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Knowledge, attitude, and preventive practices of leptospirosis affected populations in South Andaman, India: A cross-sectional study

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ABSTRACT

Introduction: Leptospirosis is the most common reoccurring zoonosis worldwide. Climatic conditions in tropical and subtropical regions are optimal for Leptospira survival. The pathogen thrives in flood-prone slum settlements of underprivileged areas where waste, open sewers, and standing water are present.

Methods: A descriptive cross-sectional study using universal sampling methodology was conducted to determine associations between sociodemographic variables and knowledge, attitudes, and practices of leptospirosis-infected individuals compared with a control group from the South Andaman population.

Results: Eight hundred and one (388 cases and 413 controls) subjects were included in the study. Overall, 61.5% of the participants were male, while the main occupation of 43.94% of the subjects was farming or agricultural work. Multilogistic regression assessing the likelihood of good knowledge about leptospirosis showed that leptospirosis-positive subjects were more likely to have good knowledge (adjusted odds ratio [AOR]: 3.5 [95% CI: 2.59–4.97], $p < 0.001$), better attitude (AOR: 97.30 [95% CI: 41.72–226.9], $p < 0.001$] than leptospirosis-negative subjects, male population groups were also more likely to have a good attitude (AOR: 3.03 [95% CI: 1.94–4.73], $p < 0.001$), and those whose main occupation is farming were more likely to have a good attitude (AOR: 3.59 [95% CI: 2.31–5.56], $p < 0.001$). The leptospirosis seropositive group was more likely to have good practices (AOR: 5.80 [95% CI: 3.58–8.73], $p < 0.001$), rural residents were 88% less likely to have good practice levels than urban residents (AR: 0.12 [95% CI: 0.07–0.20], $p < 0.01$).

Conclusion: The infected group had better knowledge than the control group. The integration of knowledge and attitudes to maintain good practices, along with the provision of an adequate sanitation system, waste disposal system, and availability of essential personal protective equipment is necessary for disease control in these islands.

Keywords: Leptospirosis; knowledge; attitude; practice; rural population

INTRODUCTION

Leptospirosis is the most common reoccurring zoonotic disease with a significant public health impact worldwide, especially on economically vulnerable populations (1,2). Rodents, cattle, pigs, and dogs are the major reservoirs of the pathogen (2,3). Most human infections occur through direct or indirect contact with the urine and body fluids of infected animals or through contact with soil or water contaminated with the urine of these animals (4,5). According to recent global estimates, leptospirosis causes 1.03 million cases and 58,900 deaths annually. It is estimated that the annual incidence in tropical climates is over ten cases/100,000 people, whereas the rate in temperate zones is much lower (0.1–1/100,000). In high-risk areas, the incidence can increase to 100/100,000 (6). The overall prevalence reported in South Andaman was 10.9%, with a higher prevalence in the rural population (12.9%) than in the urban population (7.0%) (7). Despite recurrent leptospirosis outbreaks, the disease remains a terribly neglected disease due to lack of awareness. Leptospira thrives in tropical and subtropical climates (4,8). Flood-prone slum settlements in underprivileged areas (9), the presence of waste, open sewers, and stagnant water also favor the growth of pathogens, and hosts are exposed to various infections (10). Studies have shown that knowledge, attitude, and practice (KAP) are critical in causing leptospirosis (11–13). Personal behaviors are thought to be motivated by attitudes and influenced by awareness of a disease and its risk factors (14).

Evidence suggests that KAP reports among the rural population of South Andaman among previously infected leptospirosis cases and controls have not yet been published. This study hypothesizes that each person's behavior influences

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their risk of infection. The results of the study will help us develop appropriate evidence-based strategies for prevention and control of leptospirosis in the Andaman Islands. This information is important for uncovering misconceptions that lead to unfair practices and for developing public health strategies to overcome such behaviors. They also help us provide the basis for evaluating the effectiveness of health interventions.

METHODS

South Andaman, located in the Bay of Bengal, coordinates E11.783333°N, 92.65°E with an area of 1,262 km2 and a length of 83 km of the Andaman and Nicobar Islands group (15). The topography of the study area is hilly and undulating, with poor infrastructure, open sewers, inadequate drainage of flood waters, and an underprivileged population.

