



ORIGINAL ARTICLE

Effectiveness of Public Health Education by Lecture on Improving the Knowledge, Attitude, and Practices on Leptospirosis Among Adolescents in a Public School in Manila

Jenna Angela D. Rubio, MD*

*Pamantasan ng Lungsod ng Maynila

Correspondence:

Dr. Jenna Angela D. Rubio

Email: jennadrubio@gmail.com

The authors declare that the data presented are original material and has not been previously published, accepted or considered for publication elsewhere; that the manuscript has been approved by all authors, and all authors have met the requirements for authorship.

ABSTRACT

Leptospirosis is endemic worldwide. Based on the 2016 Philippine Pediatric Society Disease Registry, there were 800 cases of leptospirosis from May 2006 to August 2016, making it a significant public health concern. Case fatality rate is about 8-9%, with increased prevalence of the disease among adults and adolescents.

Objective: This study was conducted to evaluate the effectiveness of public health education through a lecture on improving the knowledge, attitude, and practice scores on leptospirosis among adolescents from grades 7-10 in a public school in Manila.

Methodology: This was a cross-sectional analytical study. A pre-tested, self-administered questionnaire was given among 357 students in a public school in Intramuros, Manila. A lecture regarding leptospirosis was conducted and a post-test was given afterwards. Data was analyzed using paired t-test.

Results: A total of 357 students were included, with an 88.37% response rate. Total mean pre-test knowledge score was 88.64%, and total mean pre-test attitude score was 80.97%. For practices related to leptospirosis, the total mean pre-test score was 72.12%. Pre-test knowledge scores were compared with post-test scores. After the lecture, there was a significant increase in their knowledge on leptospirosis ($p < 0.0001$). There was also an improvement on post-test scores on attitude and practices regarding leptospirosis ($p < 0.0001$).

Conclusion: Public health education through a lecture was effective in increasing the knowledge, attitude, and practice scores on leptospirosis among adolescents. This may help in the prevention of the disease in the adolescent population.

KEYWORDS: *Leptospirosis, Adolescence, Public Health Education*

INTRODUCTION

Leptospirosis is a zoonotic disease endemic worldwide in tropical and subtropical countries, and in urban and rural settings. The mean annual global incidence of epidemic leptospirosis as reported in outbreaks, was 14 cases per 100,000 population¹ however, prevalence rates worldwide remain underreported. In the Philippines, leptospirosis peaks during the rainy months of July to October. In 2012, there were 6,439 cases recorded, with 141 fatalities.² There were 350 suspect cases reported nationwide from January to July 2015³ with 33 deaths during the same time period, accounting for 9.43% of all cases. The disease mostly occurs in the 25 to 39 year age group (37.4%), followed by those 15-24 years old. Based on the 2016 Philippine Pediatric Society Disease Registry, there were 800 cases of leptospirosis from May 2006 to August 2016.

Researches regarding knowledge, attitude, and practices on leptospirosis among different populations have been done. In rural Peru the potential relationship of environmental context to human exposure to *Leptospira* showed that low level of education and living close to the river were risk factors for leptospiral seropositivity. Conversely, prevalence of anti-leptospiral antibodies decreased with education and was most likely associated with a greater degree of personal hygiene.⁴

In Thailand, Wiwanitkit in 2006 conducted a knowledge survey among villagers in an endemic area which showed that 80% of subjects had poor knowledge on leptospirosis, 11% had fair knowledge, and only 9% had good knowledge of the disease.⁵ There was no significant correlation with the sex and age of subjects and their knowledge of leptospirosis. However, there was a significant correlation with the level of education and occupation and their knowledge of the

disease.

In India, studies were done among workers at risk for leptospirosis - garbage collectors, drainage cleaners and septic tank cleaners. Majority had poor knowledge (87.2%) and unsatisfactory practice scores (64.5%) but had satisfactory attitude scores (64.9%).⁶ Sources of information were the television (55%), newspaper (20%), and both television and newspaper (25%). A similar study in Malaysia showed that majority of town service workers had poor knowledge (87.2%) and unsatisfactory practice scores (64.5), while 64.9% had satisfactory attitude scores.⁷ In India, an awareness study involving the general population through a questionnaire, showed that there is only a 27% awareness on leptospirosis. In an urban slum in Brazil, another study showed that 90.3% have heard about leptospirosis and 76.6% of them know that leptospirosis is a disease.⁸ More than half of respondents know its mode of transmission. Only half recognized that the disease requires prevention and control strategies, and 35% observed protective measures such as wearing gloves and boots while cleaning the sewers.

