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The Effect of Snake and Ladder Media Health Education on PHBS Behavior Improvement in Elementary School Students

Shofiatuz Zahro[1], Sri Utami [2], Rini Ambarwati[3], and Miadi [4]
[1] Nursing major
[2] Polytechnics of the Ministry of Health Surabaya, Indonesia
Corresponding author: (e-mail: sofiyatuszahro26@gmail.com).

ABSTRACT Clean and Healthy Living Behavior (PHBS) is an important indicator in the achievement of health as stated in the *Sustainable Development Goals* (SDGs) 2015-2030 program. However, the implementation of the PHBS program in the community is still not optimal. One effective educational method is to use snake and ladder media. This study aims to analyze the influence of snake and ladder media on improving PHBS behavior in elementary school children. This study uses *a quasi-experimental* design with *a one group pre-test post-test with control group design*. Sampling using the *Simple Random Sampling Technique*, the sample consisted of 52 students in grades 3-6. The independent variable is health education using snake and ladder media, while the dependent variable includes knowledge, attitudes, and actions. The research instruments include snake and ladder boards, questionnaires, and observation sheets. Data analysis used *the Wilcoxon* test and *the Mann-Whitney* test with a value of $\alpha<0.05$. The results of the study showed an increase in knowledge, attitudes, and actions in PHBS, with a *p-value* of <0.001 ($\alpha<0.05$) each, meaning that there was an influence of snake and ladder media health education on knowledge, attitudes, and actions in PHBS. In addition, there were differences in knowledge, attitudes, and actions between the intervention and control groups with a $p<0.001$ value. It is hoped that this method can be applied effectively in the school environment. With a participatory and contextual approach, students not only gain health knowledge, but also develop healthy living skills from an early age

INDEX TERMS Health Education, Snake Ladder, Elementary School Age Children, PHBS

I. INTRODUCTION

Healthy is the right of every individual to be able to carry out all daily life activities. In order to live a healthy life, a person must have a Clean and Healthy Living Behavior (PHBS) [1]. PHBS is one of the benchmarks in the achievement of improving health in the Sustainable Development Goals (SDGs) program for 2015-2030. However, the implementation of the PHBS program has not yielded optimal results [2]. This imoptimality mainly occurs in elementary elementary school children, because at that age many health problems related to personal hygiene are found [3].

The prevalence of PHBS in Indonesia before the COVID-19 pandemic was still relatively low. Based on Riskedas data in 2017, the percentage of PHBS in Indonesia reached 60.8%, and this achievement is still far from the set target of 70%. Meanwhile, in East Java, the implementation of PHBS in 2018 reached 56.13%, and is much lower than the national level, so there is a need to increase the implementation of PHBS by the community [4]. Lamongan

Regency is one of the districts with PHBS that has not reached the government's target of 73.7%, with the government's target reaching 80%. PHBS that is not optimal can be seen from the prevalence of diarrhea in East Java in 2023 reaching 183,338 people, Lamongan ranks fifth, with 9,937 cases [5]. According to Riskesdas data in 2019, the incidence of diarrhea in children aged 5-14 years was 6.2%, occupying the highest position after toddlers and the elderly [6]. Data from the Lamongan Regency Health Office in 2018 there were 32 fostered health centers, and of the 32 health centers in Lamongan Regency there were several health

centers that had schools with low PHBS. One of them is the Pucuk Health Center. The results of the preliminary study at the Pucuk Health Center with the source of information are the holders of the PHBS program at the Pucuk Health Center, explaining that most diarrhea incidents occur in elementary school children, therefore PHBS is very important to be implemented in schools. There are several schools that have low PHBS indicators, one of which is MI Islamiyah Sumberjo and SDN Sumberjo which are located in Sumberjo Village. The location of this village is difficult to reach because it is in the interior and road access to this place is quite difficult.

Poor PHBS can cause diarrhea. Prolonged diarrhea can lead to dehydration and can interfere with the child's growth and development to be suboptimal [7]. Based on research by Munawaroh *et al*, (2016) the lack of optimal clean and healthy living behavior is influenced by several factors, including lack of knowledge, attitudes related to poor PHBS, actions related to poor PHBS, and the availability of supporting sanitation facilities that have not met the standards [8]. Elementary school is a golden age in instilling PHBS values and has the potential to be an *agent of change* in promoting PHBS both in schools, families, and communities. At that age, it is at a time when children are susceptible to diseases such as diarrhea [1]. The results of a preliminary study conducted at MI Islamiyah Sumberjo show that the implementation of clean and healthy living behaviors (PHBS) in elementary school age children at MI Islamiyah Sumberjo has not been carried out properly. Based on the information above, the condition occurs because of several things, namely that students at the school have never received information about PHBS so that most of the students at the school have not implemented clean and healthy behavior properly.

