International Scholars Journals

International Journal of Agricultural Sciences ISSN: 2167-0447 Vol. 15 (2), pp. 001-006, February, 2025. Available online at www.internationalscholarsjournals.org © International Scholars Journals

Full Length Research Paper

Health Education Interventions: A Strategy to Improve Avian Influenza Prevention Knowledge and Practices among Bird Handlers in Sokoto, Nigeria

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Accepted 10 September, 2024

Zoonotic diseases are under-reported in most parts of the world particularly in developing countries. Approximately 75% of emerging diseases are zoonotic which include avian influenza (AI), Lassa fever and toxoplasmosis. The persistence and spread of avian/fatal avian influenza A (A/H5NI) in poultry and people in Asia, Europe and Africa has led the World Health Organization (WHO) to state that the world is now in a pandemic alert phase. For these reasons, an integrated and cross-sectorial plan was needed which ensures that Nigeria was prepared to address both the causes and consequences of avian and human influenza pandemic. This study was conducted to assess the impact of educational intervention on the knowledge and practice of prevention of AI among bird handlers in Sokoto. A total of 100 male bird handlers in Sokoto metropolis were enrolled for the quasi-experimental study with pre- and post-intervention components in the same group. A set of comprehensive and pre-tested questionnaire was administered to the respondents for information on the socio-demographic characteristics, knowledge and practices regarding AI. The pre-intervention phases involved the application of the questionnaires to the respondents. The intervention measures instituted included health education on causes of AI, clinical features, communicability, prevention, morbidity/mortality patterns and a demonstration session. One month after the intervention, the same set of questionnaires were administered to the study subjects. Scores obtained for knowledge were subsequently graded as adequate (≥50%) and inadequate (<50%). At baseline, 51% of the respondents scored ≥50% with a mean knowledge score of 64±7.0, while at post-intervention, 86% of the respondents scored ≥50% with a mean knowledge score of 91±17.64 (p<0.0001). The commonest form of protection adopted by the study subjects was the use of protective clothing, including face masks.

Key words: Avian influenza, bird handlers, health education, preventive measures.

INTRODUCTION

The human population has been on the rise with attendant urbanization resulting in more humans sharing wild life and livestock habitats at the same time developing closer interactions with domestic animals. Increasing globalization, international trade and international movement of humans, goods and animals impact on the global health from one geographical location to the other. Therefore, protecting the public health where one lives means improving the overall global health (Pappaioanou, 2004). Avian influenza (AI) is a highly contagious disease primarily of birds, and caused by influenza A viruses. It is one of the greatest concerns for public health that has

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Figure 1. Map of Nigeria showing Sokoto state in extreme North West (Red color).

emerged from the animal reservoir (Brown et al., 2006; Capua and Marangon, 2007). The spread of the highly pathogenic avian influenza (HPAI) to countries in which hygienic standards are deficient increases the virus' pandemic potential and raises concerns about food security particularly in rural villages (Capua and Marangon, 2007). Aquatic birds are the sources of AI viruses (Pantin-Jackwood and Swayne, 2009; Krauss and Webster, 2010).

Infection of poultry with influenza A (subtype H5N1) virus is responsible for outbreaks in birds and a human case-fatality rate of 58% (WHO, 2006). The most likely means of transmission is from infected birds to humans and from the environment to humans, but evidence for human-to-human transmission is limited (WHO, 2005). This virus can be transmitted if a person has direct contact with infected poultry or surfaces and objects contaminated by poultry droppings.

Workers in the poultry industry, who commonly have contact with live, sick, or dying poultry, are at higher risk for AI. These workers are at increased risk, because of food handling and preparation of raw poultry meat and products. Concern exists that AI could be transmitted from uncooked birds or bird products to humans (Bridges et al., 2002; Swayne, 2006).

