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Original Research

Effects of Health Education on Leptospirosis Prevention through *Dasawisma*

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ABSTRACT

Introduction: Globally, leptospirosis is still a major health problem in African and developing countries, including Indonesia. The best control effort is with prevention through health education. Health education with conventional methods is considered less effective, so there is a need to look for other health education methods.

Methods: Aims of the research are to know the difference of effectiveness of health education methods between conventional classical method and *dasawisma* or peer group in (1) improvement of knowledge of leptospirosis disease prevention; (2) effectiveness in prevention of leptospirosis. Research is Quasi-Experimental research with a two-group control trial design. The sample consisted of 40 respondents treated by health education through *dasawisma* using a leptospirosis module as a media of Health Education, and 40 control group respondents who were given education using conventional method. Sampling technique used purposive sampling. Data were statistically analyzed with Independent T-Test.

Results: (1) Meaning of treatment group = 21.77 higher than control group = 19.62 (2) Mean prevention effort of leptospirosis disease treatment group = 54.35 better than control group = 48.15 (3) Health education through *dasawisma* was effective to increase knowledge prevention of leptospirosis (t = 2.943; p = 0.004) (4) Health education through *dasawisma* was effective for increasing prevention effort of leptospirosis (t=4.695; p=0.001).

Conclusion: Health education through *dasawisma* and leptospirosis module is significantly effective to improve knowledge of leptospirosis disease and in prevention efforts of leptospirosis.

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INTRODUCTION

Globally, tropical infectious diseases are still a very worrying health problem, especially in African countries and other developing countries, including Indonesia. Leptospirosis is a zoonotic disease caused by infection of bacterial microorganisms of *Leptospira introgans* irrespective of its specific serotype form. The incidence of leptospirosis in Indonesia is still high. According to the International Leptospirosis Society (ILS), Indonesia is a country with leptospirosis incidence ranked third below China and India. In leptospirosis patients with yellow eye lining (damage to liver tissue), the risk of death will be higher. In some publications, the mortality rate is reported to be between 3% - 54% depending on the system of the infected organs (Depkes, 2012).

According to the World Health Organization (WHO), in developing countries, especially those with hot or tropical climates, the incidence of leptospirosis is more than 1000 times compared with subtropics countries with a greater risk of illness. The incidence rate of leptospirosis in tropical countries is estimated to reach 5-20/100,000 population per year. Leptospirosis is spread throughout the world. For example, the highest ever reported epidemiological study was the incidence rate of leptospirosis in New Zealand between 1990 and 1998 of 44 per 100.000 population. The highest incidence rates occurred in meat-related workers (163/100,000 inhabitants), farmers (91.7/100,000 inhabitants) and forest-related workers by 24.1 per 100,000 population (WHO, 2010).

Based on reports from the Central Java Provincial Health Office in 2011 the number of cases of

leptospirosis in 155 residents caused the death of 23 people. This number increased compared to the year 2010, which was 133 victims of leptospira bacteria, 14 of whom died (Dinas Kesehatan Propinsi Jawa Tengah, 2011). One of the areas in Central Java Province that often occurs cases of leptospirosis is in the area of the Boyolali regency. Based on data from Boyolali District Health Office obtained information shows that the positive diagnosis of leptospirosis incidence first occurred in 2012 with the incidence of two cases found in the work area of the Ngemplak Boyolali health center. Then, in 2013, incidence of six cases was found. And in 2014, this increased to 17 cases of whom seven died (Case Fatality Rate 43.75%) (Dinas Kesehatan Kabupaten Boyolali, 2014). Ngemplak health center officers have also undertaken health education several times in *Posyandu*, but the results from year to year regarding the incidence of leptospirosis shows a continued increase. This is in contrast to existing research, which shows that health education affects leptospirosis prevention efforts. The results of Kusumastuti's research (2011) showed health education had an effective influence on leptospirosis prevention efforts. The results of research also providing evidence of the influence of health education on leptospirosis prevention efforts come from Nurjanah, Sugiyanto and Kun (2013) on the Relationship between Public Knowledge about Leptospirosis Prevention and Behavior of Health Officers. *Puskesmas* Kedungmundu's Practice of Leptospirosis Prevention in Kelurahan Tandang Kota Semarang also provides evidence there is a relationship between knowledge and leptospirosis prevention efforts. During this period, general health education is generally done when there is *Posyandu* activity and it has not been tried through a *dasawisma* or small peer group families by using the module. *Dasawisma* is a small family group of 8-10 families.