In Western Jamaica, the association between potential risk factors and clinical leptospirosis was studied and showed that both occupational and environmental exposures had an effect on the occurrence of leptospirosis.⁹

In the local setting, several studies were done on leptospirosis-related knowledge, attitude, and practices. Quina et al.¹⁰ focused on health workers and barangay officials and selected residents in Samar. It showed that majority of respondents were knowledgeable on leptospirosis. They practiced prevention and control strategies such as maintaining cleanliness of surroundings and proper hygiene. The health workers and barangay

officials “frequently” practiced them while barangay residents “always” practiced them.

A study in Laguna focused on agricultural and non-agricultural workers. It showed that the total mean knowledge score for all respondents was 68.50%. However, total mean knowledge scores between the 2 groups were not statistically significant. The total mean attitude score of all respondents (80.80%), was higher than their total mean knowledge (68.50%) and practice scores (61.28%).¹¹

A study on the association between leptospirosis-related knowledge and practices of pedicab drivers in Manila showed that 49% have correct knowledge on transmission and prevention of leptospirosis, while 21% had satisfactory preventive and health-seeking practices. This also showed that low level of education and poor knowledge had an effect on practices.¹²

Older age and income level were significantly associated with preventive practices among agricultural workers.¹¹ Still another study showed that respondents needed to have proper information regarding the disease to understand and observe preventive control strategies against leptospirosis.⁹

Although most KAP studies on leptospirosis were done in adults, one study among adolescents in Sri Lanka showed that there was a ‘good’ level of knowledge on leptospirosis in 52% of the study population.¹³ Parents’ involvement in paddy cultivation was measured and was found to be significantly associated with the level of knowledge of participants on leptospirosis. None of personal prevention practices were significantly associated with level of knowledge, suggesting that knowledge alone is not sufficient to improve on practices.¹³

Most studies concluded that education and promotional activities are

needed to increase knowledge on the disease. An intervention, such as a lecture however was not done hence, this study aimed to determine the effectiveness of public health education through a lecture on improving the knowledge, attitude, and practice scores on leptospirosis among adolescents from grades 7 to 10 in a public school in Manila.

METHODOLOGY

Ethics Approval

Written approval was obtained from the Department of Education and school Principal of Manila High School in Intramuros, Manila prior to the conduct of the study. Approval was also obtained from the Ethics Review Committee of the Department of Pediatrics and the Hospital Research Committee.

A written informed consent and assent were obtained from the parents/guardian and students respectively. The parents were informed of their right to withdraw their child’s participation any time during the study. Measures were observed to maintain confidentiality and all information were used for research purposes only.

STUDY DESIGN

This was a cross-sectional analytical study.

STUDY POPULATION

A school-based study was done in a public school in Intramuros, Manila. Students who belong to Grades 7 to 10, with ages 12 to 18 years old, and enrolled at Manila High School for the year 2016-2017 were included in this study. Excluded were those who did not give their consent as well as those who participated in the pre-test.

The sample size was computed using Lwanga and Lemeshow formula. The level of confidence was set at 95% with the normal z-deviate of 1.96. The acceptable

maximum error was 5%.

$$n = \frac{z^2 pq}{d}$$

where n = desired sample size

z = normal z-deviate

p = population proportion

q = 1-p

d = confidence interval

$$n = \frac{1.96^2 \times 0.5 \times 0.5}{.05}$$

$$n = 384$$

The computed sample size was adjusted for a 5% non-response rate.

$$N = \frac{n}{\text{response rate}}$$

$$N = \frac{384}{1 - 0.05}$$

$$N = 404$$

Data Collection

The questionnaire was pre-tested among a group of 40 students who shared similar characteristics with the study population. The items in the questionnaire were based on validated questions from a previous study by Arbiol et al (2016) with modifications. Content validation of the questionnaire was made by experts on the topic (nephrology and infectious disease consultants).

The questionnaire comprised of 4 sections. The 1st section determined the demographic profile of the students as to age, sex, grade level, family income, means of transportation, and source of information on the disease.

The 2nd section assessed the knowledge of the subjects on leptospirosis: causative agent, mode of transmission, signs and symptoms, complications, and methods of prevention and control. This section consisted of questions answerable with yes/no/I don't know. A score of 1 was given for a "Yes", and a score of 0 for "No" or "I don't know". The total knowledge score for each student ranged from 0 to 11.

The 3rd section evaluated the attitude of the students towards leptospirosis. The students were asked about their level of agreement on statements about leptospirosis, including the seriousness of the disease, its preventable and treatable nature, and the importance of protective measures such as rat control and early health-seeking behaviors. It consisted of a four-level Likert scale question format (1-strongly disagree, 2-disagree, 3-agree, 4-strongly agree), with an acceptable level of reliability. The total attitude score for each student ranged from 5 to 20.

