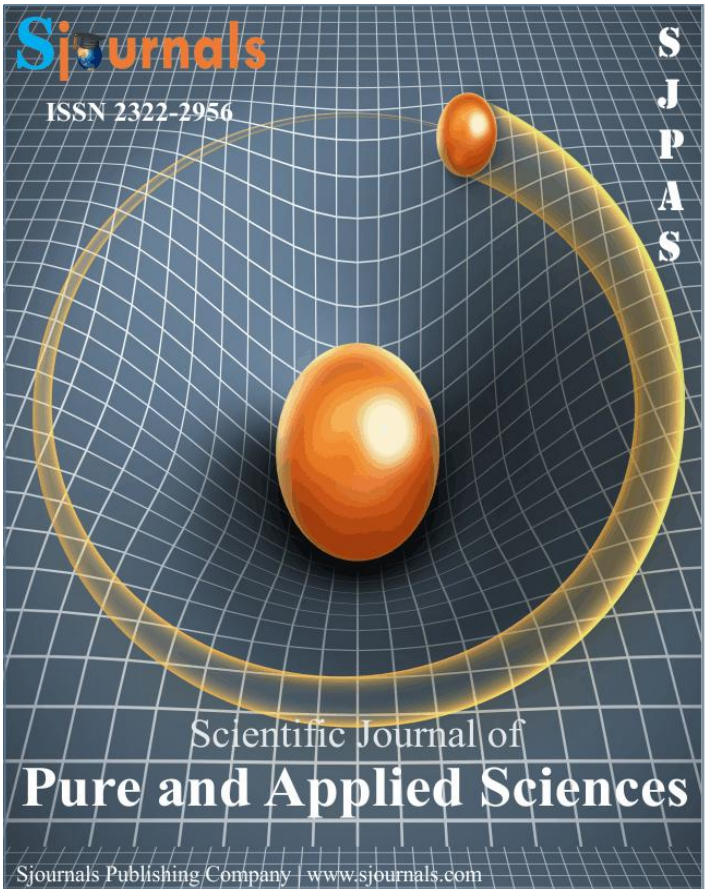

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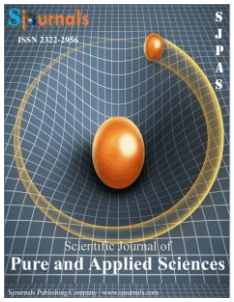

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Original article

Level of awareness and frequency of contacts with common-known exposure factors of Leptospirosis among pig farmers and slaughterhouse workers in Kaduna Metropolis, Kaduna State Nigeria

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ABSTRACT

To investigate the level of awareness and frequency of exposure to the commonly-known exposure factors of leptospirosis among pig farmers and slaughterhouse workers in Kaduna, a cross-sectional study was conducted in Kaduna metropolis. Of the 100 selected respondents, 13 (13.0%) of them had awareness of leptospirosis and 42 (42.0%) of the respondents had frequent contacts with common - known exposure factors that predispose them to the infection, with the highest frequency of contacts among respondents with no formal education, 66.67%. In conclusion, there is a high frequency of contact among the respondents to common known factors that predisposes them to the infection and low awareness level among them. This could constitute a health risk to the pig farmers and slaughterhouse workers in the metropolis; hence there is need for an increased enlightenment campaign about the infection and its zoonotic implications to the target population.

1. Introduction

Leptospirosis is one of the most common occupationally acquired infectious diseases and one of the most common diseases transmitted from animals to humans (zoonotic diseases) in Nigeria (Onyemelukwe, 1993). It has a re-emerging health problem because of its increasing incidence among humans and domestic animals (Vijayachari et al., 2008; Cruz et al., 2009; Adler and De la Pena Moctezuma, 2010). The infectious disease is caused by *Leptospira*, a Gram-negative tightly and helically coiled spirochaete bacteria. Rodents are the reservoirs of the pathogenic leptospires in natural foci (Valkonen et al., 2002), and also the disease can affect domestic animals like cattle, sheep, goats, pigs, horses and dogs in the environment. The reported prevalence of the disease in animals across Nigeria ranges between 1.0 – 33.4% (Agunloye et al., 2000; Adah, 2013) and in humans its prevalence is around 13.5% (Onyemelukwe, 1993).

Epidemiologically, Leptospires annual rates of infection vary from 10 to 100 per 100,000 persons in tropical climates (Adler and Faine, 1983), due mainly to longer survival of the organism in the warm, humid environment. Transmission of the infection may be by direct contact with urine from infected animals (Faine et al., 1999) or indirect transmission through contact with surfaces that have been contaminated from urinary shedding, including contaminated effluent, feed, water, bedding or soil (Kingscote, 1986).

People that are most commonly infected with this infectious disease include occupational, recreational, or domestic workers that often come in contact with infected animals and their excretions (Adler and De la Pena Moctezuma*,* 2010; Dutkiewicz et al., 2011). In humans, there is a clinical distinction of the infection between anicteric form of the infectious disease, which has a milder course with flu-like signs and symptoms, and the severe clinical picture of icteric leptospirosis (Weil disease), characterized by fever with chills, headache and myalgias with severe manifestations like, hepatic and renal dysfunctions, extensive hemorrhaging, cardiovascular symptoms, meningitis and clouding of the state of consciousness (Weil, 1886; Jenkins et al., 1979; Higgns et al., 1980).

