Article

PAMJ One Health

Research

Knowledge, attitudes and practices relating to avian influenza among poultry workers in Ejisu-Juaben Municipality of Ashanti Region, Ghana

Richard Bediako Asare, Raphael Deladem Folitse, Vitus Burimuah, Joseph Atawalna, William Tasiame, Benjamin Obukowho Emikpe

Corresponding author: Benjamin Obukowho Emikpe, School of Veterinary Medicine, Kwame Nkrumah University of Science and Technology, Kumasi, Ghana. banabis2001@yahoo.com

Received: 28 Aug 2020 - **Accepted:** 13 Dec 2020 - **Published:** 05 Jan 2021

Keywords: Avian influenza, knowledge, attitudes, practices, poultry workers, Ghana

Cite this article: Richard Bediako Asare et al. Knowledge, attitudes and practices relating to avian influenza among poultry workers in Ejisu-Juaben Municipality of Ashanti Region, Ghana. PAMJ - One Health. 2021;4(1). 10.11604/pamj-oh.2021.4.1.25797

Available online at: https://www.one-health.panafrican-med-journal.com/content/article/4/1/full

Knowledge, attitudes and practices relating to avian influenza among poultry workers in Ejisu-Juaben Municipality of Ashanti Region, Ghana

Richard Bediako Asare[1], Raphael Deladem Folitse[1], Vitus Burimuah[1], Joseph Atawalna[1], William Tasiame[1], Benjamin Obukowho Emikpe[1,&]

[1]School of Veterinary Medicine, Kwame Nkrumah University of Science and Technology, Kumasi, Ghana

[&]**Corresponding author**

Benjamin Obukowho Emikpe, School of Veterinary Medicine, Kwame Nkrumah University of Science and Technology, Kumasi, Ghana

Abstract

Introduction: *Avian influenza (AI) outbreaks have caused serious economic losses to poultry farmers since it was first reported in Ghana in 2007. Knowledge of AI is an important tool in its prevention and control. This study assess farmers´*

knowledge and awareness on AI recognition, prevention and control practices in poultry in the Ejisu-Juaben Municipality of the Ashanti Region, Ghana. ***Methods:*** *a descriptive cross-sectional survey using a structured questionnaire was used in this study. Correlation analysis was done to determine the relationship between Knowledge, attitude and Practice scores.* ***Results:*** *a total of 140 respondents were interviewed of which almost all (90.7%) were males, their average age was 31.21±9.78 years and 84 (60%) had less than 5 years of working experience. The study established that ninety-seven (69.3%) respondents have heard of AI and the major sources of information were Radio (35.5%) and TV (22.6%). The majority of the participants had poor preventive and control practices (61.4%) and poor knowledge (87.1%) regarding AI source & spread of infection and clinical signs in birds. Only thirteen (9.29%) were able to correctly define AI as a viral disease of birds. Fifty-seven (40.7%) respondents believe that AI can infect humans. More than half (67.9%) of the study population believed AI is fatal. There was an association between knowledge and practices (p-value=0.008).* ***Conclusion:*** *there is a gap in knowledge and preventive practices relating to AI among poultry workers in the Ejisu-Juaben municipality. Educational campaign programmes are recommended to be intensified preferably via radio and television broadcast.*

Introduction

Livestock and poultry have an important role in the Ghanaian national economy, contributing significantly to agriculture and the gross national product. The poultry sector is an essential component of farming systems and has created both direct and indirect employment opportunities, enhanced food security and supply of quality protein to people´s meals, contributing to the country´s economic growth and decreasing poverty level in rural and urban areas in developing countries [1]. The demand for poultry products in Ghana exceeds the supply with local production falling short below 10% of total demand. However, local poultry producers continue to struggle for survival [2]. Given this, there is the need for Ghana to formulate and implement policies that are conducive for improved local poultry production. Factors that threaten the poultry industry include diseases, importation of day-old-chicks, hatching eggs and frozen poultry products into Ghana, urbanization that competes with lands/location for poultry farms, illegal importation and sales of unapproved (substandard) vaccines, drugs, and other biological products, unfavorable government policies among others [3]. Important diseases that hamper the growth of the poultry industry in Ghana include Avian Influenza (Bird Flu), Newcastle disease, Infectious Bursal Disease (Gumboro), Coccidiosis, Avian Pox, and Aspergillosis [4].