To improve people's behavior, especially in elementary elementary school children to be free from health problems such as diarrhea, it is very important to carry out health promotion using interesting promotional methods and media, so that students can receive information well. According to Nutrisia Nu'im Haiya *et al* 's (2023) research on snake and ladder media handwashing behavior, it shows that health education with snake and ladder media is effective in increasing children's knowledge about hand washing with a p value of 0.001 < 0.05 [9]. According to Asep Fithri Hilman, *et al* (2022), there is an increase in knowledge after education through the snake and ladder game with a p value of 0.0001 < 0.05 because students are required to read each box occupied and snakes and ladders have their own attraction for students to be able to follow the learning process casually but still concentrate on the material [10].

Based on the above background, it is necessary to carry out health education about PHBS in elementary school children with snake and ladder media that will combine learning activities with play that will make students enthusiastic in participating in learning. According to Nutrisia Nu'im Haiya *et al* . (2023) research on snake and ladder media handwashing behavior, it shows that health education with snake and ladder media is effective in increasing children's knowledge about hand washing with a p value of 0.001 < 0.05 [9]. This is in line with research conducted by Asep Fithri Hilman, *et al* (2022) on the influence of snake and ladder media on the improvement of elementary school children's knowledge in PHBS, showing that there is an increase in knowledge after education through snake and ladder games with a p value of 0.0001 < 0.05 because students are required to read each box occupied and snakes and ladders have their own attraction for students to be able to follow the learning process with Relax, but still concentrate on the material [10]. The use of educational game-based learning methods such as snakes and ladders in Clean and Healthy Living Behavior (PHBS) education has not been widely applied at the elementary school level in Indonesia. In fact, this method has great potential to actively increase student engagement through a fun and contextual approach. Based on this background, research on the influence of snake and ladder games as a learning medium for PHBS is important. The combination of learning activities and game elements is believed to increase students' enthusiasm in participating in the learning process.

II. METHODS

This study uses *a Quasi Experimental* research design with *a One Group Pre-test Post-test With Control Group Design*. This study has been determined to be two groups, namely the intervention group and the control group. Both groups were given *the same pre-test*, then the intervention group was given a snake and ladder game treatment and the control group was not given the treatment. After that, *post-tests* were carried out on both groups [11]. Sampling using the *Simple Random Sampling Technique*, the sample consisted of 52 students in grades 3–6, namely 26 students of MI Islamiyah Sumberjo as the intervention group and 26 students of SDN Sumberjo as the control group. The independent variable is health education using snake and ladder media, while the dependent variable includes behavior improvement consisting of knowledge, attitudes, and actions in PHBS. The research instrument included a snake and ladder board which contained a picture of PHBS accompanied by a PHBS statement sentence, questionnaire, and observation sheet. Data analysis was conducted using *the Wilcoxon* test and *the Mann-Whitney* test with a value of $\alpha<0.05$. The game was carried out by gathering all students, then divided into five teams, each consisting of five people. The researcher acted as a facilitator who provided an explanation of the rules of the snake and ladder game. Next, the turn of the players who will enter the game board is determined, which can be done voluntarily or through the hompimpa method. The player representing each team is the group leader. The player rolls the dice that have been provided, and the number of steps taken is adjusted to the number that appears. For example, if the dice show five, then the player moves five steps from the starting position by walking, jumping, or doing squats, according to the game instructions.

III. RESULTS

A. KNOWLEDGE ABOUT PHBS BEFORE AND AFTER BEING GIVEN HEALTH EDUCATION ON SNAKE AND LADDER MEDIA

Based on TABLE 1, it is known that the age and gender characteristics of students in the intervention group were almost half (34.6%) aged 11 years, most (57.7%) students were male and almost half (26.9%) came from grade 4, grade 5, and grade 6.

In the control group, nearly half (42.3%) were 10-year-olds, most (61.5%) were female, and almost half (38%) were from grade 6.