Nigeria with an estimated poultry population of 140 million birds has about 60% of poultry production taking place in small backyard flocks. Outbreaks of AI have been reported from commercial farms in the states of Kano, Kaduna, Plateau, Katsina, Bauchi and Abuja area and to date four patients have been diagnosed with respiratory symptoms and a history of exposure to diseased poultry have been investigated for possible infection. This number includes a woman who died of an acute respiratory illness traced to infection with AI virus (WHO, 2006). Current surveillance for human cases has resulted in the identification of individuals with influenza-like illness who have had a history of exposure to sick or dying birds. An integrated and cross sectoral plan is needed to ensure that Nigeria is prepared to address both the causes and consequences of avian and human pandemic influenza. Literature search has shown that no interventional studies have been carried out in North Western Nigeria since the advent of avian influenza to improve the knowledge and preventive practices of bird handlers and the public in general. Since the outbreak of the disease, the Sokoto State Ministry of Animal Resources has carried out a series of enlightenment campaigns in the media aimed at creating public awareness on the dangers posed by HPAI virus. However, there is the need to identify bird handlers in strategic market places who are at greater risk of acquiring the deadly virus with the aim of equipping them with preventive measures to stop further spread of the influenza virus since they come in contact with live birds from different geographical localities.

This study is therefore aimed at assessing the effect of health education intervention on the knowledge and practice of preventive measures against AI among bird handlers in Sokoto metropolis.

The research hypothesis was that at the end of the health education intervention, there will be at least 20% improvement in the knowledge and practices related to AI.

MATERIALS AND METHODS

Sokoto state is located in the extreme North West of Nigeria, close to the confluence of Sokoto river and Rima river, sharing borders with Niger Republic to the north, Zamfara state to the east, kebbi state to the south east and Benin republic to the west (Figure 1). As of 2010, it has an estimated population of more than 4.2 million. Sokoto city is the modern day capital of Sokoto state (and its predecessor, the Northwestern State). The name Sokoto (which is the modern/anglicized version of the local name, Sakkwato) is of Arabic origin, representing suk, 'market'. It is also known as Sakkwato, Birnin Shaihu da Bello or "Sokoto, Capital of Shaihu and Bello").

Being the seat of the former Sokoto caliphate, the city is predominantly Muslim and an important seat of Islamic learning in Nigeria. The Sultan who heads the caliphate is effectively the spiritual leader of Nigerian Muslims. The metropolis is made up of four local government areas namely Sokoto North and South, Dange Shuni and Wamakko. Farming is the main stay of the economy of the state. It has an estimated population of 3 million cattle, 3 million sheep, 5 million goats, 4,600 camels and variable species of poultry including chickens, guinea fowls, ducks and turkeys (Sokoto State Profile, 2013).

This study was a quasi-experimental type with pre- and post-intervention components in the same group. The study population comprised all bird handlers in Sokoto metropolis. Using the formula for comparison of proportions in same group (Kirkwood and Sterne, 2003) and a 24% practice of prevention of AI in a previous study (Abbate et al., 2006), a sample size of 100 was obtained. Cluster sampling technique was applied in the selection of the 100 study subjects. The metropolis has 12 clusters where the bird handlers are found, out of which 6 were selected by simple random sampling technique using roll of papers. The selected respondents were given identification numbers and at the same time their telephone numbers were given to the officials of the Market Poultry sellers association for ease of communication when their presence was needed. Advocacy visits were paid to the officials of the Poultry Association of Nigeria, Sokoto state branch during which the objectives of the study were explained to them and also to solicit for

Table 1. Age distribution of respondents (n=100).

Age (years)	No. (%)
18-27	19 (19)
28-37	24 (24)
38-47	40 (40)
48-57	11 (11)
58-67	6 (6)
Total	100 (100)

Table 2. Educational status of respondents.

Educational level	No. (%)
None	18(18)
Qur'anic only	45(45)
Primary	28(28)
Secondary	9(9)
Tertiary	0(0)
Total	100 (100)

Table 3. Length of time handling birds.