A descriptive cross-sectional study was conducted in South Andaman district between September 2021 and October 2022. In calculating the sample size, it was assumed that at least 50% of the population would have a good knowledge of leptospirosis. A sample size of 384 was estimated with a power of 80% and a confidence interval (CI) of 95%. The present study includes 388 laboratory-confirmed leptospirosis cases documented in Regional Medical Research Center records from 2010 to 2020. Of the total 1990 laboratory-confirmed cases, 388 individuals (patients with laboratory confirmation) were traced using the contact address in the records. Patients were contacted via telephone and local advertising. After confirmation of Andaman hemorrhagic fever (AHF), identification number (ID) provided during the acute stage of illness, or AADHAR (Aam Aadmi Ka Adhikar – Unique ID by the Government of India) information, cases were included in the study. In addition, 413 healthy individuals comparable by age, sex, region, and occupation were selected as controls. The ratio of cases to controls was 1:1, and a total of 801 subjects agreed to participate. Subjects were asked to present at the nearest community center for a face-to-face interview to complete an interviewer-guided, validated questionnaire that included information on sociodemographics and KAPs. Participants obtained written informed consent.

Oral interviews were conducted using a pretested questionnaire. This structured questionnaire was used as the survey instrument and tested on a sample of 50 individuals. The questionnaire was reviewed and standardized for its general suitability for assessing KAP and for its ease of use. Fifty-two questions are distributed in the following sections: The first section, consisting of eight open-ended questions, addresses the sociodemographic characteristics and general information of the respondents. The second part (44 questions) includes 15 questions about understanding the symptoms, transmission methods, and prevention of leptospirosis, as well as common myths and misconceptions about the disease and environmental risk factors, 15 questions exploring attitudes, and 14 questions about their practices. The 44 total questions included 28 open-ended and 16 closed-ended questions. The open-ended questions could be answered multiple times by each respondent. For the closed-ended questions, interviewers selected the response option from a list of alternatives that matched the participant's response that was recorded. The survey instrument is available upon request.

The language used was Hindi, as the majority of respondents understand Hindi (64,933, 18.2%), but there are a majority of speakers of Bengali (91,582, 25.7%), Tamil (62,961, 17.6%), and Malayalam (28,869, 8.1%) languages in the islands (15). For those participants who could not understand Hindi, the interviewer translated the questionnaire into the respondents' native language. All technical terms were translated and explained by the interviewer. The knowledge questions on signs and complications of leptospirosis were open-ended, and options were generated based on the most frequent responses of the respondents.

The Statistical Package for the Social Sciences (SPSS), version 28.0 (SPSS Inc., Chicago, IL, USA) was used to analyze the data. The proportions of all subjects with leptospirosis were calculated and presented as frequencies (%). The $\chi 2$-test analyzed the association between two categorical variables, at the 95% CI level, $p < 0.05$ was considered statistically significant. Multilogistic regression was performed for all significant variables for the KAP domains using the main effects model method. The percentage of respondents who answered each knowledge question correctly was expressed as good knowledge. The percentages for good behavior and a positive attitude were also expressed for each KAP item. A positive attitude was assumed if respondents answered "strongly agree" or "agree" for the attitude they should have and "disagree" or "strongly disagree" for the attitude they should not have. Those who answered "often" or "always" to the behaviors they should adopt and "never" or "seldom" to the behaviors they should avoid make up the proportion of good behaviors. Those who gave the correct answer were given a score, and the incorrect answer was given a score of zero. A score is awarded for multiple valid options, even if participants made at least one correct choice. Considering the maximum possible score of one point for each item in each knowledge, attitude, and practice category, the maximum score for the knowledge category is 15. Participants who gave seven or fewer correct answers were considered poor; eight or more were considered good knowledge. For the attitude category, the maximum score is 15; participants who gave seven or fewer correct answers were considered poor attitude; eight or more are considered good attitude; and the maximum score for the practice category is 14; seven or more are considered good practice; seven or less are considered poor practice. Respondents' scores were divided by the highest possible score and converted to percentages. Percentage scores were used in the analysis instead of raw scores because it is easier to score on a scale of zero to one hundred.

The Human Ethics Committee approved the study protocol and gave its consent.

RESULTS

The demographic, socioeconomic, and occupational characteristics of the research population (n = 801) in South Andaman are shown in Table 1. The mean age of the total population is 40.91 (standard deviation [SD] 14.30) years. The age range is from 11 to 83 years. 48.43% (388) were

previously infected with leptospirosis (cases), and 51.56% (413) were controls. A total of 202 (25.2%) participants were under 30 years of age, including 89 (22.9%) cases and 113 (27.3%) controls.