TABLE 1
Characteristics of students by age, class and gender

Yes	Child Characteristics	Intervention Groups		Control Group	
		f	%	f	%
1	**Age**				
	8 years	5	19,2	0	0
	9 years	5	19,2	4	15,5
	10 years	4	15,5	11	42,3
	11 years old	9	34,6	5	19,2
	12 years	3	11,5	4	15,4
	13 years	0	0	1	3,8
	14 years	0	0	1	3,8
2	**Class**				
	Class 3	5	19,3	4	15
	Grade 4	7	26,9	3	12
	Grade 5	7	26,9	9	35
	Grade 6	7	26,9	10	38
3	**Gender**				
	Man	15	57,7	10	38,5
	Woman	11	42,3	16	61,5
Total		26	100	26	100

B. KNOWLEDGE ABOUT PHBS BEFORE AND AFTER BEING GIVEN HEALTH EDUCATION ON SNAKE AND LADDER MEDIA

Based on TABLE 2, it is known that knowledge before being given snake and ladder media health education in the intervention group was mostly (61.6%) in the adequate category and after being given snake and ladder media health education all (100%) students were in the good category, while knowledge in the control group during *pre-test* was mostly (57.7%) in the fair category and during *post-test* most (53.8%) in the adequate category.

TABLE 2
Pre-test and post-test knowledge distribution

Category	Intervention Groups				Control Group			
	Pre-Test		*Post-Test*		*Pre-Test*		*Post-Test*	
	f	%	f	%	f	%	f	%
Less	9	34.6	0	0	10	38,5	10	38,5
Enough	16	61,6	0	0	15	57,7	14	53,8
Good	1	3,8	26	100	1	3,8	2	7,7
Total	**26**	**100**	**26**	**100**	**26**	**100**	**26**	**100**

C. ATTITUDES ABOUT PHBS BEFORE AND AFTER BEING GIVEN HEALTH EDUCATION IN SNAKE AND LADDER MEDIA

Based on TABLE 3, it is known that the attitude of students in the intervention group before being given health education using snake and ladder media was mostly (57.7%) in the positive category, and after being given health education all students (100%) were in the positive category, while in the control group, before being given health education, most students (61.5%) had a positive attitude. However, after being provided with health education, there was a decline, most students (57.7%) remained in the positive category.

TABLE 3
Pre-test and post-test attitude distribution

Category	Intervention Groups				Control Group			
	Pre-Test		*Post-Test*		*Pre-Test*		*Post-Test*	
	f	%	f	%	f	%	f	%
Negative	11	42,3	0	0	10	38,5	11	42,3
Positive	15	57,7	26	100	16	61,5	15	57,7
Total	**26**	**100**	**26**	**100**	**26**	**100**	**26**	**100**

D. THE INFLUENCE OF SNAKE AND LADDER MEDIA HEALTH EDUCATION ON KNOWLEDGE IN PHBS

Based on TABLE 4, it is known that the results of *the analysis of the Wilcoxon signed rank test* knowledge questionnaire in the intervention group obtained a significance value of p=<0.001 so that p<0.05 can be interpreted as a significant difference in knowledge in the intervention group between before and after being given health education on snake and ladder media, while in the results of *the analysis Wilcoxon signed rank test* In the control group, a significance value of p=0.071 was obtained so that p>0.05 can be interpreted as no significant difference in knowledge in students in grades 3, 4, 5, 6 of MI Islamiyah Sumberjo between *pre-test* and *post-test.*

TABLE 4
Distribution of pre-test and post-test actions

Behavior Level	Category	Intervention Groups				Control Group			
		Before		After		Before		After	
		f	%	f	%	f	%	f	%
Knowledge	Less	9	34.6	0	0	10	38,5	10	38,5
	Enough	16	61,6	0	0	15	57,7	14	53,8
	Good	1	3,8	26	100	1	3,8	2	7,7
	Total	26	1000	26	100	26	100	26	100
Wilcoxon Sign Rank Test		p= 0.000 p< α = 0.05				p=0.071 p< α = 0.05			

E. THE INFLUENCE OF SNAKE AND LADDER MEDIA HEALTH EDUCATION ON ATTITUDES IN PHBS

Based on TABLE 5, it is known that the results of the analysis of *the Wilcoxon signed rank test* of attitude level in the intervention group obtained a significance value of p=0.001 so that p<0.05 which can be interpreted as a difference in attitude in the intervention group between

before and after being given health education on snake and ladder media, while the results of *the Wilcoxon signed rank test* The attitude in the control group obtained a significance value of p=0.288 so that P>0.05 which can be interpreted in the control group there is no difference in attitude between *pre-test* and *post-test.*

