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The impact of training using the team game tournament method on anemia knowledge among youth red cross (PMR) members

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ABSTRACT

Background: Anemia incidence in adolescents can be prevented by increasing the peers' knowledge through training and consumption of iron foods variety. The Youth Red Cross (PMR) is one of the elements in schools that can create peer tutors. The Team Game Tournament (TGT) is a cooperative learning method that encourages teamwork, healthy competition and develops respondents' communication skills.

Objective: This study aimed to determine the effect of training using the Team Game Tournament on anemia knowledge in Youth Red Cross (PMR) members.

Materials and Methods: Quasi-experimental study with one group pre-test and post-test on 37 Youth Red Cross (PMR) members from senior high school using the Team Game Tournament. Conducted in July 2023. Knowledge variables were measured using a questionnaire and were analyzed using the Wilcoxon test.

Results: Characteristics of respondents aged 15-16 years (64.9%), female (78.4%), and grade 10 (51.4%). Up to 55.0% were exposed to anemia education for ≥6 months by health center workers (45.0%). The Team Game Tournament affected respondents' knowledge ($p<0.05$). The percentage increase in knowledge is 3,68.

Conclusion: There's a difference in anemia knowledge of Youth Red Cross (PMR) members before and after peer tutor training using the Team Game Tournament.

Keywords *: anemia knowledge; team game tournament; training*

BACKGROUND

A period that is essential to the human life cycle is adolescence. Anemia is one of the issues that might affect adolescents and is estimated to be one of the biggest nutritional problems in adolescents[1]. Anemia affects 32.0% of those between the ages of 15 and 24 according to the findings of Indonesia Basic Health Research (Riskesdas) in 2018[2]. One of the Central Java districts with a youth ratio of 25.0% is Banyumas Regency[3]. Young women in the Banyumas Regency had a prevalence of anemia of 30.2%[4]. The incidence of anemia is higher in adolescent girls (27.2%) than in adolescent boys (20.3%)[2]. Adolescent girls menstruate every month, so they experience more blood loss[5,6]. The impact of anemia on adolescents is a decrease in immunity, resulting in decreased physical fitness and increased susceptibility to infectious diseases. In addition, there can also be a decrease in thinking ability due to a lack of oxygen supply to the brain, thereby reducing learning achievement and work productivity[7].

Common anemia symptoms include weakness, fatigue, lethargy, headaches, dizziness, and pale eyes. This could result in decreased productivity, poor cognitive growth, and an uptick in morbidity and mortality[6]. Previous study shows that anemia and student learning outcomes correlate ($p=0.026$)[8], which gives weight to this. Nutritional intake, namely the type of food consumed and the habit of implementing enhancer and inhibitor foods before meals, are the factors that affect the occurrence of anemia (André et al., 2018). This is confirmed, that inadequate amounts of iron-containing meals, poor iron absorption from the diet, and compounds that prevent iron absorption are the main causes of anemia[9].

To prevent anemia in adolescents, one alternative that can be done is to empower peers. Peers significantly impact adolescents' behavior since adolescence is a time when people are easily influenced by their surroundings, particularly social groups, and copy the actions of their peers (Wati et al., 2022). According to the statement, peers can be empowered as an agent for sharing health-related knowledge. Such as other research findings, show that peer tutor empowerment affects adolescents' awareness of anemia[10]. Peer tutoring can be a method for providing pertinent information regarding adolescent anemia in school[11]. From further research, peer tutoring had a considerable impact on students' commitment to taking iron supplements to avoid anemia[12]. The Youth Red Cross (PMR) is one of the elements in schools that can create peer tutors. Basic

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health concepts have been included in Youth Red Cross (PMR) activities, but nutrition is still a subject that receives little attention[13].

Using the Team Game Tournament (TGT) method, nutrition education is one way to spread anemia awareness. According to research that used the same process, the Team Game Tournament method splits respondents into several groups to create cooperative learning, encourage teamwork, healthy competition, and develop respondents' communication skills[14]. Adopting a nutrition intervention strategy that included both lectures and team games may improve nutrition and anemia knowledge by about 36.1% in the previous study[15]. Considering this situation, this study aims to identify the training method with the Team Game Tournament (TGT) technique that improves Youth Red Cross (PMR) members' knowledge concerning anemia at senior high school.

MATERIALS AND METHODS

In this study, a pre-post-test was used with one group in a quasi-experimental research design. One of the senior high schools in East Purwokerto, Banyumas Regency, Central Java, was the chosen location for this study. Based on the results of the preliminary survey, it is known that there have been health-related activities carried out by the Youth Red Cross (PMR) at the school, but nutrition is still a subject that receives little attention. This study took place in July 2023. The qualifications for participants in this study were Male or female, the ages of 15-18 years old, and active members of the Youth Red Cross (PMR) in school. A sample of 37 of 63 participants was selected using the proportionate stratified random sampling method. Before the beginning of the research process, informed consent was distributed and signed by both the parents of participants and participants, as well as by Youth Red Cross (PMR) supervisors.