A total of 493 (61.5%) were male; of the infected group, 250 (64.4%) were male and 243 (58.8%) were male controls. A total of 308 (38.4%) were female; of the females in the infected group, 138 (35.5%) were female and of the control subjects, 170 (41.16%) were female. A total of 687 (85.7%) of the participants lived in rural areas and 352 (43.94%) were employed full-time in agriculture or as agricultural workers.

The mean (SD) percentage score for overall good knowledge was 22.7 (18.0%), for cases 14.1 (14.7%), and for controls 7.3 (6.9%). Figure 1 shows that 27.1% of cases and 13.8% of controls knew that AHF is also known as leptospirosis. The causative agent of the disease was a bacterium known by 28.9% of the infected group and 22.1% of the controls. Overall, 64% of respondents answered that rats transmit the disease. To the question "Can animals get infected with leptospirosis?" only 28.3% of total participants answered correctly; 17.1% were cases. When asked about measures to prevent rodents in the home, 15.1% of the infected group indicated that they used some type of poison.

As shown in Figure 2, 46.5% of all participants indicated that malaria is a more serious disease in the islands, and 17.3% consider leptospirosis to be a more serious disease. The majority of respondents, 26.5%, received information from the hospital, 10.8% from friends or family, 9.3% from television, and 10.1% from newspapers, while 12.8% of respondents did not know about the disease. Regarding complications of leptospirosis, 53.5% of respondents reported that the disease was fatal, 17.6% had respiratory problems, 18.1% had kidney failure, and 10.7% had liver damage.

Good attitudes toward leptospirosis for the total population averaged (SD) 35.07 (26.4%), cases 27.1 (19.8%), and controls 7.9 (12.0%). As shown in Figure 3, attitudes toward leptospirosis symptoms were generally good for 77.4% of cases and 6.7% of controls. Overall, 84.1% of participants reported that they would need to see a physician if they had a fever. In contrast to symptoms, attitudes toward preventive measures were good in 42.2% of infected and 47.2% of controls. Overall, 89.3% said they were not worried about wearing personal protective equipment (PPE). Most participants, 63.1%, expressed concern about rodents around their home. However, in relation to putting patches on wounds/small cuts, only 13.2% showed a positive attitude when dealing with litter.

The mean (SD) for the good practices of the total population was 47.12 (26.0%), including 30.2 (17.8%) for the infected group and 16.9 (9.0%) for the control group. As shown in Figure 4, most case respondents (35.5%) had acceptable preventive practices for waste handling and glove use — yet good practices were 64.8% for the infected group and 30.2% for the controls. For food containers, a total of 95.0% was observed.

A chi-square test was used to analyze the association between sociodemographic variables and participants' KAP scores. There was a significant association between disease positivity and participants' good knowledge, as shown in Table 2. Leptospirosis confirmed subjects 282 (61.4%) have a better understanding $p \leq 0.05$, than the comparison group 177 (38.6%). The analysis of knowledge and occupation showed a significant understanding of participants working in agriculture 227 (49.5%). The age group of the participants also showed a significant relationship. However, the analysis of place of residence and gender was not significant.

In the attitude domain, a significant relationship was found with disease positivity, as the group infected with leptospirosis 244 (97.6%) tended to have better attitude than the

TABLE 1. Demographic profile of cases and control

Variable	Cases (%)	Control (%)	Total (%)
Gender			
Male	250 (64.4)	243 (58.8)	493 (61.5)
Female	138 (35.5)	170 (41.1)	308 (38.4)
Total	388 (100)	413 (100)	801 (100)
Age			
<30	89 (22.9)	113 (27.3)	202 (25.2)
>30	299 (77.0)	300 (72.6)	599 (74.7)
Total	388 (100)	413 (100)	801 (100)
Place of residence			
Rural	364 (93.8)	323 (78.2)	687 (85.7)
Urban	24 (6.1)	90 (21.7)	114 (14.2)
Total	388 (100)	413 (100)	801 (100)
Occupation			
Agriculture	250 (64.4)	102 (24.6)	352 (43.9)
Non-agriculture	138 (35.5)	311 (75.3)	449 (56.0)
Total	388 (100)	413 (100)	801 (100)