TABLE 5
The Influence of Snake and Ladder Media Health Education on Knowledge in PHBS

Behavior Level	Category	Intervention Groups				Control Group			
		Before		After		Before		After	
		f	%	f	%	f	%	f	%
Attitude	Negative	11	42,3	0	0	10	38,5	11	42,3
	Positive	15	57,7	26	100	16	61,5	15	57,7
	Total	26	100	26	100	26	100	26	100
Wilcoxon Sign Rank Test		p = 0.001 p< α = 0.05				p=0.288 p< α = 0.05			

F. *THE INFLUENCE OF SNAKE AND LADDER MEDIA HEALTH EDUCATION ON ACTIONS IN PHBS*

Based on **TABLE 6**, it is known that the results of *the Wilcoxon signed rank test of* the level of action in the intervention group obtained a significance value of p=<0.001 so that p<0.05 which can be interpreted as a difference in actions in the intervention group between before and after being given health education on snake and ladder media, while the results of *the Wilcoxon signed rank test* The action in the control group obtained a significance value of p=0.133 so that p>0.05 which can be interpreted as no difference in action in students in grades 3,4,5,6 of MI Islamiyah Sumberjo between *pre-test* and *post-test.*

TABLE 6
The Influence of Snake and Ladder Media Health Education on Attitudes in PHBS

Behavior Level	Category	Intervention Groups				Control Group			
		Before		After		Before		After	
		f	%	f	%	f	%	f	%
Action	Less	1	3,8	0	0	0	0	0	0
	Enough	16	61,6	0	0	12	46,2	13	50
	Good	9	34,6	26	100	14	53,8	13	50
	Total	26	100	26	100	26	100	26	100
Wilcoxon Sign Rank Test		p = <0.000 p< α = 0.05				p=0.133 p< α = 0.05			

G. *BEHAVIORAL DIFFERENCES IN THE SNAKE AND LADDER MEDIA HEALTH EDUCATION INTERVENTION GROUP AND THE CONTROL GROUP*

Based on **TABLE 7**, it is known that the results of *Mann U Whitney*'s statistical calculation show that H1 is accepted with *a p-value* = <0.001 < (α=0.05), which means that there is a difference in knowledge, attitudes, and actions between the snake and ladder intervention group and the control group without intervention.

TABLE 7
The Influence of Snake and Ladder Media Health Education on Actions in PHBS

Kelompok	Perilaku dalam PHBS	Sebelum		Sesudah		Selisih		Hasil Uji *Mann U Whitney*
		Mean	± SD	Mean	± SD	Mean	± SD	
Pengetahuan	Intervensi	9	2,263	15,50	1,393-	6,5	0,87	p=<0,001
	Kontrol	8,81	2,871	9,12	2,613	0,31	0,258	
Sikap	Intervensi	64,38	4,826	79,65	0,562	15,27	4,264	p=<0,001
	Sikap	62,12	6,212	63,46	4,843	1,34	1,369	
Tindakan	Intervensi	28,88	2,819	39,81	0,402	10,93	2,417	p=<0,001
	Kontrol	29,73	2,736	31,23	2,861	1,5	0,125	

The initial hypothesis in this study states that health education using snake and ladder game media influences improving the knowledge, attitudes, and actions of elementary school students in the implementation of Clean and Healthy Living Behavior (PHBS). PHBS is a set of behaviors that reflect students' ability to maintain personal hygiene, the environment, and live a healthy lifestyle, which is very important to instill from an early age. Based on the results of the above research, it is known that students who take part in snake and ladder media health education show a significant improvement in understanding of PHBS material, a more positive attitude towards healthy living behaviors, as well as changes in real actions in daily life, such as washing hands, disposing of garbage in place, and maintaining environmental cleanliness. The results of this study support the initial hypothesis. So that the use of educational game media not only makes learning more enjoyable, but also contributes significantly to changes in student behavior in running PHBS consistently.