Avian Influenza (AI) or "Bird Flu" is a highly contagious viral infection that can affect all species of birds as well as humans and can manifest itself in different ways depending mainly on the virulence of the virus strain [5]. The disease is characterized by high morbidity and mortality approaching 100% in domestic fowls [6] and could be contracted by humans and other animals thus making it an emerging pandemic of zoonotic importance [7]. Millions of birds have died due to AI and there is a growing concern over the loss of human lives and the management of its pandemic potential [8]. Avian influenza is one of the most important poultry diseases associated with high economic and public health implications worldwide. Knowledge of farmers and other stakeholders in the poultry industry on AI is an important component of the prevention and control of AI in poultry and humans [9]. High pathogenic avian influenza outbreak was first reported in Ghana in 2007 and this resulted in estimated economic losses of US$26.3 million to the poultry farmers and traders in the poultry industry [10]. Since 2007 there have been quite a lot of awareness and education campaigns on avian influenza in the country aimed at its prevention and control. Unfortunately, information on the assessment of poultry farmers´ knowledge, attitudes, and practices regarding AI is scanty. This study therefore, aims to assess

farmers´ knowledge and awareness on AI recognition, prevention and control practices in poultry in the Ejisu-Juaben Municipality of Ashanti region, Ghana. Ejisu-Juaben Municipality was chosen as the study area due to the recent AI outbreak (H5 serotype) which occurred in the year 2018 at Boankra [11].

Methods

Study area: the Ejisu-Juaben Municipality is one of the constituents of the 30 administrative districts in the Ashanti region of Ghana. The Ejisu-Juaben municipality lies within Latitudes 1°15´ N and 1°45´N and 6°15´ W and 7°00´ W, dominating a land area of 582.5 km^2 [12,13]. The municipality rests in the central part of the Ashanti region, sharing borders with six districts in the region. The population of the municipality according to the 2010 population and Housing Census, is 143,762, representing 3.0 percent of the region´s total population. Males constitute 68,648 (47.8%) and females, 75,114 (52.2%). As high as 47.0 % of households in the municipality, are involved in agriculture. In the rural localities, a little more than five out of ten households (56.5%) are agricultural households while in the urban localities, 23.9% of households are into agriculture. Most households in the municipality (96.2%) are involved in crop farming. Poultry (chicken) is the most dominant animal farming in the municipality [12].

Study design: a cross-sectional survey was used in this study. A pre-tested questionnaire was developed to collect information on the study variables relating to avian influenza in the study area. The study was conducted from January 2020 to May 2020.

Study population: poultry farm owners, poultry farmworkers and poultry farm managers in the Ejisu-Juaben Municipality were enrolled as respondents in the study.

Sampling procedure: poultry farms were selected by the snowball sampling technique and the willingness to partake in the study, while convenient sampling was employed to select respondents from each farm.

Sample size determination: sample size of 138 was estimated using Fisher's (1998) formula.

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

Where: n = desired sample size, z = confidence level of 95% (1.96), p = assumed prevalence, 10% (0.10), q = (1-p), d =precision, 5% (0.05).

Data collection procedure: information was collected using structured questionnaire (appendix) that was designed, evaluated, and administered to the selected respondents in the selected poultry farms. The questionnaire consisted of four parts: demography, knowledge, attitudes and practices. On Demography, information captured included age, gender, marital status, level of education, length of working experience, daily working time and types of work performed in the poultry industry. Knowledge variables included etiology, source of infection and signs of AI. Questionnaires on attitude included whether AI is a serious and/or preventable disease, and scores for fear of contracting AI. Practice variables include biosecurity measures of respondents. Additional questions were included to assess awareness of AI and source of information. An in-depth oral interview for the non-literate respondents was used in sourcing information.

Data analysis and presentation: data generated in this work were analyzed using Statistical Package for the Social Sciences (SPSS) software, version 22.0. Descriptive statistics was used in this study. Correlation analysis was done to show the strength of the relationship between knowledge and practice score. The association between different variables was assessed using Pearson´s chi-square test or Fisher´s exact test and $p \leq 0.05$ was considered as statistically significant. Results generated from SPSS were exported to Microsoft Office Professional Excel 2016 to generate tables

and GraphPad Prism version 8.3.1 to generate graph.

