

Improving Schistosomiasis Knowledge Among School Children and Teachers in Central Sulawesi, Indonesia

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Abstract — Schistosomiasis remains a health problem in Central Sulawesi and an intervention is needed to eliminate the disease. Health education training has been carried out to improve knowledge on schistosomiasis prevention and transmission among elementary school children and teachers. The training targets are expected to be an agent of change to introduce schistosomiasis control measures. This study used a quasi-experimental design by providing training materials on schistosomiasis control and followed by collecting and examining stool samples, catching and examining rats, conducting snails survey and examining snails to determine cercaria presence. There were 63 elementary school children participating in the intervention as case group and there were 63 elementary school children in the control group. Structured tests were conducted to determine the improved knowledge of the participants after the health education training within three phases. The results of this research reveal that there is significant improvement on the knowledge in the intervention group and in all post-test, with p-values of 0.000. On the contrary, there is no differences between before and after health education training (p-value=0.356) in the non treated group. It can be concluded that knowledge on schistosomiasis control increases among school community after intervention.

Keywords: *schistosomiasis, knowledge, elementary school, intervention, Central Sulawesi*

I. INTRODUCTION

Schistosomiasis is widely distributed and still remains a public health problem in 74 tropical and sub-tropical developing countries. It is estimated that about 207 million people are being infected with schistosomiasis and 779 million people are living in risk of infection [1]. The age groups that have the highest burden of schistosomiasis are children, adolescents, and young adults. The impact of this disease is reducing physical, nutritional and cognitive ability [2].

Schistosomiasis japonica is widely spread in tropical and subtropical developing countries in Asia, China, Japan, the Philippines and Indonesia. *Schistosoma japonicum*, a trematode worm, is the causative agent of schistosomiasis in Indonesia. The intermediate host is an amphibious snail, *Oncomelania hupensis lindoensis*. This disease is only found in Central Sulawesi province such as Napu and Bada Highland, Poso District and Lindu Highland, Sigi District [3].

Control activities have been implemented since 1973 but they are conducted only in a very limited area as the disease is only found in limited endemic area. Further, it is also an initiated control program. Schistosomiasis problems are very complicated. Therefore, disease control should not be the

responsibility of health sector only. There should also be the roles of other sectors. The schistosomiasis control that is conducted by the integrated team of schistosomiasis control includes many efforts to control this disease on human, animal, environmental management and also community participation.

Schistosomiasis infection in West Lore Subdistrict fluctuates. The prevalence in 2010 was 5.9% in which its stool sample covers only 61.1% [4]. Schistosomiasis survey conducted in July 2013 showed prevalence of Schistosomiasis at 1.38% with stool sample coverage of only 53.1%. In 2014, the prevalence was lower than 2013 at 1.32% and lower stool sample coverage at only 50.3%. The prevalence in 2016 was 0.86%. In the contrary, the minimum standard of stool sample coverage, required by the CDC MoH Republic of Indonesia, is 80% [5].

The result of a study in 2010 at the same location showed that most respondents did not have knowledge of schistosomiasis agent, transmission, symptoms, prevention, and also detection [6]. In the endemic area where low educated people inhabit the villages, health education of Schistosomiasis is needed. Based on that background, a research is conducted to improve the knowledge on schistosomiasis among students and teachers. Through this intervention, it is hoped that the students and teachers will share the knowledge on schistosomiasis to all members of the community [7].

II. MATERIAL AND METHODS

The research was implemented in West Lore District in Central Sulawesi Province, Indonesia in March – November 2016. This study was an intervention research with quasi experimental design, using schistosomiasis training materials for intervention to cases group, whereas the control group was not given any intervention. The research was implemented in 4th and 5th grade primary school students and teachers in West Lore Sub-district, Poso District, Central Sulawesi. Two groups of intervention and non-intervention purposes were selected. A number of elementary school students in grade 4, 5th grade and teachers were selected as the intervention group, i.e. as many as 63 people, while the non-intervention group consisted of 63 people.

The intervention was conducted twice. First, it was done by giving material of schistosomiasis and field practice of stool examination, catching and examining rodents, searching for snails in focus area, and also crushing snails of *Oncomelania hupensis lindoensis*. Meanwhile, the second intervention was by doing field practice just as it was done in the first intervention. Improved knowledge can be revealed by comparing the results of pre- and post-test after the first intervention. Meanwhile, the second and third post tests were done after the second intervention. The training material included the cause agent of schistosomiasis, schistosomiasis transmission, the focus area of intermediate snail of schistosomiasis, the symptoms, and also the schistosomiasis drug treatment. The sampling was calculated through the formula of two proportion using SPSS Version 17. The result of the study was analyzed using Wilcoxon test and MannWhitney.

III. RESULTS AND DISCUSSION

A. Characteristics of Respondents

School children and teacher’s empowerment in West Lore sub-district of Bada Highlands was done by increasing knowledge on schistosomiasis at 4th and 5th grade of elementary school and teachers. The characteristic of respondents is shown in Table 1.