The 4th section assessed practices related to leptospirosis, such as use of protective wear, personal hygiene, rat control measures and health seeking behaviors. It consisted of a four-level scale question format (1-never, 2-sometimes, 3-often, 4-always), with an acceptable level of reliability. The total practice score for each student ranged from 6 to 24.

The master lists of sections from Grades 7-10 were requested and the sections were randomly selected by lottery. The same method was done to select the students who were included in the study. Those who were selected were provided with a self-administered pre-test questionnaire after the study objective was explained to the students. The subjects were given 10-15 minutes to answer the questionnaire. A lecture was given afterwards and a visual aid in the form of handouts were provided during the lecture. The content of the lecture was on leptospirosis, its causative agent, transmission, signs and symptoms, management, and prevention. A self-administered post-test questionnaire was given to the students 5 minutes after the lecture.

Data were encoded using Epi Info 7. Paired t-test was used to determine if there is a significant difference on the level

of knowledge, attitude and practice scores on leptospirosis before and after the lecture.

RESULTS

A total of 357 students were included in this study, with an 88.37% response rate. The rest of the students who were included but were not present during data collection were considered dropouts. Table 1 shows the demographic profile of participants. Majority were female, (n=189 students, 52.94%) with a male to female ratio of 0.89. The mean age of participants is 14 years old. Grade 8 had the highest number of students (n=92, 25.77%). Majority belonged to families with an income of less than Php 10,000/month. The most common mode of transportation for students is by public transport through jeepney or tricycle or “pedicab”.

Table 1. Demographic Profile of Adolescent Students in a Public School in Manila

Demographic Profile	Frequency (Percentage) (n= 357)
Sex	
Male	168 (47.06%)
Female	189 (52.94%)
Age (in years)	
12	56 (15.69%)
13	53 (14.85%)
14	77 (21.57%)
15	91 (25.49%)
16	54 (15.13%)
17	17 (4.76%)
18	9 (2.52%)
Grade	
7	89 (24.93%)
8	92 (25.77%)
9	87 (24.37%)
10	89 (24.93%)
Income	
< Php 10,000	182 (50.98%)
Php 10,000 – 19,999	127 (35.57%)
Php 20,000 – 29,999	36 (10.08%)
> Php 30,000	12 (3.36%)
Mode of Transportation	
Walking to and from school	94 (26.33%)
Riding a jeep/tricycle/pedicab	261 (73.11%)

Table 2 shows where different sources of information on leptospirosis are

derived. The television is the most common source of information (65.27%), followed by public health services (14.57%) and the school (6.44%). About 3.08% of the study population said that they have not heard of leptospirosis.

Table 2. Source of Information on Leptospirosis among Adolescent Students in a Public School in Manila

Source of Information	Frequency (Percentage) (n= 357)
TV	233 (65.27%)
School	23 (6.44%)
Family	18 (5.04%)
Friends/Neighbor	2 (0.56%)
Public Health services	52 (14.57%)
Internet	18 (5.04%)
Newspaper	0 (0%)
I haven't heard about leptospirosis	11 (3.08%)

Table 3 shows the knowledge, attitude, and practice scores of study participants. The total mean pre-test knowledge score for all participants was 88.64%. Questions pertaining to disease prevention had the highest mean score of 93.91%, followed by mode of transmission, 93.46%. Questions about signs and symptoms had the lowest mean score of 79.50%.

For attitude on leptospirosis, the total mean pre-test attitude score for all participants was 80.97%, while practices related to leptospirosis had a total mean pre-test score of 72.12%. With regards to item-specific practices, protective gear and safety measures (such as wearing of boots when exposed to flood, immediate cleansing after wading, and maintaining clean surroundings) had the highest mean score of 76.03%, followed by rat control measures with a score of 69.75%. Total mean score for health-seeking behavior was lowest at 67.09%.