Knowledge and practice scoring: correctly answered question on knowledge was awarded one (1) mark and "NO" response score zero. The score for the preventive/control practices was based on a "YES" and "NO". Positive practices were awarded one mark for "YES" and zero marks for a "NO" and "unanswered" response. Also, negative practices were awarded one mark for "NO" and zero marks for a "YES" and "unanswered" response. A sum of 18 and 20 marks was attainable for knowledge and practices respectively. The Practice and Knowledge scores were transformed into categorical variables as High (scores above 80%), Moderate (between 50-80%), and Low (below 50%) adapted from Islam *et al*. [14].

Attitude: respondents' attitude was assessed by whether they believe AI is serious and can be prevented and the fear of contracting AI on a scale of 1-10 (1 = no fear at all; 10 = very much fear).

Results

Demographic characteristics: a total of 140 respondents were interviewed and the average age was 31.21 ±9.78 years. Table 1 shows that more than half of the participants (53.6%) were between the ages of 20 and 29 years, and almost all (90.7%) were males. Almost half (48.6%) of the respondents were single and have never married before while more than half (68.6%) were residing in rural areas. Sixty-six (47.1%) respondents had at least attended primary and junior high school (JHS) and 84 (60%) had less than 5 years of working experience. The average working time of the respondents was 9.77 hours and most of them (34%) spent 10 hours daily at the poultry premises. The maximum working hours of the participants were 15 hours while the minimum was 1 hour. Table 2 shows that good number of the respondents provided feed for poultry (31.45%) and collected eggs (36.6%) while a few (1.1%) slaughter and defeather poultry.

Awareness: Table 3 shows that 97 (69.3%) of the respondents have ever heard of AI and most of them (35.5%) heard of it on Radio. Other sources of awareness included TV (22.6%), family and friends (14.8%), and the least of the information source is Poster (0.6%). Table 4 shows that only the gender of respondents does not have an association with the awareness of AI (p-value >0.05). However, age, marital status, residence, educational level, and working experience are associated with awareness (p-value < 0.05).

Knowledge and practices: respondents were asked on their knowledge and biosecurity practices related to AI. Only thirteen (9.29%) were able to correctly define AI as a viral disease of birds. Fifty-seven (40.7%) respondents believe that AI can infect humans and the source of infection for humans include contact with: infected birds (30%), infected secretions and fomites (27.4%), infected eggs (21.1%) and contaminated surfaces (21.6%). The knowledge level on spread and clinical signs of AI infection in birds and biosecurity practices/measures of respondents is presented in Figure 1. The results show that the majority (87.1%) of respondents had poor knowledge, 11.4% had moderate knowledge, while the least (1.4%) had high knowledge. The majority (64.1%) of respondents practiced poor biosecurity measures, 34.3% moderate measures, while the least (4.3%) had high biosecurity measures. Table 5 shows that age and years of working experience have an association with knowledge level. However, gender, marital status, residence, and educational level do not have an association with knowledge level since their p-values are 0.711, 0.112, 0.0076 and 0.115 respectively are not statistically significant (i.e.> 0.05). Moreover, only residence have an association with practice level (Table 6) with a p- value of 0.008.

Attitudes: more than half (60.3%) of the respondents believe AI can be prevented while 5% are uncertain about whether AI can be prevented. Moreover, 67.9% of the study population believes AI is serious and 2% believe it is not serious. Concerning the fear of contracting AI, an average of

7.08±2.13 was obtained, hence AI is feared among the study population.

