



Trial of Student Filariasis Vector Control Educational Model Class V Elementary School in Pekalongan City

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Abstract

In Pekalongan City, from 2004 to 2017, the number of clinical cases or positive containing microfilaria was 417 people, while 40 were chronic. In 2018, 6 people were infected with microfilaria at the age of fewer than 12 years from SDJ, with 306 samples in the Kertoharjo sub-district. The prevalence rate of microfilaria in children aged ≤ 10 years and > 15 years is proven to be 20%. The study aimed to try out the Tic Tac Toe game to control the Filariasis Vector. The trial research design used cross-sectional, with 30 students in grade 5 at SDN 1 X in Pekalongan City. The bivariate test used the Independent t-test and Wilcoxon test. The results of the research variable knowledge, attitude, and practice have significant differences, and napping behavior has no significant difference (p -value 0.073). The results of the evaluation of the game media showed an average range of values between 90.70 and 95.00, with the lowest average score being for the welcome book design 90.70, and a standard deviation of 11.50. The highest average score is for board game design which is 95.00, and a standard deviation of 10.40. The results show the effectiveness of media games in health education and are well received by students.

Introduction

Understanding is the ability to capture the meaning and definition of the material studied. Understanding a concept is very important because by understanding a concept, students can interpret or describe it broadly and clearly (Grillich et al., 2016). The educational process primarily has goals and objectives to develop every potential possessed by humans. It is also inseparable from the children's educational process, basically cannot be separated from the environment in which children grow and develop. Education has a vital role in childhood because the development of personality, mental, intellectual, and social attitudes are generated at the early age (Evans et al., 2016). The world of children is a world of play. Whenever there is an opportunity, occasion, and time they always play. By learning while playing, children feel happy and cheerful. Playing is an activity that

they do all day long. Since for children playing is life, and life is a game (Hedges et al., 2013).

Through playing, children will try, feel, search, and find, so something new is obtained from activities in play (Tan et al., 2022). Playing in learning activities is not only liked but is also very beneficial for children's development. It includes motoric, affectivity, cognitive, spiritual, and balance benefits (Hedges et al., 2013). In principle, the learning objectives are so that students can understand the material according to the indicators made. It is because in a class there are students with different potentials in terms of talent, intelligence, and learning speed (Dormann et al., 2020). Therefore it is necessary to group learning materials so that all students can master all the indicators of the lesson according to the expectation and the time set (Grillich et al., 2016). In addition to grouping learning materials, what also needs to be paid

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attention to is the way of teaching that is per all the characteristics of the students in the class (Chang et al., 2012)

School-age children are the nation's next generation who must be equipped with knowledge so that they are expected to be able to form healthy and productive behaviors. So that it can avoid disease and disability due to micro filarial. Regulation of the Minister of Education and Culture of the Republic of Indonesia No. 65 of 2013 concerning primary and secondary education standards that health education can be integrated into the relevant subject matter, and students are taught in collaborative groups with problem-solving strategies that refer to process standards (Jayatilleke & Shah, 2020)..

Elephantiasis is a chronic disease in which swelling occurs in the legs and can be transmitted through mosquito bites (Famakinde, 2018). In medical terms, this disease is known as filariasis. Filariasis is a parasitic disease caused by microscopic worms. 3 (three) filarial worms species can cause lymphatic filariasis in humans. However, most infections are caused by *Wuchereria bancrofti*. In Asia this disease can also be caused by *Brugia malayi* and *Brugia timori*. Filariasis infection spreads through mosquito bites (Rao et al., 2006). Adult worms usually live in human lymph nodes. In an infected person, the worms will multiply and produce millions of microscopic worms or also known as microfilariae. Microfilariae are present in the blood of an infected person. If a mosquito bites an infected person, the mosquito will contain microfilariae in its body (Graves et al., 2013).

Microfilariae grow and develop in mosquitoes. When the mosquito bites another person, the worm larvae transfer from the mosquito to the human skin and travel to the lymph vessels. The larvae will grow into adult worms which usually takes 6 (six) months or more. Adult worms live for about 5-7 years. In 2018, 6 people were found to be infected with microfilaria at the age of less than 12 years from SDJ, with 306 samples in the Kertoharjo sub-district. The prevalence rate of microfilaria in children aged ≤ 10 years and > 15 years is proven to be 20%.