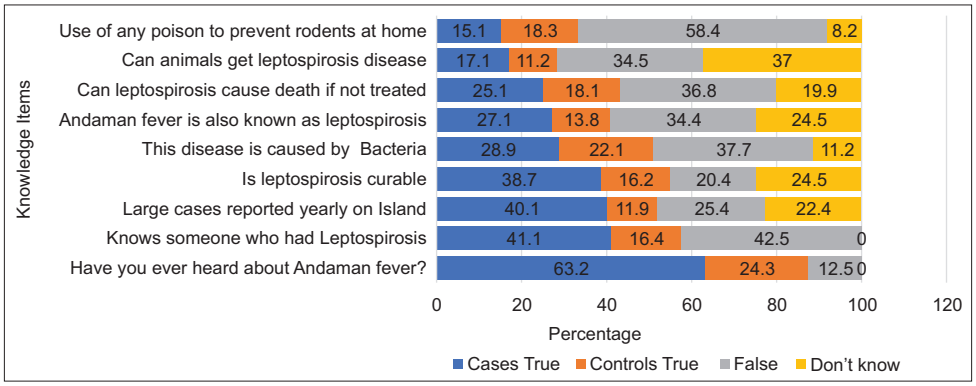

FIGURE 1. Good knowledge regarding leptospirosis among the subjects.

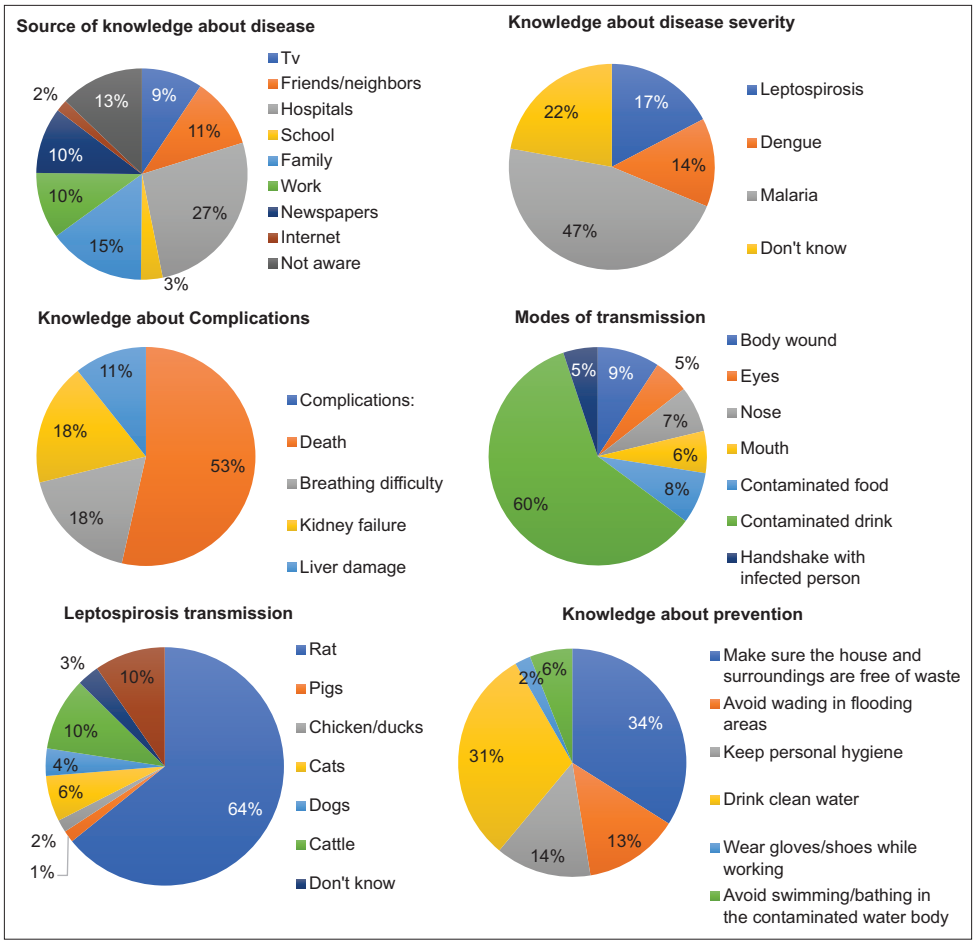

FIGURE 2. Good knowledge regarding the leptospirosis pie chart among overall subjects.