IV. DISCUSSION

A. *KNOWLEDGE ABOUT PHBS BEFORE AND AFTER BEING GIVEN HEALTH EDUCATION ON SNAKE AND LADDER MEDIA*

Based on **TABLE 1**, knowledge was obtained in the intervention group before being given health education on snake and ladder media, most of them were in the sufficient category and after being given health education on snake and ladder media all students were in the good category, while, in the control group, the knowledge of the students during *Pre-test* And *Post-test* Most remain in the category enough without showing significant changes. Based on research conducted by Nadine, et al. (2022) which showed that students' knowledge before being given health education in snake and ladder media health education was almost all in the good category and after being given health education in snake and ladder media health education increased to all students in the good category [12]. In line with research conducted by Hilman., A.F, (2022) which showed that the results of students' knowledge scores before

being given an average intervention were in the sufficient category and after being given an intervention increased to the good category [10].

Based on this study, before being given health education, most students had less knowledge. This is because knowledge is influenced by education, experience, information, and the environment [13]. Knowledge is an important variable to improve PHBS behavior in elementary elementary school children. One of the factors that affects the level of knowledge of students in this study is information. The lack of information about PHBS makes most of the students of MI Islamiyah Sumberjo and SDN Sumberjo have a lack of knowledge. Students at MI Islamiyah Sumberjo and SDN Sumberjo have never received health education about PHBS before. This was conveyed directly by the principal and students who had never received information about PHBS. So their understanding of the importance of clean and healthy living behavior (PHBS) is still limited.

B. ATTITUDES ABOUT PHBS BEFORE AND AFTER BEING GIVEN HEALTH EDUCATION IN SNAKE AND LADDER MEDIA

Based on **TABLE 2**, the attitudes in the intervention group before being given health education were mostly in the positive category, and after being given health education the entire snake and ladder media were in the positive category, while in the control group, attitudes during pre-test and post-test were mostly in the positive category, which means that there was no change. This is in line with research conducted by Kurniawati, L. (2020) which showed that there was a change in attitude in the intervention group after being given health education on snake and ladder media, which was all in the positive category, while in the control group, the students' attitude scores mostly did not experience significant changes, namely mostly in the negative category [14]. According to research conducted by Aneke, Dewi Ranee (2022) which showed that the attitude scores of students before being given an intervention mostly had a positive attitude and after being given an intervention in the form of snake and ladder media, showed a significant increase in all students having a positive attitude. Students' attitudes in this case increase because of the information that students receive during learning. [15]

Based on this study, before being given health education, most students have negative attitudes. This is because attitudes are influenced by experience, knowledge, and the environment [13]. One of the influencing factors in this study is the students' experience and knowledge. This phenomenon occurs because students in the intervention group have never received health education about PHBS before, so their understanding of the importance of clean and healthy living behaviors (PHBS) is still limited, which has an impact on the low positive attitudes shown before the intervention is carried out.

C. ACTIONS ABOUT PHBS BEFORE AND AFTER BEING GIVEN HEALTH EDUCATION SNAKE AND LADDER MEDIA

Based on **TABLE 3**, it was found that before being given health education with snake and ladder media, most of the participants in the intervention group had relatively good actions, while a small number were in the adequate category. After being given health education using snake and ladder media, all participants in this group showed good action, whereas, in the control group, *pre-test* results showed that almost half of the participants had action in the adequate category, and most in the good category. After *the post-test*, it tends to decrease, where half remain in the good category, and the other half are still in the adequate category. According to research conducted by Mustar Setiani Y. (2018) which shows that before being given health education, most of them have a category of actions that are lacking and a small part have a category of good actions. However, after being given health education, almost all snakes and ladders have good actions and very few of the students have poor actions [16]. In line with the research conducted by Sari, Kurnia Ernita, *et al,* (2024) regarding the influence of tooth brushing health education with the snake and ladder simulation game method on changes in knowledge, attitudes, and applications of brushing teeth of elementary school children in the Paron Ngawi Regional Elementary School showed that after being given health education, it increased to mostly have good actions and a small number have sufficient actions [17].

Based on this study, before being given health education, most students had a lacking level of practice or action. This is caused by several factors, such as knowledge, attitude, motivation, and environment, which affect a person's practices or actions. In this study, the main factors that affect students' actions are knowledge and attitudes. Students at MI Islamiyah Sumberjo and SDN Sumberjo have never received health education about PHBS before. The lack of information about PHBS causes most students in both schools to have a low level of knowledge. As a result, most students at MI Islamiyah Sumberjo have not implemented PHBS actions in their daily lives. However, after being given health education through the medium of snake and ladder games, all students were able to carry out PHBS actions.