Research conducted by Arum et. al. in Kuripan, Kertoharjo Village, showed that 17

respondents had "adequate" knowledge about preventing the filariasis transmission. 6 people with "bad" environmental conditions (35.3%) and 11 people with "good" environmental conditions (64.7%). Of the 53 respondents who had "good" knowledge about preventing the transmission of filariasis, there were 15 people had "bad" physical environmental conditions (28.3%), and 38 people had "good" physical environmental conditions (71.3%). Risk factors for the existence of vectors in the house, environmental improvement, presence of ditches, stagnant water, predators, livestock, bushes, water plants, rice fields, and swamps (Siwiendrayanti et al., 2020).

The preparation of modules has a vital role in learning. It includes the functions, objectives, and benefits of the modules. Not only used as independent material but modules can also be used as a teacher's tool or substitute teacher to evaluate student learning outcomes for mastery of the material available in the module (Megan Macklin et al., 2018). The creation of this game module and media is a continuation of the initial research stages and data collection to solve existing problems.

The analysis results of the need for educational media and the characteristics of the games chosen by grade 5 students in 9 elementary schools in Pekalongan City found several problems related to learning media for endemic diseases occurred in the city. The selection of types of games liked by children, as a result of the measurement is a row (Tic Tac Toe) of 122 students (67.22%) of 180 school students. The results of the focus group discussion with the grade 5 teachers indicated that the design of the tic tac toe game was modified with other games. Educational media and game media are considered suitable for the target characteristics of school-age children who like to play, move, work in groups, and carry out direct activities. To solve these problems, researchers are trying to design a learning media in an educational game tool Tic Tac Toe for controlling Filariasis. The learning media consists of a guidebook for filariasis vector control, a guidebook for the game of Tic Tac Toe, Chess Pieces, 3 x 3 boards, and question cards.

One of the games used in learning and successfully applied by previous researchers is

the Tic Tac Toe game (Hooshyar et al., 2023). Based on research by Farida & Rini, 2013 the game Tic Tac Toe in the field of mathematics can increase learning motivation in cycle I by 83.88% and by 85.85% for cycle II. According to Dirgahayuning, 2017, the Tic Tac Toe game can increase learning activities so that student learning outcomes increase, namely in cycle I by 62.29% and in cycle II by 80.95% in acid and base solutions. Based on the research, the researcher wants to develop the Tic Tac Toe game as a learning medium for students.

The choice of the Tic Tac Toe game as a learning medium is due to its simplicity in playing and easy application so that it is favored by students, as evidenced by the fact that 85.7% of students know and have played the Tic Tac Toe game (Watson, Arnold and Tanenhaus, 2009). The game difference between this research to previous research is in two aspects. First, the procedural aspect of using the Tic Tac Toe game, in the previous one, was played by two people. But in this study, it can be played by more than two people or based on the explanation above. This article aims at cooperative learning of the TGT (Time Games Tournament) type. Second, the media aspect of the Tic Tac Toe game has a 5x5 order, while previous research only had a 3x3 order, and the game media used was made of wooden boards, which can also be a place to store symbols (X & O), game cards, point cards, and books. Game guide, whereas in previous studies, the media was made of paper. This study describes the feasibility of playing Tic Tac Toe on filariasis vector control.

Method

This vector control educational media trial was the result of an analysis of the needs of an educational model for filariasis vector control in Pekalongan City for 180 grade 5 students in 9 elementary schools in Pekalongan City. This research includes the type of research and development (R&D). Development of an educational tool for the Tic Tac Toe game for controlling the Filariasis vector, consisting of several tools for learning and playing. Media Module for student self-study containing vector control, question cards about vector control, tic tac toe deck, red and green pawn pieces to play

in series, as well as a game guidebook.