Table 3. Knowledge, Attitude, and Practice Scores of Adolescent Students in a Public School in Manila

	Pre-Test		Post-Test	
	Mean ± S.D.	Mean ± S.D.	Difference	p-value
Total Knowledge Score	88.64 ± 1.94	98.68 ± 3.99	10.04	<0.0001
Mode of Transmission	93.46 ± 18.21	99.16 ± 6.31	5.70	<0.0001
Signs and Symptoms	79.48 ± 23.87	98.04 ± 7.23	18.56	<0.0001
Disease Prevention	93.91 ± 14.50	98.81 ± 5.95	4.90	<0.0001
Total Attitude Score	80.97 ± 13.01	88.94 ± 11.49	7.97	<0.0001
Total Practice Score	72.12 ± 11.86	76.45 ± 12.57	4.33	<0.0001
Protective gears and safety measures	76.03 ± 13.31	78.59 ± 13.61	2.56	<0.0001
Rat control measures	69.75 ± 19.24	72.93 ± 19.64	3.18	<0.0001
Health-seeking behavior	67.09 ± 23.15	70.87 ± 23.60	3.78	<0.0001

Pre-test knowledge scores were compared with post-test scores (Table 3). After an informative lecture was conducted, there was a significant increase in their knowledge on leptospirosis ($p < 0.0001$) as to its mode of transmission, signs and symptoms and prevention. There was also an improvement on post-test scores on attitude towards leptospirosis ($p < 0.0001$).

Comparing pre-test and post-test practice scores after the lecture, post-test scores showed that more adolescents will use protective gear and safety measures, perform rat control measures and seek timely medical consult ($p < 0.0001$).

DISCUSSION

This study determined knowledge, attitude, and practices regarding leptospirosis among adolescents in a public school in Manila. It was conducted among adolescents since the disease is common in this age group.

Most of the participants are knowledgeable on leptospirosis. This finding was similar to a study done among adolescents in Sri Lanka and workers in Samar and Laguna. This may be explained by the fact that the disease is common in slum areas such as in Manila, with frequent outbreaks of leptospirosis in the country. Total mean knowledge score (88.64%) was higher than the total mean attitude

(80.97%) and practice scores (72.12%). However, knowledge on signs and symptoms had the lowest mean score of 79.50%. This shows that knowledge on signs and symptoms need to be emphasized in this age group. However, after an informative lecture, there was a significant increase in their knowledge. Based on the study by Keenan in 2010, knowledge of the disease and its causes allows for protection from the disease. Proper education and awareness improves their knowledge on leptospirosis, which may help protect them from the disease.

The students were asked regarding their outlook on leptospirosis. A positive attitude was measured by concurring with statements about the disease. The total mean pre-test attitude score of students towards leptospirosis was 80.97%, which showed that most of them believe that leptospirosis is serious, treatable and preventable. The scores significantly improved after the lecture ($p < 0.0001$). In the study by Samarakoon et. al., knowledge alone is not sufficient to improve personal preventive practices. A positive attitude should be complemented with the correct knowledge to enhance the ability of individuals to integrate preventive measures into practice.^{11,13}

Practices of students related to leptospirosis had a total mean score of 72.12%, which is slightly higher compared with the study of Arbiol et. al. The practices included in this study were swimming or playing in floodwater, wearing boots when wading in floodwater, and immediate washing of feet with soap after wading in flood. These practices had the highest mean score among the practices measured. Since this study was conducted in an area where flooding is frequent, people living in the area are familiar with protective measures. Rat control measures include cleaning the surroundings and storing food in sealed containers. After the

lecture, the post-test total mean scores were found to be statistically significant from the pre-test total mean score ($p < 0.0001$). Young age and low-income groups were less likely to engage in leptospirosis preventive practices, hence campaigns and strategies to improve these behaviors would be valuable in these population.

Total mean score for health-seeking behaviors was 67.09%, which was the lowest among the practices measured. In the study by Lim et al.¹¹, it was noted that the interaction of poor knowledge and low educational attainment could increase the odds of having unsatisfactory preventive and health-seeking practices. In this study, after the lecture was conducted, there was a significant increase in post-test scores for health seeking behavior. This means that increasing the knowledge of the students about the disease may also improve on their health-seeking behavior.

The most common source of information for this population was television, which is the same in other studies. The positive association between broadcast media and leptospirosis prevention practices is consistent with previous findings, indicating that mass media can produce positive changes or prevent negative changes in health-related behaviors¹¹. Information dissemination and awareness must be heightened through broadcast media. Practical ways to prevent leptospirosis through educational campaign by fliers, posters, and awareness campaigns in schools and through social networking may also be done.

CONCLUSION

This study determined the knowledge, attitude and practices on leptospirosis among adolescents in a public school in Manila. The effect of public health education through a lecture about the disease was measured. The results

showed that there is a significant increase in knowledge, attitude, and practice scores of students after the lecture was provided.

An important finding in this study was that increasing awareness regarding leptospirosis may help in the prevention of the disease in the adolescent population.