TABLE I. THE CHARACTERISTIC OF SCHOOL CHILDREN AND TEACHERS IN THE ELEMENTARY SCHOOL IN WEST LORE SUB-DISTRICT, POSO DISTRICT, CENTRAL SULAWESI, 2016

Characteristic	Control*	%	Intervention*	%
Gender				
Male	27	43.0	32	50.8
Female	36	57.0	31	49.2
Age (year)				
0 – 14	38	60.3	46	73.0
15 – 49	18	28.6	12	19.0
≥ 50	7	11.1	5	8.0
Occupation				
Students	38	60.3	46	73.0
Teachers	25	39.7	17	27.0

*n = 63.
Source: Primary Data, 2016

B. The Score Before and After the Intervention

The intervention was done in two elementary schools, in Tuare Village and in Lengkeka Village. Non-intervention groups were in Tomehipi Village, Kageroa Village and in Kolori Village. The average score before and after intervention is shown in Table 2.

TABLE II. THE AVERAGE PRE AND POST TEST SCORE IN THE NON-INTERVENTION GROUP IN WEST LORE SUB-DISTRICT, POSO DISTRICT CENTRAL SULAWESI, 2016

Group	Average Score			
	Before Implem entation	After interventio n I	After intervention II	After interventio n III
Intervention	44.7	77.6	78.0	87.4
Non-Intervention	45.1	46.0	53.5	54.6

*n = 63.
Source: Primary Data, 2016

C. The Increase of Schistosomiasis Knowledge in Intervention and Non-Intervention School Group Based on the Topics of Training

The increasing of knowledge on schistosomiasis based on the topics of training in the school of implementation and non-implementation group is displayed in Table 3. As shown in Table 3, it is clear that there is a higher increase of schistosomiasis knowledge in the school implementation group compared to the non-intervention group.

TABLE III. THE INCREASE OF SCHISTOSOMIASIS KNOWLEDGE IN SCHOOL CHILDREN IN THE ELEMENTARY SCHOOL DOING THE TEST IN THE INTERVENTION IN WEST LORE SUB-DISTRICT, POSO DISTRICT CENTRAL SULAWESI, 2016

Topic of training	Result of Test			
	Before intervention (n = 63)		After intervention (n = 63)	
	Correct answer	%	Correct answer	%
Schistosomiasis cause agent	28	44.4	61	96.8
Schistosomiasis transmission	27	42.8	62	98.4
Focus area of schistosomiasis	31	49.2	57	90.4
Symptoms of schistosomiasis	51	80.9	62	98.4
Schistosomiasis treatment	40	63.4	61	96.8

*n = 63.

Source: Primary Data, 2016

D. Statistical Analysis Between Pre-test and Post-test in the Implementation and Non-Implementation Group

Based on the result of statistical test (Table 4), there is a significant increase of knowledge in intervention group between the test before implementation and after the implementation I. The pre-test value with the second post-test and the pre-test value with the third post-test is $p = 0.000$. Meanwhile, in relation to the result of statistical test in the non-intervention group, there is no differences between before and after health education training ($p\text{-value}=0.356$) in the non-treated group. ($p\text{ value} = 0.356$). However, the knowledge before intervention and after intervention II and III indicates a significantly increased knowledge ($p = 0,000$).

TABLE IV. STATISTICAL ANALYSIS RESULTS BETWEEN BEFORE AND AFTER IMPLEMENTATION IN INTERVENTION AND NON-INTERVENTION GROUP IN WEST LORE SUB-DISTRICT, POSO DISTRICT CENTRAL SULAWESI, 2016

Group	Asymp. Sig. (2-tailed) (p-value)
Intervention	0.000
Non Intervention	0.356

Various efforts to control schistosomiasis in the endemic areas have been done since 1980's, both in terms of humans with treatment, intermediate snail control and mammals. The disease still remains a health matter found in the location until now. Schistosomiasis control needs to be improved even more considering the target of schistosomiasis elimination by 2020. Education efforts to give an understanding of schistosomiasis and increase the role of community leaders have been done in the endemic areas of Lindu Plateau with a good result that can increase the coverage of population stool collection [7].

In this study, the researchers select elementary school students with low education level. The low level of education is positively correlated with the low knowledge of

the disease. This is underlined in Rosmini's study in the Napu Plateau which illustrates the most prevalent schistosomiasis found among people with primary school education. By involving elementary school children, it is expected to give positive impact in declining schistosomiasis cases as since childhood, the students have known about Schistosomiasis.

The results of analysis show that there is improved knowledge in the intervention group between before and after treatment. The intervention can improve knowledge on prevention and transmission of schistosomiasis. A study in Brazil also shows that school children and teachers, by considering social condition and experience of pain other than scientific knowledge, have satisfactory results in regards to the ability of knowing how transmission occur and how to prevent the disease [8].

