

The Influence of Education on Improving Adolescent Girls' Knowledge Regarding Anemia in the Gembong Public Health Center Area

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ABSTRACT: Community diagnosis is an activity aimed at determining the existence of a problem by systematically collecting data within a community. Anemia is a health issue that commonly arises, characterized by a condition in which the body's hemoglobin levels fall below the normal range. According to the 2018 Riskesdas data, the prevalence of anemia among adolescent girls reaches approximately 32%, meaning that 3 to 4 out of every 10 adolescent girls experience anemia. Anemia in adolescent girls has the potential to result in various negative consequences, such as reduced immunity, decreased academic performance, and diminished productivity. These observations emphasize the necessity of conducting a community diagnosis to enhance awareness and reduce cases of anemia among adolescent girls in the Puskesmas Gembong working area. The primary objectives include improving knowledge about anemia and decreasing the number of anemia cases among adolescent girls in the Puskesmas Gembong working area. An intervention plan in the form of educational sessions about anemia was developed. Following the intervention, there was an improvement in knowledge, with post-test scores exceeding 60% for over 50% of the participants. Therefore, this community diagnosis serves to enhance knowledge about anemia among adolescent girls and has resulted in the identification of anemia cases among them, leading to appropriate referrals for treatment.

Keywords: Anemia, Hemoglobin Levels, Adolescent Girls, Community Diagnosis.



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INTRODUCTION

Community diagnosis is an analysis that comprehensively describes, in both quantitative and qualitative aspects, the health of a population, taking into account factors stemming from their environment and those influencing their health. The benefit of community diagnosis is to gain a profound understanding of the community's health conditions and take appropriate actions to enhance the quality of their health.(Alberdi-Erice et al., 2021; Singh et al., 2019)

Anemia is a condition where the level of hemoglobin (Hb) in the blood is lower than the considered normal range. This condition indicates an underlying pathological disturbance. Criteria

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to determine whether an individual is experiencing anemia are as follows: in adult men, an individual is considered anemic if their Hb level is less than 13 g/dL, while in non-pregnant adult women, an Hb level below 12 g/dL signifies anemia. For pregnant women, an Hb level below 11 g/dL indicates the presence of anemia.(Lopes et al., 2022). Anemia is a symptom indicating more fundamental health issues. Adolescent females are among those at high risk of experiencing nutritional deficiencies, particularly in terms of iron. This is due to monthly menstrual bleeding, causing a loss of approximately 12.5-15 mg of iron per month. The prevalence of anemia in females (around 23.9%) is higher compared to males (around 18.4%). During adolescence, which involves the transition from childhood to adulthood, significant changes occur in biological, cognitive, and emotional aspects. To support the growth and development of these aspects, optimal nutritional intake is crucial.(Mchiza et al., 2018; Morales-Gutierrez et al., 2020; Teji et al., 2016)

The World Health Organization (WHO) states that anemia is the most significant nutritional issue for adolescents (10-19 years old). Anemia in adolescents and young adults can negatively impact their cognitive performance and development. Based on data from Riskesdas 2018, it was found that the prevalence of anemia in adolescents reached 32%, meaning 3-4 out of 10 adolescents suffer from anemia. The high prevalence of anemia in adolescents is due to suboptimal nutritional intake habits. Adolescents in puberty are particularly vulnerable to iron-deficiency anemia because they lose a significant amount of iron during menstruation. This issue is compounded by insufficient iron intake, which is crucial for body growth and development, especially in adolescent girls. Data from the Household Health Survey (SKRT) in 2012 also reported high prevalence of anemia in various groups, as follows: anemia prevalence in toddlers reached 40.5%, in pregnant women it reached 50.5%, in postpartum women it reached 45.1%, in adolescent girls aged 10-18 years it reached 57.1%, and in those aged 19-45 years it reached 39.5%. Women, particularly adolescent girls, have the highest risk of anemia within these categories.(Teji et al., 2016; Zhu et al., 2021)

