Shofa Fauziyah, 2020; Sirasa et al., 2020; Tamale et al., 2017).

The community's limited understanding of the benefits of fish consumption and the scarcity of comprehensive educational initiatives highlights the need for immediate intervention. Specifically, an effective educational program could bridge this gap and have a lasting impact on the health and growth of children in the community (Mahmudiono et al., 2020; Rzasa & Andrade, 2016). To address this issue, this community service initiative introduces an educational approach that emphasizes direct participation. This approach involves interactive activities and educational materials crafted using modern methods, such as communication-based approaches supported by visual aids, distribution of informational materials, and games suitable for school-aged children, that make information on dietary health

accessible and engaging. This innovation seeks to foster a positive attitude toward fish consumption, enhance children's understanding of its health benefits, and mitigate any psychological barriers associated with trying new foods (Baranowski et al., 2019; Kumar et al., 2017; Mikkelsen et al., 2014; Mogre et al., 2024). Recognizing the potential of such educational strategies to influence long-term dietary behavior, it is essential to implement programs that are not only informative but also culturally and developmentally appropriate for the target population.

This community service activity aims to raise awareness and knowledge among school-aged children regarding the importance of fish consumption to promote optimal growth and development; and to encourage the integration of fish into their daily diets. This initiative is expected to contribute to the broader scientific understanding of school-based nutritional interventions and provide insight into practical and culturally-sensitive strategies that can enhance the diet of consumers throughout Indonesia. Through this article, we seek to share lessons learned that can provide guidance and insight towards other community-based organizations undertaking similar approaches to addressing nutrition-based issues in diverse settings.

METHOD

The target community for this initiative consists of school-age children in SD Negeri 76 Kendari, specifically fourth- and fifth-grade students, with a total of 46 participants between the ages of 9 to 11 years. The selection of this age group is significant as children in this developmental stage are particularly influenced by dietary habits that can have lasting impacts on their health and growth. Based on preliminary investigations conducted through interviews and school visits, it was found that nutritional issues and child development remain a significant concern for educational institutions. Students exhibit a tendency to consume packaged snacks and fast food, and there is a notable lack of education regarding the utilization of local foods and the importance of fish consumption in supporting children's growth and development. The community has shown enthusiasm for initiatives that enhance

students' health and knowledge, and both school administrators and teachers were involved in organizing facilitating in-class learning activities.

A multidisciplinary team was assembled for the initiative, comprising nursing lecturers, nursing students, and representatives from local schools. Nursing lecturers provided expertise in health education about dietary practices, while students act as facilitators and observers during the initiative. Local school representatives helped facilitate access to children and organized workshops, ensuring that educational interventions were culturally relevant and effectively implemented.

The initiative's implementation unfolded in several key stages. Initially, a needs assessment was conducted through surveys and interviews with students and teachers to identify knowledge gaps regarding fish consumption. The initiative employed various educational methods, including a 30-minute lecture, discussions, and interactive elements such as booklets and video presentations were prepared to visually reinforce the learning objectives. The content covered essential topics, including nutrition definitions, the significance of proper dietary practices, and specific benefits of fish for children's growth. During the next sessions, the educators engaged the students through a combination of teaching, question-and-answer formats, and games-based education. Technology was utilized to demonstrate cooking methods through video that preserve the nutritional integrity of fish, employing multimedia presentations and digital resources for further learning.

The effectiveness of these educational interventions was evaluated through both process and outcome assessments. Observations during the workshops indicated high levels of student engagement. To measure the initiative's success, pre- and post-session surveys were conducted, assessing changes in knowledge regarding the importance of fish consumption. Indicators of success included improved understanding as evidenced by survey results and increased awareness among students about incorporating fish into their diets. Informal interviews at the end of the session were conducted, providing qualitative feedback from students and teachers. The flowchart in Figure 1 below illustrates the sequential stages of the program, from preliminary assessment to final evaluation.

