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Marine Resource Utilization and Nutrition Education to Prevent Anemia in Tuban

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ABSTRACT

Anemia in adolescent girls is a major public health issue in Indonesia and has been identified as one of the contributing factors to stunting. This problem is especially urgent in coastal areas, where despite the abundance of fish as a source of iron and protein, dietary habits often fail to optimize their potential benefits [1]. The aim of this community service program was to enhance knowledge and awareness regarding anemia prevention through nutrition education and fish processing demonstrations targeted at adolescent girls in Tuban's coastal region. Participants were recruited from five villages and involved in a series of interactive sessions that combined lectures on nutrition and anemia with hands-on demonstrations of simple and locally adapted fish-based recipes. The program was evaluated through pre-test and post-test assessments to measure knowledge improvement. Findings revealed a clear increase in participants' understanding of anemia, its link to stunting, and the role of fish consumption in maintaining health. The interactive approach encouraged active participation and was effective in fostering positive changes in attitudes and daily dietary practices. In conclusion, integrating nutrition education with practical demonstrations utilizing marine resources is an effective strategy to prevent anemia among adolescent girls in coastal communities. This approach highlights the importance of community-based interventions that are culturally appropriate and resource-based in addressing nutritional challenges.

1. INTRODUCTION

Anemia among adolescent girls is one of the major public health concerns in Indonesia, particularly in coastal areas. This condition not only affects physical health but also contributes to reduced concentration, productivity, and overall quality of life. Moreover, anemia has been identified as a contributing factor to stunting among early adolescent girls [2].

National data indicate that stunting rates in Indonesia remain alarming. Based on findings from a referenced study [5], the prevalence of stunting among children aged 5–18 years was 40.2% in boys and 30.7% in girls. Meanwhile, the prevalence of anemia among early adolescent girls was reported at 26.4%. These figures highlight the close relationship between anemia and stunting, underscoring the urgency of targeted interventions [3].

Coastal regions such as Tuban Regency hold abundant marine resources, particularly fish, which are rich in iron and

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animal protein . However, the potential of fish as a key dietary component for anemia prevention has not been fully utilized, especially among adolescent girls [4]. Limited nutrition education, unhealthy dietary habits, and lack of awareness about the importance of fish consumption are among the contributing factors [5].

This community service program therefore focuses on nutrition education and community empowerment to enhance the utilization of fish as a natural source of iron [6]. It is expected that this initiative will encourage healthier eating behaviors among adolescent girls, reduce anemia prevalence, and serve as a preventive strategy to mitigate stunting in the coastal area of Tuban [7].

2. METHODE

This community service program was conducted in the coastal area of Tuban Regency, with participants consisting of adolescent girls aged 5–12 years. The total number of participants was 170, distributed as follows: 45 from Palang Village, 38 from Karangsari Village, 28 from Jenu Village, 27 from Tambakboyo Village, and 32 from Bulu-Bancar Village.

The program applied a participatory education and demonstration-based local resource empowerment approach, carried out through the following stages:

1. Initial Identification and Socialization
   1) Coordination with village authorities, elementary schools, and local health centers (Puskesmas).
   2) Socialization of the program to parents and community leaders to ensure support.
2. Nutrition and Health Education
   1) Interactive sessions on anemia, stunting, and the importance of iron intake for adolescent girls.
   2) Delivery using interactive lectures, group discussions, educational games, and audiovisual media adapted to the age group.
3. Demonstration of Nutritious Fish Processing
   1) Demonstrating how to prepare local fish into simple, nutritious, and child-friendly meals.
   2) Introducing various local fish species from Tuban rich in iron and protein.
   3) Engaging participants to observe directly the cooking process as a way to increase their interest in fish consumption.
4. Monitoring and Evaluation
   1) Simple pre-test and post-test to measure participants' understanding.
   2) Observation of behavioral changes related to fish consumption.
   3) Joint evaluation with village authorities and parents to assess the impact.

Through these stages, the program is expected to raise awareness on the importance of fish consumption, encourage healthier eating behaviors, and contribute to the prevention of anemia and stunting among adolescent girls in Tuban's coastal communities [8].

3. RESULTS AND DISCUSSION

Result

This community service program was attended by 170 adolescent girls aged 5–12 years from five coastal villages in Tuban Regency: Palang (45 participants), Karangsari (38 participants), Jenu (28 participants), Tambakboyo (27 participants), and Bulu-Bancar (32 participants). All participants were actively involved in the activities, which included socialization, nutrition education, and fish processing demonstrations.

Table 3.1 Pre-Test and Post-Test Results of Participants' Knowledge on Anemia and Nutrition.

Village	Number of Participants	Average Pre-Test Score (%)	Average Post-Test Score (%)
Palang	45	55.3	81.6
Karangsari	38	57.1	83.2
Jenu	28	56.8	82.5

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Tambakboyo	27	55.7	81.9
Bulu-Bancar	32	56.1	84.1
Average	**170**	**56.2**	**82.7**

During the nutrition education session, a simple pre-test and post-test were conducted to measure participants' knowledge of anemia, stunting, and the benefits of fish consumption. The results indicated an improvement in average scores from 56.2% (fair category) to 82.7% (good category). This suggests that the participants gained a better understanding after receiving the interactive education [9].

In the fish processing demonstration, participants showed high enthusiasm. The dishes introduced included fish nuggets, simple fish soup, and steamed fish (pepes ikan), chosen because they are easy to prepare and appealing to children's tastes. Most participants expressed greater interest in consuming fish more frequently after the program [10].

Additionally, observations revealed that the activity also raised awareness among parents who accompanied their children. Many parents reported gaining new ideas for utilizing local fish as part of their family's daily meals.

Discussion

The findings demonstrate that participatory nutrition education combined with fish processing demonstrations effectively increased knowledge and encouraged healthier eating behaviors among adolescent girls [11]. The significant improvement in pre-test and post-test scores highlights the effectiveness of interactive methods compared to conventional lecture-based approaches [12].

This aligns with previous studies showing that practical, hands-on nutrition education is more effective for primary school-aged children, as it is both engaging and easy to apply [13]. Fish processing demonstrations proved particularly relevant in the Tuban coastal area, where abundant marine resources remain underutilized [14].

The program also addresses broader public health concerns. National data indicate that anemia prevalence among adolescent girls remains high at 26.4%, with stunting prevalence among females aged 5–18 years reaching 30.7%. Local interventions that promote fish consumption as a natural source of iron could therefore play a vital role in reducing both anemia and stunting in this vulnerable age group [15].

In conclusion, this program not only provided immediate educational benefits but also laid the foundation for sustainable interventions, such as integrating nutrition education into school curricula and encouraging active parental involvement in providing fish-based nutritious meals [16].

4. CONCLUSION

The community service program on nutrition education and fish processing demonstrations for adolescent girls aged 5–12 years in the coastal area of Tuban Regency was successfully implemented. The pre-test and post-test results revealed an improvement in participants' knowledge from an average of **56.2% to 82.7%**, indicating the effectiveness of interactive education and practical demonstrations.

Beyond increased knowledge, the program fostered greater interest in fish consumption among participants and positively impacted parents who attended. This demonstrates that optimizing local marine resources, particularly fish, can serve as an effective strategy to prevent anemia and contribute to reducing stunting among adolescent girls.

Overall, this initiative can be concluded as an effective starting point in raising nutrition awareness through local resource-based approaches. Moving forward, program sustainability is recommended through integrating nutrition education into elementary schools, collaborating with healthcare providers, and strengthening the role of families in providing fish-based nutritious meals.

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