The incidence of anemia in the province of Banten remains quite high, reaching 37.1% according to data from the City Health Office in 2017. This figure represents an increase compared to previous years.(Afritayeni et al., 2019; Pandiangan et al., 2022) The results of a survey conducted by the Gembong Community Health Center in January 2023 among adolescent girls (middle and high school-aged) attending schools within the Gembong Community Health Center's area showed that 53% or 290 out of 546 female students were affected by anemia, ranging from mild to severe cases, with the lowest hemoglobin levels reaching 5 mg/dL(Takyi et al., 2023). In addressing the issue of anemia, educational outreach programs have been implemented as a form of education to reduce anemia cases in the Gembong Community Health Center area. These educational initiatives serve as a key step in raising awareness and understanding among the community regarding nutrition and health. Through appropriate education, it is hoped that anemia cases can be reduced, thereby decreasing the incidence of anemia among adolescent girls in that area.

METHOD

PDCA (Plan-Do-Check-Act) is a continuous management cycle consisting of four stages: Plan, Do, Check, and Act. In the context of educating adolescent girls about anemia, here is the sequence of activities using the PDCA approach:

1. **Plan:** In strategizing the assessment and education on anemia among adolescent girls, the process involves several crucial steps. Firstly, it's important to define the objectives, aiming to enhance awareness of anemia risks and impart knowledge on preventive measures. Following this, identifying the target participants is essential, determining the number of adolescent girls involved and assessing their initial knowledge levels about anemia. Subsequently, the planning phase involves the design of an educational program covering diverse topics—from defining anemia to discussing risk factors, health impacts, the importance of regular blood checks, promoting a healthy lifestyle, and elucidating the role of adolescent girls in preventing anemia. Finally, to measure the success of these initiatives, evaluating methods are planned, such as the use of pre- and post-education questionnaires or comparing the initial and final knowledge levels of participants about anemia. This comprehensive approach aims to effectively educate and gauge the awareness and knowledge levels of adolescent girls regarding anemia, forming a structured path towards prevention and better health outcomes.
2. **Do:** Informing adolescent girls about the forthcoming educational activities and anemia screenings constitutes the first step—this entails the socialization of the program. This involves communicating the purpose, benefits, and schedule of the educational and anemia examination activities to the target group. Subsequently, the educational sessions, as part of the pre-planned program, should be conducted efficiently. These sessions should deliver information clearly, utilizing pertinent and easily comprehensible materials regarding anemia to ensure effective dissemination of knowledge.
3. **Check:** After conducting the knowledge assessment on anemia among adolescent girls, the next critical steps involve data analysis and result comparison. The initial phase includes the meticulous scrutiny of gathered information, encompassing both questionnaire responses and blood test outcomes. This analysis aims to pinpoint potential indicators of anemia risk or early indications of the condition among the targeted group of young females. Subsequently, the assessment seeks to compare the acquired results with predetermined objectives, verifying whether the observed outcomes align with the set targets. The ultimate goal is to ensure that the number of adolescent girls identified as at risk of anemia matches the intended goal. Further, the evaluation extends to determining the efficacy of the educational interventions by employing pre- and post-education questionnaires. These assessments are geared towards gauging the impact of the educational initiatives on the knowledge, attitudes, and intentions of the adolescent girls regarding anemia. The aim is to ascertain whether the educational sessions have effectively augmented the understanding and consciousness of this health condition among the targeted population.
4. **Act:** Upon identifying shortcomings or issues during the assessment phase, the subsequent course of action involves a systematic approach to identify areas requiring refinement. This entails formulating a detailed and quantifiable plan to address the identified deficiencies or

obstacles, aiming to enhance both the outcomes of examinations and the efficacy of anemia education. This comprehensive plan must encompass precise steps and strategies for improvement. The subsequent phase involves the execution of these improvement strategies, ensuring their integration into the routine and continual activities within the community of adolescent girls. Following the implementation, the process necessitates diligent monitoring and evaluation to ascertain the effectiveness of the instituted changes. This evaluation aims to determine whether the alterations have been successful or necessitate further modifications to achieve the desired objectives.

