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Indonesian Journal of
Tropical and Infectious Disease

Vol. 10 No. 3 September–December 2022

Original Article

Relationship between Knowledge and Preventive Behavior of Leptospirosis in Berbah District Sleman Regency Yogyakarta 2021

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Received: January 21st, 2022; Revised: April 4th, 2022; Accepted: October 10th, 2022

ABSTRACT

Public Health is the resultant from an balance of individual, agent, and environment problems. Individual knowledge and the ability to adapt to the environment vary greatly. The individual awareness and sensibility towards surroundings will contribute to the public health status. Environmental factor in the raining season with high intensity of rainfall cause some risks such as flood. It can be a disaster and destroy the facilities in the area. This can be a transmission media, a new habitat of insects for certain disease, one of them is Leptospirosis. The condition after flood with low level of clean water facilities can make these bacteria live and reproduce, with warm temperatures, neutral pH of water, humidity and also high rainfall. Leptospirosis cases in Indonesia are sufficiently high which in 2019, there are 845 cases with mortality rate for 16.26%. Some factors may affect the number of the case. This research is aimed to know the factors related to the preventive behavior of leptospirosis. It was held in Public Health Center Berbah Yogyakarta. The method of research is quantitative research with design survey method, quasi experiment. The population is the clients visiting to Public Health Center Berbah, with the average number of clients coming are 200 clients/day. The sample is taken by accidental sampling to the clients with the number of daily visits (50 persons). The result shows, that of five analyzed factors, knowledge is the factor related to the preventive behavior of leptospirosis.

Keywords: *behavior; knowledge; leptospirosis; prevention; public health*

ABSTRAK

Kesehatan masyarakat merupakan gabungan resultance dari keseimbangan masalah individu, agent, dan lingkungan. Pengetahuan individu, dan kemampuan untuk beradaptasi terhadap lingkungan sangat bervariasi. Kesadaran dan kepekaan individu terhadap lingkungan sekitar akan berkontribusi terhadap status kesehatan masyarakat. Faktor lingkungan saat musim penghujan dengan curah hujan yang cukup tinggi, berisiko menimbulkan banjir yang menjadikan suatu bencana dan dapat berakibat rusaknya sarana serta dan lingkungan sekitar. Hal ini dapat menjadi media penularan, menjadi sarang serangga/vektor suatu penyakit diantaranya penyakit leptospirosis. Kondisi pasca banjir dengan sarana air bersih yang kurang bagus, menyebabkan bakteri penyakit ini hidup dan berkembangkiak, suhu yang hangat, pH air yang netral, dan kelembaban serta curah hujan yang tinggi. Kejadian leptospirosis di Indonesia masih cukup tinggi, tahun 2019 tercatat 845 kasus dengan angka kematian 16,26%. Beberapa faktor mungkin berpengaruh terhadap angka kejadian leptospirosis. Penelitian ini bertujuan untuk mengetahui faktor-faktor yang berhubungan dengan perilaku pencegahan penyakit leptospirosis. Penelitian dilakukan di Puskesmas Berbah Yogyakarta tahun 2021. Metode penelitian adalah penelitian kuantitatif dengan menggunakan metode survey rancangan quasi experiment. Populasi adalah klien yang berkunjung ke Puskesmas Berbah, dengan rata-rata jumlah klien datang 200 klien/ hari.

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Sedangkan yang menjadi sampel adalah sejumlah klien yang diambil dengan cara accidental sampling, sejumlah klien dari jumlah rata-rata kunjungan setiap hari (50 orang). Hasil penelitian menunjukkan bahwa, dari kelima faktor yang dianalisis, pengetahuan adalah faktor yang berhubungan dengan perilaku pencegahan penyakit leptospirosis.

Kata kunci: *kesehatan masyarakat; leptospirosis; pencegahan; pengetahuan; perilaku*

How to Cite: Murwani, A., Ashar, H., Budiyati, G. A. Relationship between Knowledge and Preventive Behavior of Leptospirosis in Berbah District Sleman Regency Yogyakarta 2021. Indonesian Journal of Tropical and Infectious Disease. 10(3). 150–157. Dec. 2022.