Discussion

In this study, the average age was 31.21±9.78 years and the males were more than the females who participated. This could be due to the tedious nature of poultry-related work which compels farm owners to employ males more than females. Most of the participants were between the ages of 20 and 40 years which is the active period, this observation is similar to work done in Nepal [15]. In the study, the percentage awareness of avian influenza was 69.3% which was similar to the findings in Bangladesh [14] and in Nigeria [16]. This might be due to the recent outbreak of avian influenza that occurred in the Ejisu-Juaben district. It is also evident in this study that, mass media i.e. radio and television is the main source of information to respondents. This is consistent with reports of other workers in Cambodia [17] and in Nigeria [18,19]. Gender of respondents does not have an influence on awareness of AI, however age, marital status, residence, educational level, and years of working experience have significant influence on awareness. This suggest that poultry workers who are, between 20-39 years; married; staying in a rural area; had at least attended a JHS and had at least 5 years of working experience are more likely to be aware of AI (Table 4). This could be due the reason that AI is not endemic in Ghana, hence longer period needed for a worker to become aware.

It is evident in this study that, 87.7% of respondents had poor knowledge level about avian influenza etiology, signs in infected birds, and source of transmission of the virus. This result is not consistent with study from Nigeria where, poultry farmers in Ibadan displayed a good knowledge of causes, transmission, and signs of avian influenza [20]. This could be as a result of failure of farm owners and managers to relay information to their workers after awareness creation seminars and conferences. The mass media specifically radio and televisions often do not disseminate the cause, clinical signs, and transmission of AI but rather announced its outbreak. Only 13 (9.29%) were able to correctly define AI as a viral disease of birds. This is contradictory to the findings of the study done in Pokhara city in Nepal where 75% of the participants gave a correct definition of bird flu [15]. This could be due to the reason that, the authors conducted the research in an area where the respondents are highly educated (Tertiary and above). The knowledge of Poultry workers on risk of contracting AI through contact with poultry birds and their products is low which calls for concern and need for proper education. Additionally, this study established higher percentage of poor practice which contradicts the findings of the study done in Nepal where 59.3% had a good practice. It is evident in this study that, AI is feared among the greater part of the respondents as observed by other workers [18,19] in Nigeria.

Conclusion

The study reveals that the majority of the respondents have ever heard of avian influenza however, the knowledge level of its etiology, clinical signs, and transmission was low. Moreover, more than half of the respondents´ practices regarding the prevention and control measure of AI were found to be low. The major source of awareness to the study population was information from television and radio. Accordingly, the study has established a gap in knowledge, attitude and practice among poultry workers in the Ejisu-Juaben municipality despite a recent outbreak in the study area. Stakeholders should develop and implement educational campaign programmes tailored towards poultry workers regarding the knowledge and preventive practices of AI. The mass media particularly radio and TV, should be adequately engaged in the dissemination of educational campaign messages, since it is the main source of information for poultry workers.

What is known about this topic

- *Avian Influenza is a contagious disease;*
- *Avian influenza caused serious economic losses to poultry farmers;*
- *Level of knowledge of the disease aid preventive measure.*

What this study adds

- *Majority only heard of name of the disease: avian influenza;*
- *The knowledge level of its etiology, clinical signs, and transmission was low;*
- *Practices of prevention and control measure of AI were found to be low.*

Competing interests

The authors declare no competing interests.

Authors' contributions

All authors (RBA, RDF, VB, JA, WT and BOE) contributed to the study´s design. RBA, RDF, WT and BOE drafted of the manuscript. Other authors (VB, WT, RDF and BOE) critically revised the manuscript and provided valuable inputs. All authors (RBA, RDF, VB, JA, WT and BOE) read and approved the final version of the manuscript.

Acknowledgments

We appreciate the poultry farmers and workers that gave information on knowledge of AI. We are thankful to the farms owners for their voluntary participation.

Tables and figures

Table 1: demographics of the study population (n=140)