Each participant was divided into two, learned to balance the subject matter with gameplay, and explored the rules and techniques of board design. Students learn to draw vector control materials with characters and practice writing the game narratives. They experimented with reconstructing classic games like Tic Tac Toe, adding new aspects to see if the game still played well. Students also participate in peer reviews of each other's games. It allows them to critique and resolve any issues with the game as it is being made and also fosters constructive criticism and teamwork. In the finished product, each game created for participants provides a socio-ecological perspective on health issues and vector control.

Media evaluation is by asking for expert judgment or expert validation. Expert validation is by material experts, health experts (doctors), and P2P professionals from the Pekalongan city health office. Media experts are visual communication design experts from academics and educational game experts from health and recreation physical education professionals so that they get the appropriate media. Assessment through Focus Group discussion is through 2 stages of media assessment obtained notes, comments, and suggestions to obtain the valid one. The field trials were adjusted as expert advice. Then field trials were carried out to evaluate vector controlling health education game products for the prevention of filariasis by students. The trials was done by the fifth-grade elementary school students, at public elementary school X, Pekalongan City. The design of the trial research uses quasi-experimentation. This method is based on the consideration that educational media trial research should be natural, and students do not feel that they are being experimented on. This educational media trial used a sample of 30 students in the class. The data type in this study is the results of students' conceptual understanding tests. The data collection instrument used in this research is a conceptual understanding test sheet that has been tested for validity and reliability (Zain et al., 2020). The data collection technique uses the test method for students' concept understanding test sheets. The effectiveness

of the data analysis technique was from the concept of the understanding test (pretest and posttest) and analyzed for improvement. Data analysis of the Tic Tac Toe game media trial looked at the concepts of the level of knowledge, attitude, and behavior of filariasis vector control using the Independent t-test and the Wilcoxon test.

Results and Discussions

The product developed is the Tic Tac Toe game, which has specifications consisting of a Tic Tac Toe board, symbols of red and green chess pawn players, question cards, game manuals, and filariasis modules. The Tic Tac Toe game product is a modification of the original (Gibson, Cornell and Gill, 2017). There are two differences. Firstly, in this study, there is a 3x3 order using Tic Tac Toe board media, symbols of red and green chess pawn players, question cards, game manuals, and filariasis modules. In Rosiana's research, the media aspect of the Tic Tac Toe game contained a 5x5 order using wooden planks and symbol storage (X&O) (Watson, Arnold and Tanenhaus, 2009). Second, the aspect of the Tic Tac Toe game procedure, the use of the Tic Tac Toe game in this study was only played by two people. But in previous research, the game was played by more than two people or in groups. John von Neumann, a mathematician, launched the field of game theory in 1928 when he published his analysis of two-player "zero-sum" games, such as chess and tic-tac-toe. In a zero-sum situation, there is a p number of squares as a measurable reward that must be divided between the parties. In such a situation, it would be impossible for one side to advance its position without the other side suffering a corresponding loss. In the game of tic-tac-toe (also called noughts and crosses; and hugs and kisses), for one player to win, the other must lose (Coates, Chin and Chung, 2011).. The product of the Tic Tac Toe game can be seen in the image below:



Figure 1. Product Book Welcome to the world of Filariasis Vector control



Figure 2. Tic Tac Toe Filariasis Game Guidebook Products

Table 1. Recapitulation of Health Education Test Scores for Filariasis Vector Control Effectiveness of Tic Tac Toe Games

Variables	Pretest		Post-test		p-value	Test
	mean	SD	mean	SD		
Knowledge Value	25.100	3.925	28.430	2.128	0.002	Wilcoxon
Attitude Value	81.400	7.309	85.270	5.552	0.036	Wilcoxon
Breeding place in the house	10.000	2.889	14.000	1.661	0.001	T dependen
Breeding place outside	6.370	2.220	8.930	1.507	0.001	Wilcoxon
Mosquito's rest place	6.370	1.650	8.770	1.455	0.001	T dependen
Mosquito net application	4.570	1.977	6.400	1.976	0.001	T dependen
Mosquito repellent application	2.700	1.343	4.300	1.179	0.001	Wilcoxon
Out of the house habit	2.030	1.299	3.170	1.117	0.002	Wilcoxon
Take a nap habit	0.870	1.224	1.600	1.812	0.073	Wilcoxon

Source: Primary Data, 2022

Table 2. Results of Game Media Assessment According to Grade V Elementary School Students