Samples for diagnosis of leptospirosis could include blood, cerebrospinal fluid, urine, or organ biopsies and diagnosis can be carried out by bacterial culture, isolation and identification and serological techniques, including Microscopic Agglutination Test (MAT), Enzyme-linked Immunosorbent Assays (ELISA), among others and also using molecular techniques such as Polymerase Chain Reaction (PCR), Amplified Fragment Length Polymorphism (AFLP), among others (Miller et al., 1989; Mendoza and Prescott, 1992).

2. Materials and methods

Structured questionnaires consisting of closed ended questions were administered to respondents which included the pig farmers and the pig slaughterhouse workers to assess their level of awareness and frequency of contacts with common-known exposure factors of leptospiral infection. The study cut across the four (4) Local Government Areas that make up Kaduna metropolis including; Kaduna South, Kaduna North, Chikun and Igabi Local Government Areas.

Kaduna metropolis has an estimated human population of 1,558,563of which less than 1% (15,585) is pig farmers and slaughterhouse workers, according to the National Population census (2006). But following a pivot study, the population of pig farmers and slaughterhouse workers is a fraction of the total population of people in the metropolis, hence that detected our sample size.

A total number of 100 structured questionnaires consisting of closed ended questions were administered to the pig farmers and pig slaughterhouse workers. The questionnaires were distributed across the study area, using the non-probability sampling schemes including the purposive and convenience sampling system based on the availability and corporation of the respondents around each area. The results obtained were presented using tables (descriptive statistics) while Chi-square test and Fisher's exact test were used to analyze the data obtained.

Some of the common-known exposure factors considered in the questionnaire include, careless handling and contact with aborted tissues, body fluid and excretions from sick animals, non-use of protective gloves, clothing and foot wears while handling the animals, non-washing of hands after handling the animals with appropriate disinfectants or while eating within the working environment, inadequate protection of injuries while handling animals and their by-products, etc.

3. Results and discussion

A total of 100 questionnaires were administered to the respondents, of which 35 questionnaires each were administered to respondents at Chikun and Kaduna-South Local government areas and 15 each were administered to those at Igabi and Kaduna-North Local government areas. Seventy of the questionnaires were administered to pig farmers and 30 to slaughterhouses workers. Seventy six (76) of the questionnaires were administered to the male respondents while 24 questionnaires were administered to the female respondents (Table 1). Twenty one (21) of the respondents were ≤ 18 years, 62 of them were between 18 - 45 years of age and 17 of them were ≥ 45 years (Table 1). While 3 of the respondents had no formal education, 21 of them had primary education, 72 of them had secondary education and 4 of them had tertiary education (Table 1). Of the 100 respondents, 13 (13.0%) of them had awareness of leptospirosis, and while 2 (6.67%) out of the 30 respondents from slaughterhouses were aware of the infection, 11 (15.71 %) out of the 70 respondents from pig farms had awareness of the infectious disease (Table 2). Although there was no statistically significant difference in awareness in relation to sexes of the respondents ($p = 0.259$), 2 (8.33%) out of the 24 female respondents had awareness of the infection and 11 (14.47%) of the 76 male respondents were aware of it (Table 2). None of the respondents of ages, ≤ 18 years had awareness of leptospirosis. While 10 (16.12%) of the 62 respondents between 18 – 45 years old were aware of the infection, 3 (17.65%) of the 17 respondents of ages ≥ 45 years had awareness of the infection with statistically significant difference ($p = 0.000$) among the age groups (Table 2). None of the 3 respondents with no formal education was aware of the disease condition, 1 (4.76%) of the 21 respondents with primary education were aware of the infection and 9 (12.5%) of the 72 respondents with secondary education had awareness of the infection and 3 (75.0%) of the 4 respondents with tertiary education were aware of the infection with a statistically significant difference ($p = 0.0000$) between respondents (Table 2).

Of the 100 respondents, 42 (42%) had frequent contacts with common-known exposure factors which predisposes them to the infectious disease (Table 3). Although there was no statistically significant association ($p = 0.198$) between the frequency of contacts with common-known exposure factors to leptospirosis and sex of the respondents, there were larger number of male respondents with frequent contacts to such factors (46.05%) than the female (29.17%) (Table 3). Occupationally, Seventeen (56.67%) of the 30 slaughterhouse worker had frequent contacts with common-known exposure factors, while 25 (35.71%) of the 70 pig farmers had frequent contacts with factors of the infection (Table 3). Thirteen (61.90%) of the 21 respondents ≤ 18years had frequent contacts with common-known exposure factors to leptospirosis while 27 (43.54%) of the 62 respondents between 18 – 45 years had frequent contacts with common-known factors and 2 (11.76%) of the 17 respondents ≥ 45years had frequent contacts with common-known exposure factors of the infection (Table 4.7). Two (66.67%) of the 3 respondents with no formal education had frequent contacts with the exposure factors to leptospiral infection, 11 (52.38%) of the 21 respondents with primary education had frequent contacts with the factors and 29 (40.28%) of the 4 respondents with tertiary education had frequent contacts with common-known exposure factors of the infection. There was a statistically significant difference ($p = 0.0027$) among the different educational levels (Table 3).