The young and low-income groups were less likely to engage in leptospirosis prevention practices, hence campaigns and strategies to improve on such behaviors for this age group would be valuable in reducing the risk and potential economic burden of leptospirosis.

RECOMMENDATIONS

The out-of-school youth population who may have a higher probability of being exposed to the disease can be studied. Comparison of knowledge, attitude, and practices of students between private and public schools may also be done. Area of residence, physical set-up of households, and means of livelihood can be looked into in future studies, and other modes of intervention may be utilized apart from lectures.

Since the study showed positive results, it may be used by policy makers, health educators, and physicians to plan campaigns on leptospirosis. A follow-up study on the study participants may also be done to check whether the students truly understood the lecture and review whether or not they have applied what they learned.

REFERENCE:

1. Report of the second meeting of the leptospirosis burden epidemiology reference group, WHO, 2011
2. Amilasan, A.T, Ujiie M, Suzuki M, Eumelia S, Belo MCP, Koizumi N, Yoshimatsu K, Schmidt WP, Marte S, Dimaano EM, Villarama JB, Ariyoshi K, *Outbreak Of Leptospirosis After Flood In The Philippines*, 2009, Emerging Infectious

- Diseases, Vol. 18, No. 1, January 2012, pp 91-94
3. Leptospirosis Cases, Epidemiology Bureau Public Health Surveillance Division, Department of Health, July 2015
 4. Johnson M, Smith H, Joseph P, Gilman R, Bautista C, Campos C, Cespedes M, Klatsky P, Vidal C, Terry H, Calderon, M, Coral C, Cabrera L, Parmar P, and Vinetz J, *Environmental Exposure And Leptospirosis, Peru*, Emerging Infectious Diseases, Vol. 10, No. 6, June 2004, pp 1016-1022
 5. Wiwanitkit V, *A Note From A Survey Of Some Knowledge Aspects Of Leptospirosis Aong A Sample Of Rural Villagers In The Highly Endemic Area, Thailand, Rural and Remote Health*, Volume 6: 526, 2006, 1-6
 6. Prabhu N, Meera J, Bharanidharan G, Natarajaseenivasan K, Ismail M, Uma A, *Knowledge, Attitude And Practice Towards Leptospirosis Among Municipal Workers In Tiruchirapalli, India*, International Journal of Pharma Research and Health Sciences, Volume 2 (3), 2014, Page-246-254
 7. Mohd Rahim S, Aziah BD, Mohd Nazri S, Azwany YN, Habsah H, Zahiruddin WM, Zaliha I, Mohamed Rusli A, *Town Service Workers' Knowledge, Attitude And Practice Towards Leptospirosis*, Brunei Darussalam Journal of Health, 2012, 5: 1-12
 8. Wildo Navegantes de Araújo, Brooke Finkmoore, Guilherme S. Ribeiro, Renato B. Reis, Ridalva D. M. Felzemburgh, José E. Hagan, Mitermayer G. Reis, Albert I. Ko, and Federico Costa, *Knowledge, Attitudes, And Practices Related To Leptospirosis Among Urban Slum Residents In Brazil*, American Journal of Tropics Medicine and Hygiene, Vol 88(2), 2013, pp. 359–363
 9. Keenan J, Ervin G, Aung M, McGwin Jr, G, Jolly P, *Risk Factors For Clinical Leptospirosis From Western Jamaica*, American Journal of Tropics Medicine and Hygiene, Vol 83(3), 2010, pp. 633–636
 10. Quina, CR, Alamanza JU, Tagarino, JB, *Knowledge, Attitudes And Practices Of Leptospirosis In Catbalogan City, Samar, Philippines*, American Journal of Public Health Research, 2014, Vol 2, No 3, pp 91-98
 11. Arbiol, J, Orencio P, Romena N, Nomura H, Takashi Y, Yabe M, *Knowledge, Attitude And Practices Towards Leptospirosis Among Lakeshore Communities Of Calamba And Los Banos, Laguna, Philippines*, Agriculture, Vol 6, No. 18 2016
 12. Lim, PA, Reyes, MB, Vasque, DJ, Lim, RJ, Palatino, MC, *Association Between Leptospirosis-Related Knowledge And Practices Of Male Pedicab Drivers In Manila*, Acta Medica Philippina, Vol 49, No. 3, 2015, pp 73-79
 13. Samarakoon YM, Gunawardena N, *Knowledge And Self-Reported Practices Regarding Leptospirosis Among Adolescent School Children In A Highly Endemic Rural Area In Sri Lanka*, Rural and Remote Health 13: 2360
 14. Leptospirosis, Clinical Practice Guidelines, 2010
 15. www.pps.com.ph