Media Assessment	Mean	SD
Welcome to the world of Filariasis module design	90.70	11.50
Game guide module design	91.33	10.95
Question card design	92.83	9.96
Tic Tac Toe board design	95.00	10.40
The process of learning and playing	91.22	12.66

Source: Primary Data, 2022

Table 2 shows that before using the Tic Tac Toe game, as many as 30 students, most of the assessment variables showed a p-value <0.05, at an α value of 0.05, meaning a significant difference between the pretest and post-test. Only the napping behavior variable had no significant difference (p-value 0.073). According to Sudjana (Sari, 2019), the purpose of media in learning is to generate student motivation. Significant improvement in both online educational approaches and game-based virtual reality telephone applications compared to traditional education and traditional laboratory classes (AL-Mugheed et al., 2022). Based on this description, interactive learning media is very much needed during the learning process. It will be able to create reciprocal relationships and access to ease of learning. As for students, with interactive learning media, they have the independence to learn in any situation and condition. This description is one of the reasons for the development of interactive media with the Powtoon application. Interactive media with the Powtoon application developed in the form of images, text, and objects (Hedges

et al., 2013).

The use of games generates new desires and interests, as well as motivation and stimulation of learning activities, which will positively influence (Tan et al., 2022). It can be interpreted that the higher the learning motivation, the greater the positive influence on students. The educational games is an fun form of learning that can increase students motivation to understand the concept of the material studied better (Campbell et al., 2012). Like the Alberta Project Promoting Living Active and Eating Healthy (APPLE) program utilizing "School Health Facilitators", individuals stationed in each school to address specific school environments include facilitators and barriers to healthy policies, practices, and behaviors and engage stakeholders at all levels, from parents, students, to staff (Burke et al., 2014).

Table 2 shows the results of the media evaluation by respondents. The assessment uses a percentage value based on the maximum value contained in the research instrument. Based on the results, the average score ranges from

90.70 to 95.00, with the lowest average score for the welcome book design, which is 90.70, and a standard deviation of 11.50. The highest average score is the board game design, which is 95.00 and a standard deviation of 10.40.

The learning method uses games aims to help facilitate the process, make learning fun, and even increase learning effectiveness (Wood, Gladwell & Barton, 2014). It is in line with Maiga's opinion (2009:198), which says that playing is a vital part of the learning environment because it can enhance memorable learning experiences, enhance mood and make learning effective. This game-based learning model is a type of learning model that is often used and implemented in the classroom by teachers (Hedges et al., 2013). In general, this learning model is designed to balance the learning material taught by the teacher by playing and students' abilities related to the application to the real world (Staiano, 2014). With this learning model, students can train their focus to solve problems. Budiono et. al. research obtained the same results regarding the effectiveness of the game model developed in improving the students' nutritional status and physical fitness, with the prevalence of overweight occurring in research subjects being high. The prevalence of excess nutrition before the intervention was 29.6%, and after the intervention was 25.9% (Anwar MC, Budiono I, 2019). Therefore, this game-based learning can attract students' interest in learning. Most students focus on educational media during gameplay. This media explains that a player must consider the game important, useful, interesting, and fun and that there must be variety and novelty to attract sustainable gameplay (Staiano, 2014). These results also suggest that acoustic excellence is the result of a speaker- and listener-centered process (Watson, Arnold and Tanenhaus, 2009). Providing learning activities that are packaged in a fun way, in this case by using the Tic Tac Toe game, make students more motivated to participate in learning. The purpose of using the Tic Tac Toe game, is to increase students' understanding of filariasis prevention in the material on filariasis vector control. From the results of the discussion above, the Tic Tac Toe game can be said to be effective, so it is suitable

for use as a learning medium for fifth-grade elementary school students.

Conclusion

The conclusion from the results of the analysis and discussion of the research conducted by the researcher, the Tic Tac Toe game is appropriate for use in Health Education learning for Filariasis vector control has a very effective category in terms of effectiveness, when viewed based on indicators of understanding the concept, a p-value <0 is obtained, 05, at an a value of 0.05, there is a significant difference between the pretest and post-test.

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