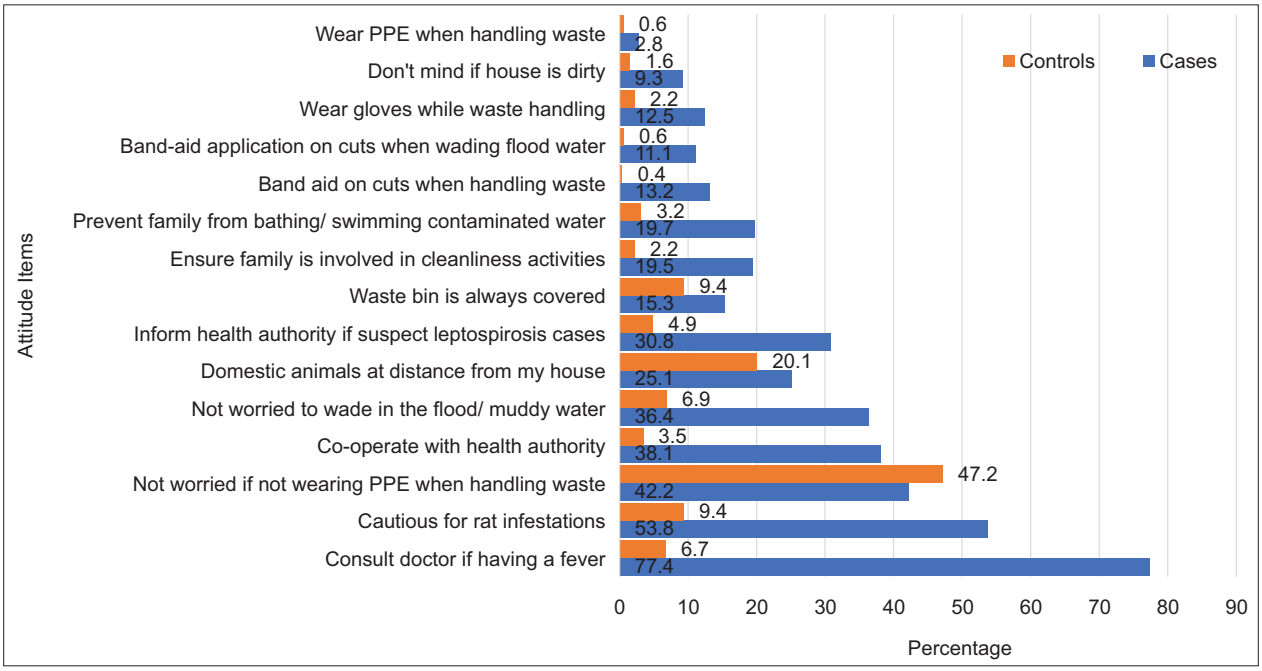

FIGURE 3. Positive attitude toward leptospirosis among the cases and controls.

seronegative participants 6 (2.4%), the results are significant at $p < 0.05$. A significant relationship was also observed with gender, where 184 (73.6%) of the male population had good attitude. The good attitude of 186 (74.4%) of the participants who practice agriculture as a profession is also significant as shown in Table 3.

A significant association was found between leptospirosis positivity (68.9%) and good practices. The association with place of residence was also significant, with 73.1% of rural participants having better practices than only 26.9% in urban areas. However, there was no other significant relationship as shown in Table 4.