MATERIALS AND METHODS

This research used quasi-experimental with two group control trial design. The sample consisted of 40 respondents treated by health education through *dasawisma* using the module and 40 control group respondents using conventional method. *Dasawisma* is a small family group of 8-10 families. The Leptopsirosis module is a small book that is distributed to respondents to read and take home. The leptospirosis module contains the concept of leptospirosis and simple precautions to be easily understood by the audience. Data were collected by a leptospirosis cognitive test and questionnaire on leptospirosis incidence. Knowledge is measured by cognitive tests with 30 questions divided into two categories (good and less). Leptospirosis prevention measures were measured using a questionnaire with a number of Guttman scale statements (always, occasionally, never). Instrument validity test used Pearson correlation with SPSS 18. Sampling technique used purposive sampling. Data were analyzed with Independent t-test. Ethical clearance was received from the ethical committee at the health polytechnic of Surakarta (number ECPKS/X/002/2017 on 20 February, 2017.

RESULTS

The characteristics of respondents are shown in Table 1. Demographically, based on the age category in the treatment group, the majority are in the 31 to 40 years category by as much as 32.5%, while, in the control group, most are in the age group of 20 – 30, accounting for 37.5%. Characteristics of religion followed by the majority of respondents is Islam with 95% in the treatment group and 97.5% in control group. Regarding education, it is generally seen equal wherein most treatment groups have high school education of 40% and, in the control group, as many as 47.5%.

Table 2 illustrates both the treatment group and the control group in which no one had ever been suspected of leptospirosis disease. However, the risk of contracting the disease is quite large, namely the presence of rat vectors in the treatment group by as much as 75% and in the control group 72.5%. Besides, there is also the environmental factor, which is the water channel around the house in the control group, with 92.5% while, in the treatment group it is 87.5%. Related to whether the daily respondents were often exposed or had contact with sewer water or sewerage channels, both groups showed the same result, 22.5%.

Table 3 shows the level of knowledge of respondents before health counseling about leptospirosis in the treatment group with the highest percentage in the less category of 82.5%, while, in the control group, the majority was also in the less category with 90%. The result of univariate analysis was obtained in the treatment group with an average value of 18.6, minimum 11, maximum 25, with deviation standard 3.57. While, in the control group, the average value was of 17.6 maximum 26, minimum 7 and standard deviation 4.38.

While the description of the level of knowledge of respondents after health education, as shown in Table 4, shows that the level of knowledge of the respondents in the treatment group is the highest in the category less, by 55%, and the good category is 45%. However, in the control group, the percentage of knowledge level in the category of less is more 77.5% and in the good category 22.5%. The result of univariate analysis showed, in the treatment group, average value of 21.77, maximum value 27, minimum value 16 and standard deviation 2.67, while the control group obtained average value of 19.62, with maximum value 27 and minimum value 12 with a standard deviation value of 3.7.

Independent t test obtained that health education through dasawisma had significant effect on knowledge level of the respondents (t value = 2.943 with p = 0.004). The mean value of treatment group

Table 1. Demographic Characteristics

Variables	Treatment (n = 40)		Controls (n = 40)	
	f	%	f	%
Age				
20 - 30	12	30	15	37.5
31 - 40	13	32.5	11	27.5
41 - 50	11	27.5	9	22,5
>50	4	10	5	12.5
Religion				
Islam	38	95	39	97.5
Christian	1	2.5	1	2.5
Catholic	1	2.5	0	0
Education				
Elementary	7	17.5	10	25
Junior High School	12	30	12	30
Senior High School	16	40	17	47.5
Diploma	2	5	0	0
Bachelor	3	7.5	1	2.5

Table 2. Characteristics of Respondents Based on Leptospirosis Risk Factors

Variables	Treatment		Control	
	f	%	f	%
Have experience of sick				
Yes	0	0	0	0
No	40	100	40	100
Environment				
Rat	30	75	29	72.5
Ditch	35	87.5	37	92.5
Contact	9	22.5	9	22.5

Table 3. Description of Knowledge Level of Respondents about Leptospirosis before Being Given Health Education

Categories	Treatment		Control	
	f	%	f	%
Less	33	82.5	36	90
Good	7	17.5	4	10

(21.77) is higher than the control group (19.62), so it means that health education through dasawisma using the module is more effective in improving leptospirosis knowledge compared with the conventional method.

Leptospirosis Prevention Effort

Prevention efforts for leptospirosis infection were measured twice (pre-test and post-test). Pre-test to determine the prevention efforts of respondents before being given health education, while post-test was to know the value of respondent knowledge level after being given health education by using the module in the *dasawisma* group.