D. THE INFLUENCE OF SNAKE AND LADDER MEDIA HEALTH EDUCATION ON KNOWLEDGE IN PHBS

Based on **TABLE 4**, it was found that there was an increase in students' knowledge scores in the intervention group after being given snake and ladder media health education which showed the influence of snake and ladder media health education on student knowledge in PHBS. In the control group, there was no significant change in the students' knowledge scores. So it can be interpreted that there was no significant increase in knowledge in the control group between pre-test and post-test. The results of this study are supported by Nuranisah., (2020) who states that there is an influence of snake and ladder game media about CTPS on knowledge and attitudes in efforts to prevent diarrhea, this happens because playing snake and ladder is so interesting that many students become enthusiastic about playing it, besides that students are also easy to grasp and understand the material given in the

snake and ladder game [18]. Based on research conducted by Sitanaya, Rini, *et al*. (2021), shows that before the snake and ladder simulation game was carried out, there were most of them in the category of sufficient. After the snake and ladder simulation game was carried out, there was an increase in scores, where almost all students were categorized as good. This indicates that snake and ladder simulation games can contribute to increasing children's knowledge values [19]. Knowledge can be interpreted as something that is known through the five senses and its processing is carried out by the mind. Everyone needs science to live their lives well. Obtaining this knowledge must of course be through the process of learning, searching, observing, and analyzing [13].

The increase in knowledge in elementary elementary school children is influenced by age, gender, intelligence, personality and environment. As they age, children show improved cognitive abilities, such as the ability to group objects, as well as an interest in numbers and writing. In gender, men tend to have more rational thinking and women are more influenced by emotional aspects. In addition, differences in intelligence and personality in each child also play a role in their understanding of PHBS behavior. The surrounding environment is an important factor that can shape children's understanding and habits, thus affecting *post-test* results after health education interventions.

E. THE INFLUENCE OF SNAKE AND LADDER MEDIA HEALTH EDUCATION ON ATTITUDES IN PHBS

Based on **TABLE 5**, it was found that there was an increase in the attitude score of students in the intervention group after being given health education using snake and ladder media which showed the influence of snake and ladder media health education on students' attitudes in PHBS. In the control group, the students' attitude scores did not experience significant changes, both during the pre-test and post-test. This shows that without health education interventions, students' attitudes towards PHBS tend to remain constant and do not improve. In accordance with the research of Nuranisah (2020) which states that there is an influence of snake and ladder game media about CTPS on attitudes in efforts to prevent diarrhea, this happens because playing snake and ladder is so interesting that many students become enthusiastic in playing it, besides that students are also easy to grasp and understand the material provided in the snake and ladder game [18]. The results of this study are supported by Rosidah *et al.,* (2024) regarding the effect of health education using snake and ladder media on knowledge and attitudes about the dangers of smoking in SMA Negeri 4 Samarinda students showing that attitudes increase both before and after substantial effects are achieved, with a value of 0.000 ($p < 0.05$). This shows that there is an increase in the number of students who have a good attitude during the post test [20].

The development of attitudes in elementary elementary school children is influenced by age and gender factors. As they age, children begin to develop a deeper understanding of their gender identity, which influences their attitudes and behaviors in social interactions. Boys tend to show more active and aggressive behavior, while girls are more likely to show empathy and caring traits. This difference is influenced by biological and sociocultural factors that shape gender roles from an early age. Understanding the influence of age and gender on this change in attitudes is important for educators and parents in supporting children's social and emotional development optimally.

F. The Influence of Snake and Ladder Media Health Education on Actions in PHBS

Based on **TABLE 6**, there was a significant increase in the students' action scores in the intervention group after being given snake and ladder media health education which showed the influence of snake and ladder media health education on the action in PHBS, while in the control group, there was no significant difference between the action scores during the pre-test and post-test, which shows that without health education intervention, students' actions in implementing PHBS tend to remain. In line with the research conducted by Putri, Rifa F.Z et al (2024) on the medium of snake and ladder games on tooth brushing behavior in elementary school children which stated that the value of action before getting education through snake and ladder games was mostly in the bad category and after being given education on snake and ladder games was almost entirely in good criteria. Therefore, it can be concluded that there is an influence of snake and ladder media given to increase the action of brushing teeth [21].