Training begins with a pre-test that was taken by the respondents before they received the training materials. The following phase involves training through "Anemia" and "Iron Intake" material. The post-test was filled out by the respondents following the presentation of the content and the discussion. The definition of anemia, its causes, symptoms, implications, iron in food, iron metabolism, enhancers, inhibitors, and proper ways of taking iron are all included in the pre-and post-test materials. The materials were given out over two days, with "Anemia" on the first day and "Iron Intake" on the second.

After the distribution of training materials, competitive games were played. The subthemes determined in the pre and post-tests are also present in competitive games. According to the group's division, respondents are instructed to sit in a row. The game's conclusions were held once all the competitive game questions were fully solved.

The Wilcoxon test was utilized to assess the variables. This research utilized IBM SPSS Statistics version 22 (IBM Corp., Armonk, NY, USA) to conduct statistical tests. Faculty of Health Science Ethics Commission approved this study with clearance number 1079/EC/KEPK/V/2023. The material presented is based on “Guidelines for Prevention and Management of Anemia in Young Girls and Women of Reproductive Age”[7] and “Review on Iron and Its Importance for Human Health”[16].

RESULTS

According to Table 1 research findings, most of the respondents (64.9%) were between the ages of 15 and 16 and female (78.4%). The percentage of responses in grade 10 (51.4%), compared to grade 11 (48.6%), was not significantly different. Table 2 shows that 54.1% of respondents had received anemia education, including anemia education received within the past six months (45.0%) and anemia education received from health center staff members (45.0%).

Table 3 shows a summary of the respondents' knowledge of anemia and iron both before and after receiving training. The knowledge questionnaire in this study contained four different types of answers, but there was a single correct response. According to the pre-test findings, the indications and symptoms that could manifest in people with anemia were the knowledge about anemia that respondents misunderstood the most (83.8%). The definition of anemia, in comparison, received the fewest false answers (5.4%). In the post-test results, the item with the least inaccurate responses was the definition of anemia (0.0%), while the item with the most incorrect responses was the etiology of anemia (40.5%).

Based on the average knowledge results in Table 4, the average post-test score is 8.68, and the pre-test score is 5. There has been an improvement in the respondents' knowledge, as proven by a change in the pre- and post-test average scores. The average difference between scores before and after training of 3.68 offers

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evidence for this. After taking part in training implementing the Team Game Tournament method, it can be concluded that there is a difference in the knowledge of the respondents ($p<0.001$).

Table 1. Respondent Characteristic

Characteristics	n	%
Ages		
15-16 years	24	64.9
17-18 years	13	35.1
Sex		
Girls	29	78.4
Boys	8	21.6
Grades		
10th grade	19	51.4
11th grade	18	48.6
Exposure to Anemia-Related Knowledge		
Have never	17	45.9
Have	20	54,1

Table 2. Respondents Based on Exposure to Anemia-Related Education

Variable	n	%
Last Time to Get Education		
≥ 6 months	11	55.0
< 6 months	9	45.0
Education Sources		
Health center staff	9	45.0
Parents	3	15.0
Social media	5	25.0
Others (school, friends)	3	15.0

Table 3. Knowledge of Anemia Results among Youth Red Cross (PMR) Members

Item		Pre-test		Post-test	
		n	%	n	%
1) What does the term "anemia" mean?	Correct	35	94.6	37	100.0
	Wrong	2	5.4	0	0.0
2) A contributing factor to iron-deficient anemia is	Correct	19	51.3	22	59.5
	Wrong	18	48.6	15	40.5
3) What is the normal limit of hemoglobin for both men and women?	Correct	13	35.1	29	78.4
	Wrong	24	64.9	8	21.6
4) What symptoms and indicators are present in an anemic person?	Correct	6	16.2	29	78.4
	Wrong	31	83.8	8	21.2
5) What effects can anemia have on a person?	Correct	19	51.3	29	78.4
	Wrong	18	48.6	8	21.6
6) What are some foods that contain iron and are easy for the body to absorb?	Correct	16	43.2	34	91.9
	Wrong	21	56.8	3	8.1
7) Where does the body absorb iron?	Correct	24	64.9	36	97.3
	Wrong	13	35.1	1	2.7
8) What is the name of the dietary source which helps in the body's absorption of iron?	Correct	10	27.0	36	97.3
	Wrong	27	73.0	1	2.7
9) What kinds of meals inhibit the body from absorbing iron?	Correct	27	73.0	35	94.6
	Wrong	10	27.0	2	5.4
10) When is it acceptable to consume tea or coffee to avoid iron deficiency anemia?	Correct	16	43.2	34	91.9
	Wrong	21	56.8	3	8.1

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Table 4. Training's Effect on Respondents' Knowledge of Anemia