After the action phase is completed, the PDCA cycle can be repeated to continue improving and developing the anemia education and examination program for adolescent girls in a sustainable manner. The measurement of knowledge levels is based on assessment indicator questionnaires given to the participants. Some questions posed to the participants include:

1. Do you have any knowledge about anemia?
2. What does anemia mean?
3. Are you aware of the signs and symptoms of anemia?
4. What level of Hemoglobin (Hb) in an adolescent girl is considered anemic?
5. What are the preventive measures for anemia?
6. How much iron intake is recommended for individuals with anemia?
7. What is the method for taking anemia medication?
8. Can consumption of iron-rich foods prevent anemia?
9. What are the symptoms of being affected by anemia?
10. What are the consequences of untreated anemia?

In this research, a statistical analysis method called descriptive table analysis was employed. The aim of this analysis is to explain and outline the relationships between various variables under investigation. Descriptive table analysis functions as a tool to illustrate and elaborate on information associated with the interaction between these variables.

RESULT AND DISCUSSION

The community service activity took place on February 6, 2023, involving 88 participants. All respondents participated in the entire series of activities, including pretests, posttests, and educational sessions. All respondent characteristics have been recorded in Table 1. The posttest

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results indicated that respondents who scored above 60 showed improvement, and over 50% of the respondents achieved this score.

Table 1. The Characteristics of Participants in Intervention Counseling Activities

Parameter	n (%)	Mean
Age, year		13,6
13 years old	40 (45,5%)	
14 years old	48 (54,5%)	
Pretest Score		
≥60%	20 (23%)	
<60%	68 (77%)	
Posttest Score		
≥60%	66 (75%)	
<60%	22 (25%)	



Figure 1. Anemia Counselling for Adolescent Girls

Anemia is a condition in the body where the hemoglobin (Hb) levels in the blood are lower than normal. Anemia indicates an underlying pathological process. Adult males are considered anemic when Hb <13 g/dL, non-pregnant adult females <12 g/dL, and pregnant females <11 g/dL.(Bhutta et al., 2017; Keats et al., 2018) Hemoglobin is one of the components in red blood cells/erythrocytes that functions to bind oxygen and transport it to all tissue cells in the body. Oxygen is necessary for the functioning of body tissues. A lack of oxygen in the tissues of the brain and muscles can lead to symptoms such as reduced concentration and a lack of energy when performing activities. Hemoglobin is formed from a combination of protein and iron, constituting red blood cells/erythrocytes. Anemia is a symptom that requires investigation into its cause, and its management should be done according to the underlying cause.(Ahankari et al., 2017; Shaka & Wondimagegne, 2018)

Anemia is a highly prevalent condition. The World Health Organization (WHO) has estimated the global prevalence of anemia to be 24.8%. The highest prevalence is found among preschool-age children (47.4%), followed by pregnant women (41.8%), non-pregnant women (30.2%), school-age children (25.4%), and men (12.7%). Adolescent girls are among the groups vulnerable to experiencing nutritional deficiencies, especially iron, due to monthly menstrual cycles resulting in blood loss. Iron loss during menstruation is estimated to be around 12.5-15 mg per month.(Engidaw et al., 2018; Fuhrmann et al., 2015) The prevalence of anemia in females (23.9%) is higher compared to males (18.4%). During adolescence, the transition from childhood to adulthood is marked by several changes, including biological, cognitive, and emotional shifts. Optimal intake of nutrients is necessary for the growth and development of these aspects. According to the WHO, during adolescence, specifically from 10 to 19 years old, anemia is considered the most significant nutritional issue. Anemia in adolescents and young adults can have negative impacts on their cognitive performance and growth.(Ghatpande et al., 2019; Gonete et al., 2018)

Adolescent girls are among the group susceptible to anemia, particularly iron-deficiency anemia, due to experiencing monthly menstrual cycles leading to blood loss. Iron loss during menstruation is estimated at around 12.5-15 mg per month. Iron deficiency can result in anemia, characterized by lower than normal levels of hemoglobin or red blood cells. The causes of iron-deficiency anemia stem from insufficient iron intake, significant bleeding, or a combination of both. Inadequate food intake affects the insufficiency of both macro and micronutrients. Poor dietary quality and low bioavailability of iron intake are the most significant factors contributing to iron deficiency.(Christian & Smith, 2018; Işık Balcı et al., 2012) Therefore, education can be conducted as an effort for preventive action against anemia in adolescent girls, and it can be implemented through:

1. Increasing the consumption of iron-rich foods. Integrating knowledge about sources of iron-rich foods, such as red meat, liver, fish, legumes, and fortified cereals, as a central element in educational strategies. Teaching the community how to incorporate these foods into their daily diet is a crucial step in reducing the risk of anemia.(Kumar et al., 2022; Pivina et al., 2019)
2. Iron supplementation through the consumption of Iron and Folic Acid (IFA) tablets is also a significant aspect of preventing anemia. Counseling regarding the proper use of IFA tablets, appropriate dosage, as well as their benefits and potential risks, is essential in aiding the community to make informed decisions about this supplementation. Educating the community about the crucial role of medical consultation in the use of IFA tablets is a vital aspect that should not be overlooked.(Christian & Smith, 2018; Mchiza et al., 2018)
3. Increasing the consumption of fruits and vegetables that contain vitamin C in the daily diet is a relevant preventive strategy in community education efforts. Teaching the importance of consuming fruits such as oranges, strawberries, and vegetables like broccoli, which enhance the absorption of iron from food, is a crucial element in this educational program.(Işık Balcı et al., 2012; Keats et al., 2018)

4. Increasing the intake of animal-based protein sources, which contain iron in the form of heme iron, is also a key component in the strategy to prevent anemia. Helping the community understand the essential role of meat, poultry, and fish in their daily diet is a crucial part of educational efforts.(Christian & Smith, 2018; Ghatpande et al., 2019)
5. Understanding the importance of avoiding the consumption of beverages such as tea and coffee during meals or while taking Iron and Folic Acid (IFA) tablets. This is an emphasized preventive step in the efforts to prevent anemia. Providing knowledge to the community about the negative impact of consuming these beverages on iron absorption is an essential part of the educational program.(Lee, 2023; Mchiza et al., 2018)
6. Exercising or engaging in regular physical activities is a crucial component in the approach to preventing anemia at a community level. In this educational effort, outlining the benefits of exercise, such as improved blood circulation, better metabolism, and enhanced overall well-being, is important to emphasize in supporting the community to lead healthier lives overall.(Christian & Smith, 2018; Tesfaye et al., 2015)

Understanding the risk factors for anemia plays a crucial role. This understanding can assist adolescent girls in adopting a healthy lifestyle and implementing changes regarding controllable factors to reduce the risk of anemia. Anemia is a health condition that has serious implications for the human body. Hence, educational activities play an important role in raising awareness and understanding among adolescent girls about the risks and consequences associated with anemia. Through education, adolescent girls can gain a deeper understanding of the signs and symptoms of anemia, the risk factors affecting hemoglobin levels in the body, and the preventive measures that can be taken to maintain health and control hemoglobin levels.(Işık Balcı et al., 2012; Kim et al., 2014)

Education also plays a crucial role in changing the behavior of adolescent girls concerning lifestyle factors related to anemia. Through appropriate education, adolescent girls can be provided with in-depth information about the importance of maintaining a healthy diet, regularly participating in physical activities, managing stress, and avoiding habits that can lead to anemia. With a deeper understanding of the negative impacts of an unhealthy lifestyle, adolescent girls can be motivated to adopt healthier behaviors.(Gonete et al., 2018; Tesfaye et al., 2015)

CONCLUSION

Education is an extremely effective method for increasing the awareness of adolescent girls about the importance of maintaining health quality and optimizing cardiovascular function, especially in the context of anemia. Through education, detailed and comprehensive information about anemia can be conveyed to adolescent girls with the goal of enhancing their understanding and awareness of the importance of maintaining health and encouraging them to take and implement appropriate preventive measures. Anemia is a condition that requires special attention, and education can help individuals understand the associated risks and actions that can be taken to manage and prevent it. Therefore, with an increased understanding of anemia in the working area of the Gembong

Community Health Center (Puskesmas), it is hoped that adolescent girls can recognize the risk factors that can lead to anemia and take appropriate preventive and treatment measures.

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