Table 2: practice characteristics

Table 3: awareness and information source

Table 4: relationship between awareness and demographic characteristics

Table 5: relationship between knowledge level and demographic characteristics

Table 6: relationship between practice level and demographics

Figure 1: knowledge and practice levels of respondents

References

1. Hamid MA, Rahman MA, Ahmed S, Hossain KM. Status of poultry industry in Bangladesh and the role of private sector for its development. Asian J Poultry Sci. 2016;11(1): 1-13.
2. Graphic Online. Challenges of the poultry industry in Ghana. 2016. Accessed 0n January 3, 2020.
3. FAO. Poultry sector Ghana. FAO animal production and health livestock country reviews. 2014. Accessed 0n January 3, 2020.
4. Atuahene CC, Attoh-Kotoku V, Mensah JJ. Poultry production in Ghana: prospects and challenges. Ghanaian Journal of Animal Science. 2012;5(2). **Google Scholar**
5. OIE-World Organisation for Animal Health. Update on avian influenza in animals (types H5 and H7). 2020. Accessed January 3, 2020.
6. Oluwole O, Emikpe B, Olugasa B. Attitude of poultry farmers towards vaccination against newcastle disease and avian influenza in Ibadan, Nigeria. Sokoto J Vet Sci. 2012;10(1). **Google Scholar**
7. Fasanmi OG, Laleye AT, Fasina FO. Systematic review and meta-analyses of cases and deaths associated with highly pathogenic avian influenza H5N1 in humans and poultry. CAB Rev: perspectives in Agriculture, Veterinary Science, Nutrition and Natural Resources. 2016;11(004). **Google Scholar**

8. Capua I, Alexander DJ. The challenge of avian influenza to the veterinary community. Avian Pathol. 2006;35(3): 189-205. **PubMed**| **Google Scholar**
9. Neupane D, Khanal V, Ghimire K, Aro AR, Leppin A. Knowledge, attitudes and practices related to avian influenza among poultry workers in Nepal: a cross sectional study. BMC Infect Dis. 2012 Mar 30;12: 76. **PubMed**| **Google Scholar**
10. Akunzule AN, Koney EBM, Tiongco M. Economic impact assessment of highly pathogenic avian influenza on the poultry industry in Ghana. World´s Poultry Sci J. 2009;65: 517-528. **Google Scholar**
11. OIE - World Organisation for Animal Health. What is Avian Influenza. 2020. Accessed January 2 2020.
12. Ghana Statistical Service. Ejisu-Juaben Municipal. 2014. Accessed on January 3, 2020.
13. Wiafe ED, Asamoah G. Land-cover change assessment in Ejisu -Juabeng district in Ghana. EJFS. 2018;6(1): 1-8.
14. Islam SS, Islam MS, Kabir SH, Begum M, Ahmed MU, Moinuddin M. Awareness on Avian Influenza among the workers of selected poultry farms in Dhaka City. Juniper Online J Public Health. 2017;1(1): 1-5. **Google Scholar**
15. Timilsina A, Mahat S. Knowledge and practices towards Avian Influenza among poultry workers in Pokhara. Janapriya J Interdiscip Stud. 2018;7(1): 26-34. **Google Scholar**
16. Ezeh CC, Ezeh OH, Afolayan SB. Knowledge and attitude of poultry farmers towards biosecurity against zoonotic avian influenza H5N1 in Kaduna state, Nigeria. Asian J Agric Rural Dev. 2017;7(3): 56-64. **Google Scholar**
17. Khun M, Heng C, Md HO, Kasuya H, Sakamoto J. Knowledge, attitudes and practices towards avian influenza A (H5N1) among Cambodian women: a cross-sectional study. Asian Pac J Trop Med. 2012;5(9): 727-734. **PubMed**| **Google Scholar**
18. Fatiregun AA, Saani MM. Knowledge, attitudes and compliance of poultry workers with preventive measures for avian influenza in Lagelu, Oyo State, Nigeria. J Infect Dev Countr. 2008 Apr 1;2(2): 130-4. **PubMed**| **Google Scholar**
19. Umar Y, Thilagavathi R, Yakubu J. A Study on awareness, attitudes, and practices related to Avian Influenza among poultry workers in Dawakin Tofa Local Government, Kano State, Nigeria. IOSR JAVS Ver I. 2015;8(2): 2319-2372. **Google Scholar**
20. Omowon AA, Oladejo AO, Omowon AM. Knowledge, attitude and practice of farmers to avian influenza resurgence in Ibadan, Nigeria: a case study of the 2015 avian influenza resurgence. Direct Res J Agric Food Sci. 2019;7(July): 199-207.