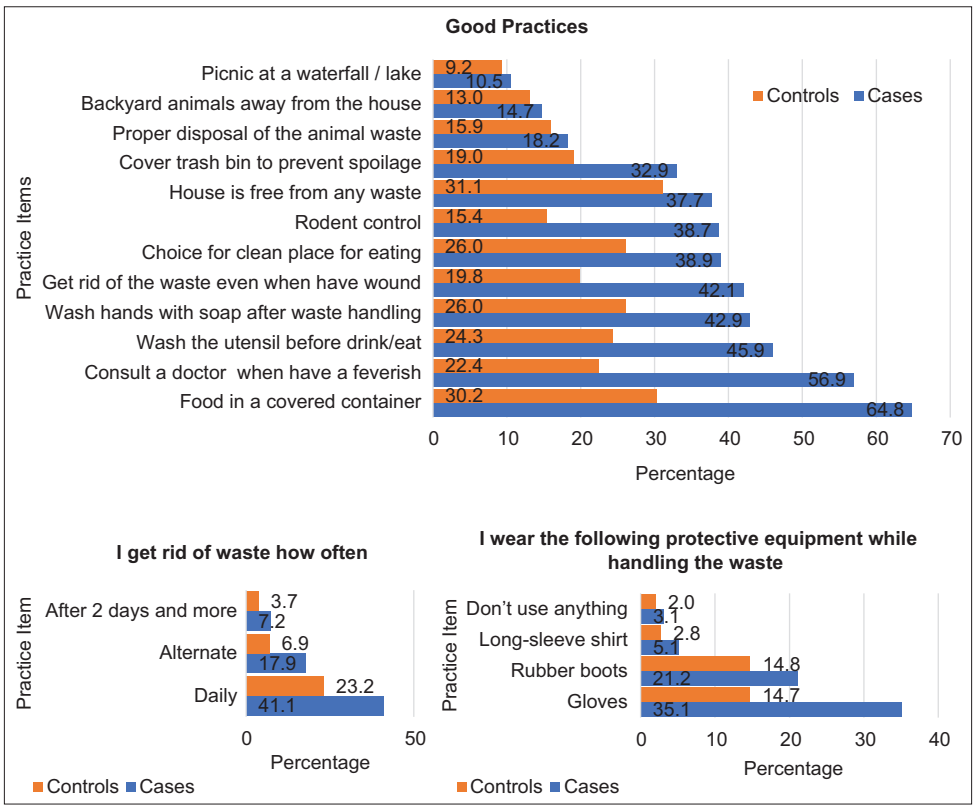

FIGURE 4. Positive prevention practices toward leptospirosis among the cases and controls.

TABLE 2. Association between sociodemographic characteristics with knowledge levels of subjects regarding leptospirosis

Variables	Good knowledge						*p*-value
	Good		Poor		Total		
	n	%	n	%	n	%	
Age classification							
≤30 years	129	28.1	73	21.3	202	25.2	*p*=0.047
31–50 years	226	49.2	172	50.3	398	49.7	
>50 years	104	22.7	97	28.4	201	25.1	
Total	459	100.0	342	100.0	801	100.0	
Gender of the participant							
Male	280	61.0	213	62.3	493	61.5	*p*=0.713
Female	179	39.0	129	37.7	308	38.5	
Total	459	100.0	342	100.0	801	100.0	
Residence							
Rural	401	87.4	286	83.6	687	85.8	*p*=0.134
Urban	58	12.6	56	16.4	114	14.2	
Total	459	100.0	342	100.0	801	100.0	
Occupation							
Agriculture	227	49.5	125	36.5	352	43.9	*p*<0.001
Non-agriculture	232	50.5	217	63.5	449	56.1	
Total	459	100.0	342	100.0	801	100.0	
Seropositivity of leptospirosis							
Positive	282	61.4	106	31.0	388	48.4	*p*<0.001
Negative	177	38.6	236	69.0	413	51.6	
Total	459	100.0	342	100.0	801	100.0	

%: Column percentage

TABLE 3. Association between sociodemographic characteristics with attitude levels of subjects regarding leptospirosis

Variables	Good attitude						*p*-value
	Good		Poor		Total		
	n	%	n	%	n	%	
Age classification							
≤30 years	65	26.0	137	24.9	202	25.2	*p*=0.874
31–50 years	125	50.0	273	49.5	398	49.7	
>50 years	60	24.0	141	25.6	201	25.1	
Total	250	100.0	551	100.0	801	100.0	
Gender of the participant							
Male	184	73.6	309	56.1	493	61.5	*p*<0.001
Female	66	26.4	242	43.9	308	38.5	
Total	250	100.0	551	100.0	801	100.0	
Residence							
Rural	221	88.4	466	84.6	687	85.8	*p*=0.151
Urban	29	11.6	85	15.4	114	14.2	
Total	250	100.0	551	100.0	801	100.0	
Occupation of the participant							
Agriculture	186	74.4	166	30.1	352	43.9	*p*<0.001
Non-agriculture	64	25.6	385	69.9	449	56.1	
Total	250	100.0	551	100.0	801	100.0	
Seropositivity of leptospirosis							
Positive	244	97.6	144	26.1	388	48.4	*p*<0.001
Negative	6	2.4	407	73.9	413	51.6	
Total	250	100.0	551	100.0	801	100.0	

%: Column percentage

Multilogistic regression was performed to assess factors influencing good knowledge of leptospirosis, with poor knowledge set as the baseline. Positive leptospirosis cases were more likely to have good knowledge (adjusted odds ratio [AOR]: 3.5 [95% CI: 2.59–4.97], p < 0.001) than leptospirosis-negative individuals. In addition, individuals aged thirty and under had a higher odds ratio (AOR: 1.6 [95% CI: 1.14–2.29], p < 0.006) of being well knowledgeable about leptospirosis than individuals aged more than 30 years, as shown in Table 5.