Table 1
Demographic representation in relation to occupation, age, sex and educational status of the respondents .

Variable	Respondents	Chikun LGA	Kaduna - South LGA	Kaduna - North LGA	Igabi LGA	Total	Percentage (%)
Sex	Male	30	10	24	12	76	76
	Female	5	5	11	3	24	24
Occupation	Farm workers	27	8	22	13	70	70
	Slaughterhouse workers	13	6	8	3	30	30
Educational Status	No formal edu.	1	0	1	1	3	3
	Primary edu.	6	4	9	2	21	21
	Secondary edu.	27	10	23	12	72	72
	Tertiary edu.	1	1	2	0	4	4
Age	≤ 18 years	9	12	6	4	21	21
	18 – 45 years	20	11	23	8	62	62
	≥ 45 years	6	2	6	3	17	17

Table 2
The level of awareness to leptospirosis in relation to occupation, age, sex and educational status among the respondents.

Variable	Parameter	Num. of respondents	Num. of respondents with awareness	Percentage (%)	p-value	X^2
	Total	100	13	13		
Occupation	Farm workers	70	11	15.71	0.149	2.355
	Slaughterhouse workers	30	2	6.67		
Age	≤ 18 yrs	21	0	0.00	0.000	29.41
	18 – 45 yrs	62	10	16.12		
	≥ 45 yrs	17	3	17.65		
Sex	Male	76	11	14.47	0.259	1.796
	Female	24	2	8.33		
Edu Level	No formal edu	3	0	0.00	0.000	21.32
	Primary edu	21	1	4.76		
	Secondary edu	72	9	12.50		
	Tertiary edu	4	3	75.00		

Table 3
Frequency of contacts with common-known exposure factors to leptospirosis in relation to occupation, age, sex and educational status among the respondents.

Variable	Parameter	Num. of respondents	Freq of contacts with known exposure factors	Percentage (%)	p-value	X^2
	Total	100	42	42		
Occupation	Farm workers	70	25	35.71	0.274	1.485
	Slaughterhouse workers	30	17	56.67		
Age	≤ 18 yrs	21	13	61.90	0.0092	7.26
	18 – 45 yrs	62	27	43.54		
	≥ 45 yrs	17	2	11.76		
Sex	Male	76	35	46.05	0.198	1.42
	Female	24	7	29.17		
Edu Level	No formal edu	3	2	66.67	0.0027	9.15
	Primary edu	21	11	52.38		
	Secondary edu	72	29	40.28		
	Tertiary edu	4	1	25.00		

The low level of awareness (13.0%) obtained in this finding could be ascribed to low literacy level and poor information dissemination about the disease to the general populace especially as regards its zoonotic implication. This is in agreement with the findings of Ngbede et al. (2012), with an awareness of 5.48%, who suggested that this low level of awareness might have been due to low level of formal education among the respondents and the fact that the disease has no name in the local dialects of the people.

The higher level of awareness among men could be due to the fact that most of the established farms are managed by men; hence their quest for information to improve their farm management practices and productivity in general and also may be due to beliefs and cultural practices. This agrees with the findings of Mukhtar and Kokab (2008) and Brown et al. (2011).

The highest level of awareness observed among respondents of ages ≥ 45 years shows that there is association between awareness of the infectious disease and the ages of the respondents. This could be attributed

to the fact that the older farmers gain more experience and information with time. A higher level of awareness observed among the farm workers could be ascribed to the quest for increased knowledge among farm workers in order to increase productivity and make more profit.

Although there was no statistically significant association between them ($p = 0.198$), the larger number of male respondents with frequent contacts with common-known exposure factors of the disease despite their higher level of awareness, could be attributed to the attitudinal reluctance of the male population to adopt good hygienic practices. The higher frequency of contacts with common-known exposure factors among respondents ≤18 years could be ascribed to poor knowledge of the infection among them and the attitudinal reluctance of the respondents to adopt healthy hygienic life style.

While there was no statistically significant association ($p = 0.274$) between occupation of the respondents and frequency of contacts with common-known exposure factors to leptospirosis, the higher frequency of contacts among the slaughterhouse workers could be attributed to poor knowledge of the infection among the workers and their closer contact with such animals.

With the lowest frequency of contacts among the respondents with tertiary educational (25.0%) and a statistically significant association of ($p = 0.0027$) between respondents educational status and the frequency of contacts with the common known exposure factors, there is tendency that the more educated the population are, the less frequently they come in contacts with factors that predispose them to leptospirosis.

4. Conclusion

There should be increased enlightenment campaign about the infection and its zoonotic implications among pig farmers and slaughterhouse workers. The farmers and slaughterhouse workers should be encouraged to take some personal protective measures while working on farms and during slaughter and dressing of pig carcasses. Study on the infection should be extended to other regions within the state and the country at large as to provide information of the infection of the country and as such formulate an effective strategy to contain it.

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