Knowledge	n	$\bar{X}$±SD	Δ$\bar{X}$	p-value
Pre-test	37	5±1.8	3.68	0.000
Post-test	37	8.68±1.3		

DISCUSSION

Adolescent grow quite quickly, thus they require a diet that supports their needs[5]. They are susceptible to illness, such as anemia, if their dietary intake is insufficient. Compared to adolescents who have never been exposed to information, exposure to it can help adolescents learn more information, and the knowledge and behavior of adolescents are influenced by the information they learn[17]. This study found that 45% of respondents obtained knowledge about anemia from health center officers. Health professionals are the source of information that can significantly impact a person's ideas and behavior[18]. This is in line with the role of health workers as one of the parties that play an important role in adolescent health, namely as educators to provide education, facilitators, and health counselors[19].

The results of this study indicate that training using the Team Game Tournament method, namely group competition games, can change respondents' knowledge before and after training. Table 4 shows the Wilcoxon test results with a p-value <0.05 (p = 0.000) which means that there is a difference in respondents' knowledge after participating in training with the Team Game Tournament method. The table shows that there is a difference in the median in the pretest and post-test values. This shows a change in the form of increased knowledge in respondents after being given training. Moreover, this study revealed that the respondents already understood what anemia was, but they were unable to determine risk factors, symptoms, iron-rich foods, or food components that could enhance or inhibit iron absorption.

All respondents who attended were divided into 6 groups, each consisting of 4-5 respondents. Before the game started, each group was asked to review the material that had been given. The duration of the group game activity was that each question had 3 minutes to answer so 30 minutes were given to answer all questions. At the end of the game, all questions were discussed together so that all respondents could find out the correct answers. The results obtained from this group game were that each group was able to answer the questions correctly. It's just that there were still some answers that were less precise and did not match the questions.

These findings show how respondents' knowledge can be impacted by education training. This is in line with a previous study, which discovered variations in respondents' knowledge before and after receiving training[20]. According to more research, training can affect adolescents' knowledge of anemia[20]. This proves that the combination method in training or learning is effective for nutritional intervention. Other researchers, who state that the combination of lectures and games is one of the most effective nutritional education media reinforce this response[21].

Based on previous research, the Team Game Tournament approach combined with presentations can raise high school student's understanding of anemia by 36.1%, according to research implementing the same method[15]. Increased knowledge also occurred in another research which shows that there was an increase in the average knowledge score before (14.41) and after (18.30) being given game-based nutrition education in the treatment group[22]. These two studies indicate that nutritional knowledge can be affected through game-based nutritional interventions (p<0.001).

The Team Game Tournament method of learning differs from the classic classroom approach of learning. The classroom approach requires listeners to just passively take in the information being presented, which makes it likely that the information will be quickly forgotten since listening alone will not provide as much knowledge as participating in discussions[23]. The Team Game Tournament method is a collaborative method of learning that will encourage participant involvement. Random groups of participants are formed, representing different academic levels and classes, to develop cooperation in the answer to the given questions. The team with the highest score receives a prize after the Team Game Tournament procedure is finished. The goal of awarding prizes is to motivate teams to actively react to the questions[14].

This method has several advantages, so it can be a recommendation for learning. The existence of a cooperative learning system in this method gives students the freedom to interact and express opinions. This can increase self-confidence and show the potential of students. One of the principles of the Team Game Tournament method is grouping students with different ability levels. This can increase the capability of sensitivity and tolerance between students, as well as increase the ability to work together to expand student

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learning motivation. That way students get a better understanding of the material because they are not just passively listening[24]. Learning requires using all five of one's senses, two of which are sight and hearing[25]. The process of learning can be assisted by using methods that can be received by the five senses. More knowledge will be gained the more all five senses are used[26].

Listening to the teacher's explanations was the most popular learning strategy. Over time, educators need to develop learning aids/media that can provide motivation and direct and comprehensive learning experiences to students through all senses. The use of media in this learning is in line with Dale's Cone of Experience theory, where experience/learning is obtained from direct experience (concrete or real), objects around that resemble reality, to verbal symbols. The more concrete the media used, the easier it is for students to understand the material given. Therefore, to help students fully understand the lesson material, educators should try to develop the subject of learning using clear visualizations[27].

This study shows that the method—a team game tournament—can encourage high school students to increase their knowledge, making it suitable for use as an educational instrument not only for Youth Red Cross (PMR) members but also for other students. Researchers who plan to carry out additional research on the same issue can also benefit from the findings of this study.

CONCLUSIONS

There was a difference in the knowledge of Youth Red Cross (PMR) members before and after training to implement the Team Game Tournament method ($p<0.001$). Respondents' knowledge improved both before and after attending anemia training, with an average change in knowledge (3.68). Respondents who took the training are supposed to get involved as peer tutors for their friends and spread reliable information about adolescent anemia in a school environment.

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