TABLE 4. Association between sociodemographic characteristics with practice levels of subjects regarding leptospirosis

Variables	Good practice						*p*-value
	Good		Poor		Total		
	n	%	n	%	n	%	
Age classification							
≤30 years	64	29.2	138	23.7	202	25.2	*p*=0.234
31–50 years	106	48.4	292	50.2	398	49.7	
>50 years	49	22.4	152	26.1	201	25.1	
Total	219	100.0	582	100.0	801	100.0	
Gender of the participant							
Male	131	59.8	362	62.2	493	61.5	*p*=0.537
Female	88	40.2	220	37.8	308	38.5	
Total	219	100.0	582	100.0	801	100.0	
Residence							
Rural	160	73.1	527	90.5	687	85.8	*p*<0.001
Urban	59	26.9	55	9.5	114	14.2	
Total	219	100.0	582	100.0	801	100.0	
Occupation of the participant							
Agriculture	93	42.5	259	44.5	352	43.9	*p*=0.605
Non-agriculture	126	57.5	323	55.5	449	56.1	
Total	219	100.0	582	100.0	801	100.0	
Seropositivity of leptospirosis							
Positive	151	68.9	237	40.7	388	48.4	*p*<0.001
Negative	68	31.1	345	59.3	413	51.6	
Total	219	100.0	582	100.0	801	100.0	

%: Column percentage

TABLE 5. Multi-logistic regression model exploring significant sociodemographic variables of knowledge level toward leptospirosis

Good knowledge	Odds ratio	95% Confidence interval		Sig.
		L	U	
Intercept				0.0
Seropositivity				
Leptospirosis positive	3.58	2.59	4.97	**0.0001**
Leptospirosis negative				
Occupation				
Agriculture	1.05	0.76	1.46	0.740
Non-agriculture				
Age group				
≤30 years	1.62	1.14	2.29	**0.006**
≥31 years				

Bold numbers indicate statistical significance.

A multilogistic regression analysis was performed with poor attitude as the baseline. Accordingly, leptospirosis-positive individuals had better attitudes toward leptospirosis disease than leptospirosis-negative individuals (AOR: 97.30 [95% CI: 41.72–226.9], p < 0.001), the male population was also more likely to have a good attitude than the comparison group (AOR: 3.03 [95% CI: 1.94–4.73], p < 0.001), and the main occupation in agriculture showed a higher probability of a good attitude (AOR: 3.59 [95% CI: 2.31–5.56], p < 0.001), as indicated in Table 6.

Table 7 shows the multilogistic regression analysis with the level of leptospirosis practice and demographic variables, with poor practice as the baseline. This shows that subjects with leptospirosis seropositivity had a higher probability of having a good level of practice than the comparison group (AOR: 5.80 [95% CI: 3.58–8.73], p < 0.001). Rural residents were

TABLE 6. Multi-logistic regression model exploring significant sociodemographic variables of attitude level toward leptospirosis

Good attitude	Odds ratio	95% Confidence interval		Sig.
		L	U	
Intercept				0.0
Seropositivity				
Leptospirosis positive	97.30	41.72	226.9	**0.0001**
Leptospirosis negative				
Gender				
Male	3.03	1.94	4.73	**0.0001**
Female				
Occupation				
Agriculture	3.59	2.31	5.56	**0.0001**
Non-agriculture				

Bold numbers indicate statistical significance.

TABLE 7. Multi-logistic regression model exploring significant sociodemographic variables of practice level toward leptospirosis

Good practice	Odds ratio	95% Confidence interval		Sig.
		L	U	
Intercept				0.206
Seropositivity				
Leptospirosis positive	5.80	3.58	8.73	**0.0001**
Leptospirosis negative				
Place of residence				
Rural	0.12	0.07	0.20	**0.0001**
Urban				

Bold numbers indicate statistical significance.

88% less likely to have a good practice level than urban residents (AOR: 0.12 [95% CI: 0.07–0.20], p < 0.001).

DISCUSSION

This is the first study to describe the knowledge, attitudes, and preventive practices of leptospirosis-infected and non-infected residents of South Andaman in the Andaman Islands. In our study, 87.5% of respondents had heard of the disease. Another recent study from the endemic city of Madurai, India, which included both rural and urban respondents, found that there was limited knowledge (0.1%) of leptospirosis transmission by rats (16). In a survey in a peripheral part of South Chennai among high-risk individuals, 40.9% considered leptospirosis to be a disease (17). In Tiruchirapalli, India, 18.9% of urban employees knew of leptospirosis disease (13). A report of leptospirosis in Kelantan found that 12.8% had heard of the disease (18). In a study conducted in Argentine slums, most participants (83.2%) had heard of leptospirosis (12). However, both this study and a study from urban slums in Brazil found that community members were unable to make the necessary behavioral changes even with a high level of knowledge about leptospirosis (10, 16). In our study, we face similar challenges because leptospirosis is endemic in these islands (19) and most of the rural population is from a low-income group and cannot afford the cost of PPE. Communities are likely to adopt risk reduction strategies if the availability of at least essential personal protective equipment, such as gloves and rubber boots, is improved. In addition, daily trash collection should be expanded by installing more covered trash cans and hiring personnel to remove trash from disposal sites on a daily basis.