Table 6 shows the prevention of leptospirosis before health counseling; in both the treatment group and the control group, the number in the good category is more than the less category. Univariate

Table 4. Description of Knowledge Level of Respondents about Leptospirosis Having Been Given Health Education

Categories	Treatment		Control	
	f	%	f	%
Less	22	55	31	77.5
Good	18	45	9	22.5

Table 5. Effect of Health Education on Knowledge Level of Respondents about Leptospirosis

Group	Treatment	Control
Mean	21.77	19.62
Std	2.67	3.76
t	2.943	
Sig (2-tailed) p	0.004	

Table 6. Description of Leptospirosis Prevention Efforts before Being Given Health Education

Categories	Treatment n = 40		Control n = 40	
	f	%	f	%
Less	9	22.5	8	20
Good	31	77.5	32	80

Table 7. Description of Leptospirosis Prevention Efforts Having Been Given Health Education

Categories	Treatment n = 40		Control n = 40	
	f	%	f	%
Less	1	2.5	12	30
Good	39	97.5	28	70

Table 8. Effect of Health Education on Prevention of Leptospirosis

Group	Treatment	Control
Mean	54.35	48.15
Std	4.54	7.00
t	4.695	
Sig (2-tailed) p	0.001	

analysis results obtained data on the treatment group which showed the mean of 51.42, maximum value 60.00, minimum value 39 and standard deviation of 7.07. While, in the control group, there was average value of 48.00, maximum value 58, and minimum value 22 with standard deviation of 7.69.

The value of prevention of leptospirosis after health education as shown in Table 7 shows the value in the treatment group is much better than the control group, that is for the category of either 97.5% versus 70%, while in the category less 2.5% is much less than control group that reached 30%. Univariate analysis result showed the increase of value in both treatment and control group that is in the mean treatment group 54.35 maximum value 64 and minimum value 41 with standard deviation 4.59. As for the control group shows the average value of 48.18 maximum value 58 minimum value 28 and value standard deviation 7.00.

Table 8 shows that health education through *Dasawisma* and leptospirosis module is effective for increasing prevention of leptospirosis disease as

shown by t = 4.695 (p = 0.001) and median value of treatment group 54.35 is much better than control group (48.15).

DISCUSSION

Effectiveness of Health Education through *Dasawisma* and Leptospirosis Module Regarding Knowledge

Leptospirosis is a disease caused by pathogenic leptospires. Symptoms of leptospirosis are similar to other infectious diseases, such as influenza, meningitis, hepatitis, dengue fever, dengue hemorrhagic fever and other viral fevers (Sudoyo, 2006). Leptospirosis usually occurs endemically in densely populated areas. However, it can also occur in rural areas where the distance between houses is far away, but sanitation of water disposal is not hygienic, so it is easy to become a medium for leprosy vector transmission of leptospirosis. According to Lehman (2014), the pathogenesis of leptospirosis has not been fully understood. The leptospires enter the body of the host through iris / abrasion lesions on the skin, conjunctiva or intact mucosa that lines the mouth, pharynx, esophagus, bronchus or alveolus and can enter by inhalation droplet infection and by drinking contaminated water.

To be able to perform the prevention and control of endemic leptospirosis disease requires public awareness to always maintain a lively environment so as not to become a medium for rat breeding as a means of transmission of leptospirosis disease or through other creatures such as goats, cattle, sheep and others. Awareness will form naturally after the individual knows or knows about an object that is around it, including leptospirosis disease. Promotional action is the most inexpensive and safe strategy to control a disease. Health promotion can be done through health education or health counseling. Through health counseling, health workers can provide information to individuals, families, or communities so that knowledge will increase. Knowledge is the result of knowing, and this happens after people have sensed a particular object. Knowledge or cognition is a very important domain in shaping one's actions (over behavior). Behavior based on knowledge will be better than behavior that is not based on knowledge (Notoatmodjo, 2011). According to Azwar (as cited in Fitriani, 2011), educational activities or health education is a health promotion method that is done by spreading the message, instilling confidence so that people are not only aware, know and understand, but are also willing and able to see that there is a relationship with health.