INTRODUCTION

Indonesia is a tropical country that has two seasons, dry and rainy season. In early November to January, it is the raining season in which some areas are in flood. This condition brings some risk not only the disaster itself but also some diseases suffered such as diarrhea, skin disease, Acute Respiratory Syndrom (ARI), and leptospirosis. Leptospirosis is also known as post-flood cold. It is one of zoonosis disease which is caused by rats as the carrier chain. It was initially discovered by Weil in 1886, but in 1915, Inada found the causative bacteria which was Spirochaeta of the genus Leptospira.[1] Among the genus, only *Species Interrogans* are pathogenic to animals and humans which are fewer than 180 *Serotype* and 18 *Serogroup*. One kind of *serotypes* can generate to a differently clinical picture which in contrast a clinical picture for aseptic meningitis can be affected by *Serotype.* Leptospirosis has a widely and varieties clinical manifestation.

It is broadly distributed worldwide, especially in tropical and subtropical countries which have high rain intensity. Yet there has been no evidence to the number of leptospirosis cases in the world, but it can be expected that the case can happen in the areas with high risk factors for exposure to leptospirosis by more than 100 cases per 100,000 every year. In tropical country with high humidity, the number of cases can be ranged 10–100 for 100,000 citizens each year, while in subtropical country; it is around 0.1–1 per 1,000,000 as well. The mortality rate from leptospirosis in some places worldwide was reported about 5–30%. These numbers are not significantly reliable because there are still a lot of areas in the world with properly undiagnosed leptospirosis. Cases in Indonesia are moderately high which in 2019 there are 845 cases by 16.26% mortality rates.

In 1970–2012, there were about 318 outbreak cases with the average of 7 outbreaks per year. These areas are Latin America and Caribbean Island (36%), followed by Southern Asia (13%) and Northern America (11%). Most outbreak cases happened in tropic and subtropical areas (55%). The risk factors that can cause the outbreak are outdoor activities (25%), exposed to flood water (23%) and puddle (22%).[2] Other significantly risk factors are living in rubber plantation and taking a bath in a natural bath.[3] The burden caused by leptospirosis is fairly high but there is less accurate diagnosis due to the lack of public awareness to this disease. World Health Organization (WHO) and Leptospirosis Burden Epidemiology Reference Group (LERG) hold the evaluation of leptospirosis burden and transmission. Some risk factors are found as the causes of leptospirosis such as water exposure, recreational water/swimming activities in developing countries, flooding and heavy rain.[4] While other studies states that the risk factors in public are the environment close to the river, garbage, poor sanitation and many rats around the house. In this case, society has tried some prevention to the spread of the disease.[5]

Looking at the phenomena, the awareness is required towards leptospirosis and epidemiology development. Confirming cases that are spreading and epidemiological

knowledge of leptospirosis such as life cycles, geographic patterns, populations most at risk that are needed for adequate prevention of the spread of leptospirosis, one of which is preventive knowledge of the disease.[6] This research is aimed to know the factors related to the preventive behavior of leptospirosis.

MATERIALS AND METHODS

The type of research is quantitative research with a design survey method, using an accidental sampling technique. The research was conducted in November 2021 where the frequency of rain is still very high. The community in the Berbah Health Center area has never received counseling related to leptospirosis and most of the community as farmers, they do not use footwear when farming in the fields. We received ethical clearance from Stikes Surya Global with number 210/KEPK/SSG/I/2022. The population is the clients visiting to Public Health Center Berbah, with the average number of clients coming are 200 clients/day. The sample is taken by accidental sampling to the clients with the number of daily visits in Public Health Center Berbah. Analysis using ANOVA. Questionnaire was used in this research are knowledge about leptospirosis questionnaire and behavior questionnaire. After processing the data with the frequency distribution, the following categorical data is obtained. The categorization of knowledge in this research divided into 3 categorization which good (76%–100%), adequate (56%–75%) and less (<56%). For behavior, it is divided into 2 categorization which good (≥15) and poor (<15).[7]

RESULTS AND DISCUSSION

The result of the research, related to characteristic frequency distribution, can be described that there are 27 females and 23 males as the respondents whom 14 of them working as farmers. Leptospirosis case is appeared due to not only the factor of knowledge but also their occupation as farmers. The structured interview was collected from mostly famers and this job has a direct contact to dirty water, place, garbage and animal. If no one uses personal protective equipment and there is an injury, Leptospira bacteria can enter through wounds and humans can get leptospirosis.