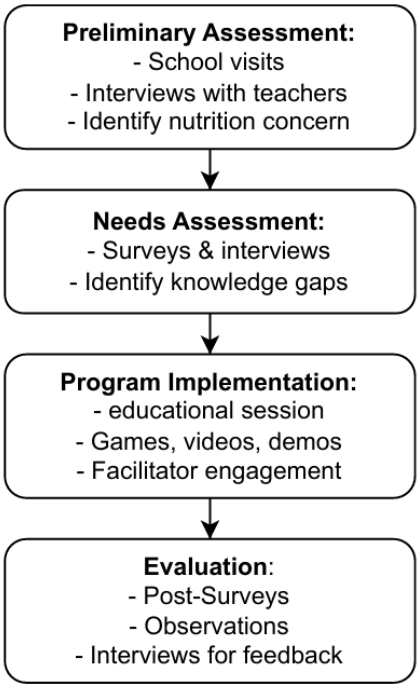

Figure 1 Flowchart of the Stages of the Community Service Program Implementation

RESULT AND DISCUSSION

The community service project through education about the nutritional importance of fish consumption was successfully implemented at SD Negeri 76 Kendari, engaging a significant portion of the student body in educational sessions about the benefits of fish consumption. This initiative was carefully designed to address the gaps in nutritional knowledge among children, aiming to instill a lasting appreciation for the health benefits associated with fish in their diets.

The educational intervention began with a meticulously planned session that involved various engaging methods to capture the interest of young students. The setting was the familiar environment of their school, where they were already comfortable and open to learning. On the 10th of September 2022, the team comprising five university lecturers embarked on this enriching journey with the children. Each team member executed their designated roles, with assistance from school teachers and administrators. Their responsibilities included providing guidance and oversight to the students during educational presentations, video

screenings, and activities involving educational games. Of the total 46 students from grades 4 and 5, 44 students (96%) attended the community service activity, with 2 students absent during the event. The participants included 26 female and 18 male students, ranging in age from 9 to 11 years.

The project commenced with a carefully structured educational program designed to enhance children's understanding of the nutritional benefits of fish consumption. The program began with a 15-minute presentation delivered by university faculty experts specializing on nutrition. This session provided foundational knowledge on the essential nutrients found in fish, such as omega-3 fatty acids, high-quality proteins, vital vitamins like vitamin D and B12, and their benefits for growth, cognitive development, immune function, and overall health.To reinforce the key messages conveyed in the presentation, the program provided supplementary learning materials in the form of booklets containing educational content tailored to the children's comprehension levels. These booklets included colorful illustrations, simple yet informative explanations, and practical tips on incorporating fish into their daily diets. The materials were designed to serve as a lasting resource that children could revisit, reinforcing their learning beyond the educational session. The following Figure 2 shows a depiction of the printed educational booklets distributed to participants, containing informative content and practical guidance on nutrition and healthy eating habits.

Figure 2 Booklets Material

A crucial component of the program was an eight-minute educational video titled titled "The Benefits of Eating Fish for Growing Children". This video was strategically developed to complement the verbal information provided in the presentation and booklet, making the learning experience more interactive and memorable. The video featured engaging animations and real-life footage, ensuring that complex nutritional concepts were conveyed in a visually appealing and easily digestible manner. It was crafted to engage children's attention through captivating visuals and succinct, clear information, thereby reinforcing the educational message. Additionally, it included a cooking demonstration that showcased step-by-step instructions on how to prepare fish-based meals in a simple, delicious, and nutritious way. The inclusion of this practical element aimed to inspire children to appreciate fish as a versatile and enjoyable food choice. The following Figure 3 illustrates a visual representation of the educational video sessions, where children actively participated in watching the eight-minute video on the benefits of eating fish.

The educational activities were also coupled with games designed to solidify the knowledge imparted. Students were involved in a 20-minute educational game activity about "My Healthy Plate with Fish Menu". In this session, students were accompanied by a facilitator to compile their ideal meal plates by including fish as a source of food ingredients to complete a healthy plate with a balanced nutritional menu. This hands-on activity not only reinforced their learning but also encouraged them to apply their new knowledge practically. The session concluded with a 5-minute interactive discussion, allowing students to ask questions and express their thoughts on the topic, which facilitated a deeper understanding and engagement with the content. This interaction was not only insightful but also indicative of their growing curiosity and interest in the subject matter. The following Figure 4 illustrates how students engaging in interactive session.