Table 1: demographics of the study population (n=140)			
	Characteristics	**Frequency (n)**	**Percentage (%)**
Age(years)	19 and below	4	2.9
	20-29	75	53.6
	30-39	34	24.3
	40-49	17	12.1
	50 and above	10	7.1
Gender	male	127	90.7
	female	13	9.3
Marital Status	Married	63	45
	Single	68	48.6
	Divorced	6	4.3
	Widowed	3	2.1
Residence	rural	96	68.6
	urban	44	31.4
Educational Level	None	7	5.0
	Primary and JHS	66	47.1
	SHS	45	32.1
	college and Higher	22	15.7
Working Experience(years)	< 5	84	60.0
	5-10	40	28.6
	>10	16	11.4

Table 2: practice characteristics		
Work type	**Responses**	**Percentage (%)**
Feed poultry	94	34.1
Collect eggs	101	36.6
Sweep and pack droppings	30	10.9
Slaughter and defeather poultry	3	1.1
Guard environment	14	5.1
Supervision	34	12.3

Table 3: awareness and information source			
		Frequency (n=140)	**Percentage (%)**
Heard of AI	Yes	97	69.3
	No	43	30.7
Information Source	TV	35	22.6
	Radio	55	35.5
	News Paper	4	2.6
	Seminars	7	4.5
	Poster	1	0.6
	Family and Friends	23	14.8
	Employer	11	7.1
	Health Professional	15	9.7
	Other	4	2.6

Table 4: relationship between awareness and demographic characteristics				
Have you heard of Bird Flu (AI) before?				p-value
		Yes	No	
Demographics		Frequency (%)		
Age(years)	19 and below	2(2.1)	2(4.7)	0.012**
	20-29	44(45.4)	31(72.1)	
	30-39	27(27.8)	7(16.3)	
	40-49	16(16.5)	1(2.3)	
	50 and above	8(8.2)	2(4.7)	
Sex	Male	86(88.7)	41(95.3)	0.344**
	Female	11(11.3)	2(4.7)	
Marital Status	Married	51(52.6)	12(27.9)	0.018**
	Single	42(43.3)	26(60.5)	
	Divorced	3(3.1)	3(7.0)	
	Widowed	1(1)	2(4.7)	
Residence	Rural	60(61.9)	36(83.7)	0.011*
	Urban	37(38.1)	7(16.3)	
Educational Level	None	2(2.1)	5(11.6)	0.007**
	Primary and JHS	42(43.3)	24(55.8)	
	SHS	33(34.0)	12(27.9)	
	College and Higher	20(20.6)	2(4.7)	
Years of Working Experience	< 5	46(47.4)	38(88.4)	<0.001**
	5-10	36(37.1)	4(9.3)	
	>10	15(15.5)	1(2.3)	
Total		97(100.0)	43(100.0)	
p-value <0.05 is significant, * =Chi-square, **Fishers Exact test				

Table 5: relationship between knowledge level and demographic characteristics					
Demographics		**Knowledge Level**			**p-value***
		HIGH Frequency (%)	**MODERATE**	**LOW**	
Age(years)	19 and below	0(0.0)	0(0.0)	4(3.3)	0.001
	20-29	0(0.0)	5(31.3)	70(57.4)	
	30-39	0(0.0)	10(62.5)	24(19.7)	
	40-49	0(0.0)	0(0.0)	17(13.9)	
	50 and above	2(100.0)	1(6.3)	7(5.7)	
Gender	Male	2(100.0)	14(87.5)	111(91.0)	0.711
	Female	0(0.0)	2(12.5)	11(9.0)	
Marital Status	Married	2(100.0)	12(75.0)	49(40.2)	0.112
	Single	0(0.0)	4(25.0)	64(52.5)	
	Divorced	0(0.0)	0(0.0)	6(4.9)	
	Widowed	0(0.0)	0(0.0)	3(2.5)	
Residence	Rural	0(0.0)	13(81.3)	83(68.0)	0.076
	Urban	2(100.0)	3(18.8)	39(32.0)	
Educational Level	None	0(0.0)	0(0.0)	7(5.7)	0.115
	Primary and JHS	0(0.0)	6(37.5)	60(49.2)	
	SHS	0(0.0)	8(50.0)	37(30.3)	
	College and Higher	2(100.0)	2(12.5)	18(14.8)	
Years of Working Experience	< 5	0(0.0)	4(25.0)	80(65.6)	<0.001
	5-10	0(0.0)	11(68.8)	29(23.8)	
	>10	2(100.0)	1(6.3)	13(10.7)	
Total		2(100.0)	16(100.0)	122(100.0)	
*=Fisher's Exact test, p-value <0.05 is significant					