Table 1. Respondent Characteristic Distribution

Variable	Category	Total (n=50)	Precentage (%)
Gender	Female	27	54
	Male	23	46
Age	10-20 years old	2	4
	20-30 years old	7	14
	31-40 years old	8	16
	41-50 years old	5	10
	51-60 years old	18	36
Occupation	Jobless	9	18
	Government employee	1	2
	Farmer	14	28
	Private employee	6	12
	Seller	9	18
Education	No Education	1	2
	Elementary School	9	18.0
	Junior High School	14	28.0
	Senior High School	18	36.0
	University	8	16.0
Knowledge	Good	16	32
	Adequate	10	20
	Less	24	48
Preventive Behavior	Good	19	38
	Poor	31	62

Table 1 shows the characteristics of the respondents, more than a third of the respondents were elderly (51–60 years), worked as farmers, had a high school education and almost half had very low knowledge and prevention behaviors.

Table 2. Table of Homogenic Test to the Factors Related to the Behavior

Variable	Levene statistics	Significancy	Interpretation
Age	3.024	0.014	Not homogene
Gender	0.533	0.469	Homogene
Education	0.323	0.808	Homogene
Job	0.864	0.493	Homogene
Knowledge	2.184	0.037	Not homogene

Table 2 shows the results of the homogeneity test for the five variables, where two of the five were declared not homogeneous.

Table 3. Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.506[a]	0.256	0.240	2.949

Table 3 explains that the magnitude of the correlation value is 0.506. From the outputs, it can be obtained that the coefficient of determination (R Square) is 0.256 which means that the influence of knowledge variables on behavioral variables is 25.6%.

Table 4. ANOVA Test

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	143.602	1	143.602	16.515	0.000[b]
Residual	417.378	48	8.695		
Total	560.980	49			

Table 4 shows that F value is accounted 16.515 with the significant level as much as 0.000 < 0.05 therefore it can be concluded that there is a relationship between knowledge and the society behavior towards Leptospirosis in Berbah District, Sleman Regency, Yogyakarta. From the results above, it can be drawn that knowledge also affects towards the behavior to Leptospirosis in the same area.

The incidence of leptospirosis is common in tropical countries, such as Indonesia and other Southeast Asian countries. One of the phenomena is that there is a high level of awareness on how to prevent this disease but the behavior toward its prevention still needs enhancement. This likely happened in Thailand where the society has the high awareness but the level of preventive behavior has not been optimal even though there is no leptospirosis recorded in this area. Thus, the perception and preventive behavior to Leptospirosis need to be continuously done and get the supports from various parties even though there is no Leptospirosis detected in certain areas. This can be done in ruder to have a good-behavior society towards the prevention of the disease.[8]

Leptospirosis is a disease caused by an interaction among factors such as human's activities, carrier animals, and environment. Domestic and wild animals can be the carriers of leptospirosis bacteria through their urine. Puddle when it is raining season can be a potential place of the leptospirosis transmission media to human. Transmission that allows the entry of these bacteria is through open wound that is exposed by water contaminated by leptospirosis bacteria.[9]

Berbah District, an area that stretches from north to south at the very end and has many very large rice fields, can still be found rats. Most of the respondents said that they often see rats around their houses from rice field areas. People living in Berbah District have a sufficient knowledge and a good behavior related to this disease. New information about something can give a new cognitive foundation in forming knowledge. This is corresponded to the theory from L. Green stating that someone's behavior towards their health is affected not only from their knowledge but also their beliefs, cultures, traditions, and so on.[10] Leptospirosis is still common, so in order to minimize the spread of the disease, some efforts should be taken

as an alternative approach which is *OneHealth* Approach. It is a combination of several sectors in handling some aspects regarding to the disease which those aspects are in the different sectors which are sector in handling humans, animals, and environment.[10]

Counseling will increase the respondent's knowledge and attitude, as it was held by Pujiyanti and Trapsilowati,[12] by the plan of *one group pre-post design* in Sedayu and Wukirsari Village, Bantul Regency. The result shows that there was a distinctive significant ($p<0.05$). As well as the significant influence, knowledge can be obtained from various sources such as counseling by giving information or knowledge. The factors affecting the knowledge are education, information/mass media, occupation, environment, experience, age, social, culture and economy. Public knowledge about leptospirosis can be influenced by a lot of factors. One of them is information from printed and electronic media as well. There is new information about something that can give a new cognitive foundation in forming knowledge towards a new perspective.[10]

A prevention towards a leptospirosis case is through the information distribution that also one of the ways to decrease the number of the leptospirosis case. The result from this method is a decent attitude and knowledge towards the attitude or preventive effort to leptospirosis. Similar to the research held in Medan showing that there were an adequate raise of the knowledge after giving a preventive information.[13] Beside that, education can also level up the awareness of the preventive behavior mainly if it can be done in a small group. The education got by the society about this disease is proven to be able to increase the number of society awareness to prevent the disease.[14]