In our study, crucial behaviors such as putting a Band-Aid on a small cut during trash collection (13.2% of cases, 0.6% of controls) or wading through flood waters (11.1% of cases, 0.6% of controls) were dire conditions. In other findings from urban areas in Selangor, Malaysia, most Malaysian wet market workers (36.8%) and non-Malaysian wet market workers (10.1%) were unaware that cuts and wounds on the body were among the modes of transmission of leptospirosis (20). However, Kelantan urban workers had an overall satisfactory attitude of 64.9% toward leptospirosis (18); cross-sectional estimates from northeast Malaysia showed 52% satisfactory attitude (21). The urban population of Selangor, Malaysia, had good attitudes toward cooperation with health authorities in leptospirosis prevention programs (87.9%) (22). A study from Brazilian slums reported that 32.3% of households had open sewers and that socioeconomic level, sanitation, and housing environment quality characteristics directly or indirectly influenced all other response factors. Residents in unsanitary regions were more likely to be exposed to sources of contamination such as open sewers near their homes (9). Our results related to attitudes toward rodent control measures within the household environment were (53.8% cases and 9.4% control). In a study from Salvador, Brazil, it was reported that 72% of respondents used ineffective or risky methods to eliminate rat infestations in their homes, such as chumbinho, an illegal and dangerous rodenticide (10). Approximately 89.39% of all respondents (47.2% controls + 42.2% cases) indicated that they were not concerned even if they did not wear PPE because there are many rural and remote areas in the Andaman Islands that make it difficult to access health, education, and primary health care facilities.

Of the respondents from the non-high-risk group in Selangor, 77% had good food handling practices (22). We also obtained good scores for keeping food in a covered container (95.0% overall: 64.8% of cases, 30.2% of controls). Poor scores for keeping backyard animals at some distance from the house; this could be because people are reluctant to keep cattle far from their houses. After all, they value them very much and treat them like family. In addition, there needs to be a proper system for disposing of cattle waste, one of the main causes of disease transmission. A study from the Philippines among farmers and non-farmers found that the overall average practice (66.3%) was much higher than that of farmers (57.5%), which was statistically significant (11), also indicating the need to educate farmers on preventive practices and change their behavior through formal farmer training.

In an Arizona study of canine leptospirosis, 86% of respondents were reluctant to vaccinate their dogs against leptospirosis because of potential side effects (23). In endemic leptospirosis areas, pets must be vaccinated because it is essential for animal and human health. In the rural population of the Andaman Islands, almost every household has a pet cat and dog, but an appropriate pet vaccination schedule is required. A study of visitors to a recreational forest in Malaysia found that 57% and 51.3% of respondents cited wearing shoes in the recreational area and avoiding water activities as leptospirosis prevention measures, respectively (24). The study site and other slum settlements in Salvador indicate an increased risk of infection during flooding due to inadequate drainage of rainwater and clogging of sewage systems with mud and garbage (9). Large-scale infrastructure initiatives, such as the development of formal and functional sewage systems, can reduce the burden of leptospirosis in tropical regions. Leptospirosis is a global problem; a collective approach is needed to control the disease (25).

Limitations

The self-report data used in this study allowed us to identify several possible biases. Respondents may have had memory lapses and biases when answering sensitive topics such as smoking and personal hygiene (17). In these cases, instead of expressing their genuine opinion, respondents might give an answer that they believe would be more socially acceptable. Another limitation of the study is that most of the subjects were adults, because leptospirosis is more common in adults but has also been reported to cause infections in children (26).

CONCLUSION

This study entails inconsistencies in the KAP of the subjects. Efforts to change behaviors need to be strengthened to promote good knowledge and positive attitudes toward prevention. It points to the importance of proper integration of knowledge and attitude in reformulating into sustainable practices. Proper drainage systems, waste disposal systems, and availability of essential PPE are necessary to control the disease in developing countries and especially in endemic areas. High-risk areas can be gradually transformed into low-risk areas by reducing environmental exposure through health interventions. Community-based health education must be conducted to change knowledge about leptospirosis and preventive practices. Identifying at-risk areas in the population in relation to KAP will help policy makers develop a targeted and well-directed intervention program against leptospirosis.

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CONFLICTS OF INTEREST

The authors declare that they have no competing interests.

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