If associated with clean and healthy behavior, gender can affect behavior, According to Ikasari et al., (2020), women often practice handwashing correctly than men. Girls experience rapid growth at school age, where they tend to be taller, stronger, and skilled in fine motor activities, so they pay more attention to personal hygiene. Meanwhile, men need a greater push to properly practice handwashing [22]. However, one of the main factors that can affect student behavior in PHBS is knowledge. If a person's knowledge is lacking, the behavior that will be carried out is also not good. A person will behave well if he has good knowledge and the right information.

G. Behavioral Differences in the Snake and Ladder Media Health Education Intervention Group and the Control Group

Based on **TABLE 7**, it was found that there was a difference between the snake and ladder intervention group and the control group on behavior about PHBS in elementary elementary school children. These differences are analyzed based on three main domains, namely knowledge, attitudes, and actions. The results showed that health education using snake and ladder media had a more significant influence on improving students' knowledge, attitudes, and actions in the intervention group compared to the control group that did not receive health education. Based on research by Maksum *et al*., (2022) regarding the effectiveness of health promotion of modified snake and ladder games on the level of knowledge about COVID-19 health protocols which shows that the

intervention group has a better *post-test average* than the control group, meaning that the intervention group experienced a significant increase in knowledge after being given health promotion of the snake and ladder game compared to the control group that was not given any treatment [23]. In line with the research of Medina et al., (2024) on the influence of educational games of balanced nutrition snakes and ladders, it was shown that there was a significant difference between knowledge and attitude scores in the intervention group and the control group after being given treatment ($p<0.05$) which can be concluded that there is an influence of educational games of snakes and ladders on knowledge and attitudes about balanced nutrition in elementary school children [24].

According to Piaget's theory, elementary elementary school children are at the stage of concrete operational cognitive development. At this stage, the child begins to learn to think and solve problems logically in real situations, although he is not yet able to do abstract reasoning [25]. In line with the research of Ikasari et al., (2020), elementary school children understand the value of learning by forming concepts, seeing relationships, and solving problems in concrete situations. When it comes to handwashing behavior, girls tend to be better at doing it than boys, because boys need more encouragement in implementing the habit. However, male students were able to practice handwashing better than female students after being given more encouragement [22].

In this study, the snake and ladder game was proven to be able to hone students' insights and encourage changes in PHBS behavior for the better. When compared to the control group that did not receive the intervention, the intervention group that used snake and ladder media tended to show a more marked improvement in the understanding and application of PHBS. The behavioral differences between the two groups reflect that innovative and participatory learning approaches are more effective in instilling health values. Therefore, the integration of game media such as snakes and ladders in health education activities in schools is worthy of further development as an alternative method that is not only educational, but also fun. When compared to the control group that received only conventional counseling, the intervention group that used snake and ladder media tended to show a more marked improvement in the understanding and application of PHBS.

Research Limitations

There are several limitations in this study, including that there are several students who work together or discuss when completing questions from the questionnaire, so that it can affect the results of students' knowledge scores and attitudes. This study only included the age and gender of the students so that it did not consider environmental factors that could affect behavior change.

V. CONCLUSION

The conclusion of this study is that there is an influence of snake and ladder media health education on the improvement of knowledge, attitudes, and actions in PHBS in students at MI Islamiyah Sumberjo and SDN Sumberjo. In addition, there are differences in knowledge, attitudes, and actions between the intervention group and the control group, reflecting that innovative and participatory learning approaches are more effective in instilling health values. In this study, the snake and ladder game was proven to be able to hone students' insights and encourage changes in PHBS behavior for the better. When compared to the control group that did not receive the intervention, the intervention group that used snake and ladder media tended to show a more marked improvement in the understanding and application of PHBS. Suggestions for research sites are expected by the school to create learning programs related to PHBS or health during class meetings using interesting game media such as snakes and ladders which are proven to be able to improve student behavior in PHBS. For students in grades 3, 4, 5, 6 of MI Islamiyah Sumberjo and SDN Sumberjo It is hoped that after receiving health education in snake and ladder media, PHBS is expected to be able to understand and disseminate PHBS material to all students and families at home. For further research, it is necessary to conduct research by considering the factors of education and the work of students' parents to determine the influence of the environment on behavioral changes in PHBS. In addition, it is necessary to condition students when doing the questionnaire to obtain valid results. In the assessment of actions, direct observation also needs to be carried out so that the results are more valid and avoid subjectivity in the assessment. For local health centers, the research is expected to make new policies in socializing PHBS to elementary elementary school children, especially in remote areas with interesting methods such as snake and ladder games or conventional methods that are educational, interesting, and fun.

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