The information about leptospirosis, besides being collected from public counseling, also has a source of information gathered from family/friend. Similar to the research from Pujiyanti et al[15] stating that the society was still in low level of knowledge and 80% of the society had a preventive behavior which was using the personal protection equipment when handling carcass and controlling rats.[15]

In this research, respondents' occupation is mostly farmers. The analysis shows that occupation does not have any relationship to the preventive behavior. The same result is also reported in some research, there was no correlation between occupation and the case of leptospirosis.[16,17]

Farmers are the jobs closely related to humid and wet conditions where they can be the place to get contaminated by leptospirosis bacteria. The jobs that have high risk to get infected are farmers,[18] vet, garbage collector, gutter cleaner, miner, or any other jobs that always have contact with dirty places. Moreover, when there is no sufficient self-protector. Maharani's research also stated that the majority of respondents, in the study of preventing a disease, had a high risk job and poor equipped. Therefore, the use of self-protectors such as gloves and boots has a role in preventing Leptospirosis disease. Thus, it requires enhancement to the awareness level to the use of self-protectors for risky jobs.[17] Not only directly contacted jobs that can affect the spread, but also the use of footwear could be one of the other factors. It is related to more than 50% respondents, in Samekto et al[19] study, who have not got any counseling yet. For this case, there should be a raise of the knowledge to each individual who works in scope of work at risk for leptospirosis.[18] Although working as a farmer is not related to the preventive behavior to the disease, but there should be any socialization to them as a preventive way. It is because the disease can be indirectly spread by the infected animal urine. Bacteria can survive for months in puddle and humid underground. Knowing that farmers are very close to this kind of environment then the preventive effort is required as well as the socialization to the preventive behavior of Leptospirosis.[20]

Age factor in this research has no relationship to the preventive behavior. The result is different to Hasanah, Nugraheni and Wahyuni's.[21] stating that there was a correlation between age and the behavior. Age is connected by the level of individual understanding in accepting information. The older the people, the more capable they can comprehend on what action or behavior that belongs to preventive actions. But in this research, age does not become a predictor to the self-awareness to prevent disease. It can be caused by some other factors such as their education background that is mostly dominated by high school level.

From this study, it can be obtained that knowledge is the only factor relating to the behavior to Leptospirosis.[21] A lot of factors can affect one's knowledge. These also contribute to decision and attitude in processing information, analyze, and apply something that has never been known before. Therefore, knowledge is very essential and a decisive value before health behavior works.[21,23]

Prevention is the way that can be used to reduce the spread of leptospirosis. It is by increasing the knowledge and behavior about leptospirosis.[24,25] Kipper et al[5] stated that some people had adequate knowledge this disease such as the transmission, symptoms, and prevention in a basic level. They also tried to stop the spread even though they has not completely understood of the spreading system, the host that carries leptospirosis and the factors affecting the big number of spreading in a community.[5]

Same theory was highlighted in Fadlilah's study stating that there is a relationship between knowledge and preventive practice to leptospirosis. It shows that the higher the level of education they have, the better the preventive behavior they do even if it is compared to the lower education level. From here, it also can be noticed that knowledge has a significant impact in increasing individual awareness of the preventive behavior to leptospirosis. Knowledge that they have will strengthen them in making decision. They who have a good knowledge and realize the danger of the disease will level up their awareness to do a preventive action.[22]

Limitations in this research were carried out while still in the COVID 19 pandemic, so it was necessary to limit contact with respondents. The behavior of society in this research majority is in the poor group. As the spreadness of leptospirosis, it is caused by the spread of the virus through open wounds. So it is closely related to how human behavior. Clean human behavior will be able to reduce the spread of leptospirosis infection. And vice versa, human behavior with low sanitation will increase the spread of infection.[26] Public health behavior is also an effort to improve environmental sanitation. One of the recognizable indicators of this environmental sanitation is the presence of rats. Good environmental sanitation results from healthy community behavior will reduce the number of rat species in the environment. This of course can prevent the further spread of leptospirosis.[27]

CONCLUSIONS

From this research, it can be concluded that the individual's knowledge is related to the preventive behavior of Leptospirosis in Berbah District, Sleman, Yogyakarta.

ACKNOWLEDGEMENT

The authors would like to thank the Berbah Public Health Center for their assistance and cooperation during the conduct of the research.

CONFLICT OF INTEREST

The authors declare that they have no conflict of interest.

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