The results of Okatini, Purwana and Djaja's (2007) studies provide similar evidence with this study wherein the dominant factors affecting leptospirosis occurrence are education (OR = 3.7), knowledge (OR = 33.1), clean water (OR = 4.5), and component home structuring (OR = 8.2). The results of this study are also similar to Priyanto's (2008) research where community behavior has an influence on the incidence of leptospirosis. Thus, leptospirosis prevention efforts should be pursued by changing the behavior of the community through health education activities. The success of health education is influenced by several factors, one of which is the size of audience or the target of counseling. According to Fitriani (2011), the smaller the target or the audience then the easier is the management of the extension process. According to Harsono's (2004) model of learning with small groups, where the audience is divided into small groups consisting of 8-10 learners, this will be more effective in achieving learning objectives. In application, this small group can be realized in the form of homelessness. Each *dasawisma* group consists of about 10-20 members. The results of this study provide empirical evidence that health education methods of leptospirosis disease through *dasawisma* are more effective than classical methods. Table 5 shows the value t = 2.943 with p = 0.004, so it can be concluded that H0 rejected and Ha accepted, which means there is difference between the treatment group and the control group. Because the mean value of the treatment group, 21.77, is higher than the control group value of 19.62, it can be concluded that health education through *dasawisma* using the module is more effective in improving leptospirosis knowledge compared with the conventional method, which is by lecturing through a large group or class. With the small group method of *dasawisma*, a counselor or tutor will be easier to control the class or audience.

The *dasawisma* of this study consists of 10 members who are mostly mothers or women, who, in fact, have a better effect of nature in terms of increasing knowledge and public participation in prevention of leptospirosis disease. The interaction between counselor and audience is also closer and more intense, so that the counseling process will be more interactive and the material will be more easily remembered and understood by the audience. In counseling or learning, using small groups of media are good modules. In the module, it has been arranged so that the written material is concise, clear and applicable. In the module, there are also problems of training so that with a relatively small number of audience then the material will be more easily remembered. The results of this study are in line with research by Rahmawati (2012) which proves that the number of mice as a vector of leptospirosis transmission is increasingly in line with the participation of mothers in installing a mousetrap. Health education through *dasawisma* will be more effective, because *dasawisma* is a vehicle for community participation in the field of health by self-help at family level, directly controlled by the PKK village team. One of the family members in the tenth group is chosen to be the group leader or liaison with the coach or counselor.

Effect of Module on *Dasawisma* on Prevention of Leptospirosis Disease

Individual behavior can be distinguished from the level of knowledge which then shapes attitudes. Attitude is a reaction or a person's response to a stimulus or object. Manifestations of attitudes cannot be directly seen, but are only interpreted first from closed behaviors. From this understanding, it can be underlined that, as long as the behavior is still closed, then it is called attitude, whereas, when it is open, the actual behavior is shown as health (Adnani, 2011). According to Fitriani (2011), the factors that influence the formation of behavior include knowledge, perception and attitudes of a person to a health problem. This study provides empirical evidence that health education through *dasawisma* can change or increase public awareness and efforts in prevention and control of leptospirosis disease. Table 7 shows that health education through homelessness and the leptospirosis module is effective to increase prevention of leptospirosis disease as indicated by t value 4.695 (p = 0.001) and median value of treatment group 54.35, which is much better than the control group of only 48.15. According to Lehman (2014), prevention and control of leptospirosis can be done by providing intervention on the source of infection and intervention in the path of transmission and human host. Such actions can be carried out by, for example, reducing rat populations in several ways, such as rat poison, trapping, rodenticide use and rodent predators, eliminating rats' access to settlements, food and drinking water by building agricultural warehouses as sources of water reservoirs and moor-resistant yards, and by throwing away food and trash far from the reach of rats. Preventing rodents and other wildlife from living in human habitats by maintaining a clean environment, removing trash from grass and shrubs, and maintaining sanitation, especially by building good sewage and bathroom facilities and providing clean drinking water. These actions can be done well, if the community has sufficient knowledge and perception of how to prevent leptospirosis disease. The results of this study are in line with the research of Murti, Prabandari and Riyanto (2006) in which the peer education method through homelessness was effective in the discovery of Lung Tuberculosis. Although the goal of peer education was the discovery of suspected TBC Lung, in principle it provides evidence that peer education methods through small groups are effective for improving public health efforts.

CONCLUSION

Health education with *dasawisma* is effective to increase knowledge about prevention of leptospirosis, hence increasing prevention of leptospirosis. Based on the conclusions of this research, nurses are expected to use the *dasawisma* medium in an effort to improve the levying and prevention efforts of leptospirosis disease and they should be able to use and develop the leptospirosis module as a medium of education and health promotion on prevention efforts of leptospirosis disease.

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