The analysis on the non-intervention group proves that there is no differences between before and after health education training in the non-treated group. This is understandable considering that non-intervention group is not given schistosomiasis materials in class as well as practice in the field.

The results of analysis prove that the implementation of variables has a major impact to the improved knowledge of the students and the elementary school teachers. The study in Brazil shows that students and teacher are active representative to bring new concept into the community [9]. Meanwhile, a study in Lindu in 2011 which discussed about the role of community leader, teacher, and health agent, shows an increasing of stool sample collection after the intervention. A previous study reveals that there are three important implementation in schistosomiasis management, i.e. higher quality of sanitation, health training or education, and mass drug administration of Praziquantel [10]. In Tanzania, the people have lower awareness about the disease transmission. Therefore, it increases the transmission. Besides, there is also re-infection of schistosomiasis after mass drug administration [11]. One of the schistosomiasis control in human is conducted through community participation. Most school children in two villages in Tanzania show that they have a better knowledge about the schistosomiasis transmission and prevention [11]. The study in Tanzania on the role of students and teachers, which considers social demography and illness experiences other than knowledge, shows great improvement on disease transmission and prevention [12].

The results of analysis prove that treatment variables may have a great impact to improve knowledge among elementary school students and teachers. The treatment variables are provision of schistosomiasis materials in class and practice in the field. Based on the results of research, the provision of schistosomiasis materials in pictures and video format in the classroom as well as the direct practice of stool examination, snail and rate surveys are better remembered by the students and elementary school teachers. This indicates that theory of material would be better and remembered when followed by a practice in the field.

This result is consistent with a study conducted in China in which there is an increased knowledge of schistosomiasis, detection and schistosomiasis therapy among students implementation class by 99.8% compared to non intervention which is only 16.7% in the Dongting Lake area. The increase of knowledge among children happen because the experimental group children are given 2 hours lesson on schistosomiasis through face-to-face method with discussion as well as video playback [9]. The increase on students' knowledge is in accordance with the theory such as teaching techniques (ways) and educational tools (media) that greatly determines the success of message delivery. The use of educational aids is really good to help accelerate and deepen the material delivery. It can stimulate students to know and have a better understanding. Therefore, it is expected to help deliver health messages easily [13]. A study in the Philiphines shows that the schistosomiasis control on that country is conducted through chemotherapy equipped with environmental sanitation, health promotion, and mollusciciding to reduce the disease severity [14]. A productive and sustainable intervention however cannot be achieved without adequate education especially among working population. Therefore, there needs to be adequate health education on the disease transmission, feasible control strategies, as well as other preventive measures [15].

Schistosomiasis control in Yamanashi Prefecture has been conducted through strong coordination among stake holders, the community and the academic experts. Through those efforts, the schistosomiasis in that location was eradicated in 1996 [16]. A lesson related to schistosomiasis from a study in SubSahara shows that knowledge on schistosomiasis prevention control may be increased through adequate and standardised health promotion to the community [17].

Swaziland has given an attention on schistosomiasis, by conducting many interventions, such as the worm treatment, health promotion, and schistosomiasis training at schools. It is important to evaluate the knowing capacity of students on schistosomiasis because they have high risk to the infection which is related to playing or water contact activity. [2].

Another study in Mwea Kenya shows that knowledge on schistosomiasis is low. Therefore, integrated control program to reach schistosomiasis control is required. Schistosomiasis control promotion is effective to decrease the infection and severity of the disease [18].

It also occurs in Nigeria in which treatment using praziquantel, community empowerment and promotion on schistosomiasis prevention and clean and healthy life behaviour reduces the infection and severity of schistosomiasis [19]. A study in Mozambique shows there is improvement on the schistosomiasis knowledge and self-reported behaviour after intervention with health promotion [20]. Children in Zanzibar also become high-risk behaviors population related to schistosomiasis transmission. The knowledge of children on schistosomiasis is inadequate. Therefore, they need health education and promotion to prevent and control schistosomiasis [21].

Improved knowledge of students and teachers in the two primary schools shows that intervention conducted in the intervention villages, either in Tuare elementary school or in Lengkeka elementary school, equally can improve knowledge on schistosomiasis. School children and teachers have a great potential to continue and disseminate knowledge on schistosomiasis that has been taught at schools. At the end, they can share the knowledge to their families and communities. It will be great if the provision of schistosomiasis material can be conducted in other endemic schistosomiasis areas, namely in Lindu Highlands and Napu. Thus, it is recommended that schistosomiasis is a subject of local content in the endemic areas.

IV. CONCLUSION

In conclusion, the provision of materials in the classroom and field practice to school children and teachers in the intervention groups significantly increases knowledge by comparing before and after intervention phase. The provision of materials at Tuare and Lengkeka elementary school equally increases knowledge on schistosomiasis. The increasing knowledge of school children and teachers through materials and field practice can be done in other schools located in other area of schistosomiasis.

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