Table 6: relationship between practice level and demographics					
		Practice Level			**p-value***
Demographics		**HIGH Frequency (%)**	**MODERATE**	**LOW**	
Age	19 and below	0(0)	2(4.2)	2(2.3)	0.145
	20-29	1(16.7)	30(62.5)	44(51.2)	
	30-39	2(33.3)	9(18.8)	23(26.7)	
	40-49	1(16.7)	6(12.5)	10(11.6)	
	50 and above	2(33.3)	1(2.1)	7(8.1)	
Gender	Male	6(100)	44(91.7)	77(89.5)	0.873
	Female	0(0)	4(8.3)	9(10.5)	
Marital status	Married	4(66.7)	16(33.3)	43(50)	0.246
	Single	2(33.3)	30(62.5)	36(41.9)	
	Divorced	0(0)	2(4.2)	4(4.7)	
	Widowed	0(0)	0(0)	3(3.5)	
Residence	Rural	3(50)	26(54.2)	67(77.9)	0.008
	Urban	3(50)	22(45.8)	19(22.1)	
Educational Level	None	0(0)	1(2.1)	6(7.0)	0.061
	Primary and JHS	1(16.7)	23(47.9)	42(48.8)	
	SHS	1(16.7)	15(31.3)	29(33.7)	
	College and Higher	4(66.7)	9(18.8)	9(10.5)	
Years of Working Experience	< 5	1(16.7)	30(62.5)	53(61.6)	0.146
	5-10	3(50)	12(25.0)	25(29.1)	
	>10	2(33.3)	6(12.5)	8(9.3)	
Total		6(100)	48(100)	86(100)	
*=Fisher's Exact Test					

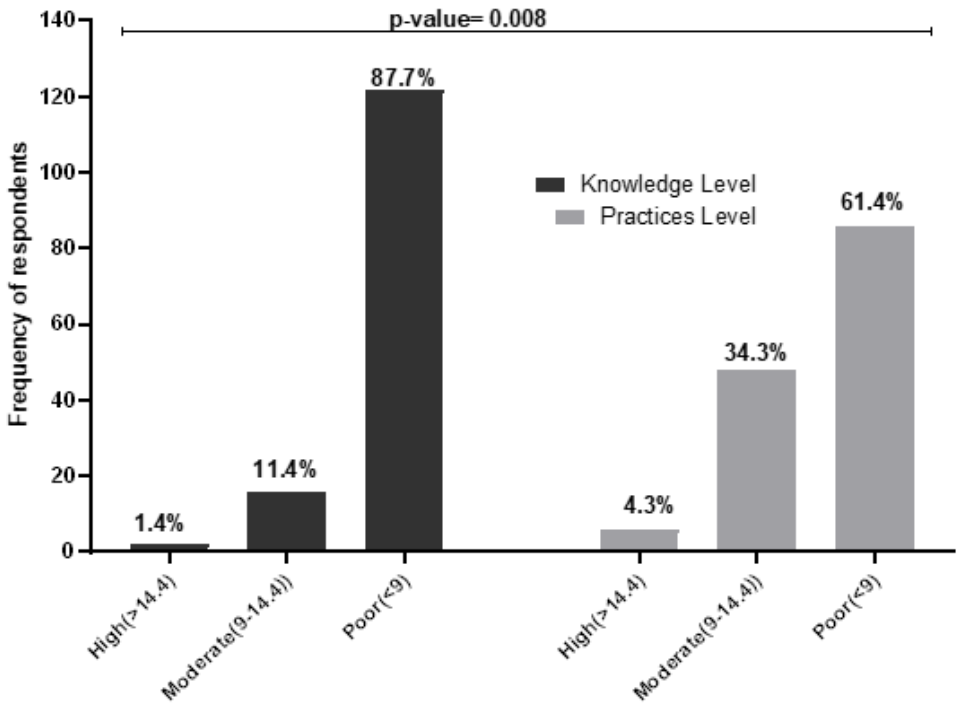

Figure 1: knowledge and practice levels of respondents