Figure 3 Video Screenings

Figure 4 Interactive Session

During the educational session and video screenings, students appeared to pay close attention and were highly enthusiastic about inquiring into various topics. They listened intently to the explanations provided by the instructors and displayed curiosity by asking thoughtful questions. Their inquiries spanned a range of topics, reflecting their genuine interest in understanding the role of fish in nutrition. Some students sought clarification on how fish contributes to height growth, while others were curious about potential allergies related to fish consumption. Additionally, they inquired whether fish provided similar health benefits compared to other protein

sources such as eggs or tempeh, showcasing their eagerness to compare and contrast different nutritional options. The students also demonstrated active participation during the educational game sessions, which were facilitated by instructors. In the evaluation session, the students expressed their intention to bring home the informational booklets provided and to show and discuss them with their parents. Some students even voiced personal commitments to increasing their fish consumption, recognizing its benefits for their growth and overall health. Their willingness to implement these dietary changes indicated that the session had successfully fostered awareness and motivation toward healthier eating habits.

The effectiveness of the educational intervention was evident in the significant improvements in the children's knowledge and attitudes towards fish consumption. Before the session, many students were unaware of the specific health benefits of fish, showing a general disinterest and lack of knowledge about nutritional choices. However, following the intervention, there was a notable increase in the number of students who could accurately discuss the nutrients found in fish and express a genuine interest in incorporating fish into their weekly diet. Table 1 below summarizes these changes.

Table 1 Impact of Nutritional Education on Knowledge of Fish Nutrients and Weekly Consumption Willingness

Aspect	Average Score of Knowledge	
	Pre-Education	**Post-Education**
Knowledge of Fish's Nutrients	57	88
Willingness to Consume Fish Weekly	64	92

Feedback from both students and teachers provided valuable insights into the implementation and impact of the program. Many students expressed increased awareness and enthusiasm about the importance of eating nutritious foods, particularly fish. The project not only enhanced the students' nutritional knowledge but also positively shifted their dietary preferences towards healthier choices, demonstrating the power of targeted educational programs in influencing child nutrition and public health outcomes. Some children even committed to sharing this

new knowledge with their families and persuaded them to include more fish in their diets. The integration of interactive components such as videos and discussions were particularly effective in maintaining the students' interest and facilitating active learning that can effectively alter dietary attitudes among children (Mogre et al., 2024; Varman et al., 2021).

The findings from this project are not only significant in the context of public health and nutrition but also highlighted the critical importance of nutrition education in schools and its impact on children's health behaviors. By engaging students in an informative and interactive manner, the initiative successfully imparted essential knowledge about fish consumption, fostering not only immediate improvements in dietary choices but also setting the foundation for lifelong healthy eating habits (Rzasa & Andrade, 2016). The positive outcomes from this project serve as a compelling model for similar interventions, suggesting that well-designed educational strategies can effectively transform children's nutritional attitudes and behaviors. Going forward, the project can be adapted and implemented in other schools, potentially leading to widespread improvements in child nutrition and public health outcomes.

CONCLUSION

The results of this community service initiative demonstrate that educational interventions can effectively enhance awareness and knowledge among school-aged children regarding the importance of fish consumption for their growth and development. The program successfully fostered positive attitudes and increased understanding about the nutritional benefits of fish and improving dietary choices of children towards the consumption of fish which is a step towards developing healthier eating habits. For these habits to be sustained, future projects should have provisions for impact evaluation through follow-up examinations to note changes over time. Considering the importance of parents in maintaining appropriate eating habits at home, the program should be expanded to offer parents' education classes or materials that teach them how to make fish and other well-balanced meals to help reinforce the program. Such measures would help magnify the impact of the school-

based programs and improve the nutritional status of children on a more permanent basis.

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