Length of time (years)	No. (%)
1-5	27 (27)
6-10	34 (34)
11-15	29 (29)
16-20	10 (10)
Total	100 (100)

Mean=9.1±1.14.

Table 4. Sources of information about avian influenza.

Source of information	No. (%)
Radio/Television	60 (60)
Public enlightenment/lectures	23 (23)
Friends	10 (10)
Others	7 (7)
Total	100 (100)

their members' cooperation in ensuring the success of the study. A set of comprehensive, pretested questionnaire was administered by 6 trained research assistants on the respondents. Observational checklists were also used to assess the practices of the bird handlers with respect to preventive measures. The questionnaires sought such information as the socio-demographic characteristics, knowledge and practices regarding AI. The study instrument was pretested in a poultry market of another local government area outside the metropolis.

The members of the association in the 6 identified clusters were informed of the research and a day was set aside for the application of the study instruments. The study subjects were grouped into 2 for the purpose of the intervention. Each group was headed by 2 principal researchers. Informed verbal consent was obtained from individual study subjects and they were also given the option of opting out of the study when they so wished. Institutional ethical clearance was obtained from the ethical committee of the Usman Danfodiyo University, Sokoto. The pre-intervention phase of the study involved the application of the study instruments (questionnaires) to the respondents which was followed shortly by the intervention phase. The intervention which was basically health education had a demonstration segment. There were 2 sessions of the health education, each facilitated by 2 principal researchers. The health education sessions took place in the secretariat of the Market Poultry Association, Sokoto state branch located a stone throw from the market, each session lasting three hours. The contents of the health education included the cause of AI, clinical features, differentials, communicability, treatment and prevention, morbidity and mortality pattern all over the world including Nigeria.

The demonstration session involved the use of personal protective apparels. There was also a question and answer session that lasted for forty minutes to enable respondents get clarification on some grey areas. Information, education and communication materials used for the health education included posters, flip charts, pictures, etc. The health education sessions were repeated a week after to reinforce the knowledge acquired. One month after the intervention, the same set of questionnaires was administered to the study subjects in the same venue to obtain the post-intervention data. Check list was used in the markets and poultry farms to observe preventive measures by the subjects.

Data collected using the questionnaires was entered into and analyzed using EPI INFO version 3.5.1 (2008) computer software. Cross tabulation of variables was done and level of statistical significance was set at $p<0.05$. Each correct answer on the knowledge questions was awarded a mark with no marks awarded for wrong answers. Knowledge was graded with scores <50 and ≥50% adjudged inadequate and adequate knowledge, respectively.

RESULTS

A total of one hundred (n=100) respondents participated in the study. The ages of the respondents ranged from 18 to 63 years, 38 to 47 years being the modal class and those above 58 years constituted 6%. The mean age (±2 standard deviation (SD)) of the respondents was 37±3.34 years (Table 1). All the study subjects were males and Muslims. A total of 45% of them had only Qur'anic education, 18% had no education, while only 9% had secondary education (Table 2). Most of the respondents, 34% had been handling birds for between 6 and 10 years, while only 10% of them handled birds for over 16 years (Table 3). Sixty percent of the respondents have heard of AI, with the media being the commonest source of information followed by public enlightenment campaigns (Table 4). At baseline, 51% of the respondents scored ≥50% on the knowledge and prevention of AI (adequate knowledge), with a mean (±2 SD) knowledge score of 64±7.01. At post-intervention, 86% of the respondents scored ≥50% (adequate knowledge) with a mean knowledge score of 91±17.64 ($p<0.0001$) (Table 5). The commonest form of personal protection adopted by the study subjects was the use of protective clothing including face masks (Table 6). Results from the

Table 5. Knowledge of AI.

Knowledge of AI	Study phase		Test statistics
	Pre-intervention	Post-intervention	
	No. (%)	No. (%)	
Adequate	51(51)	86(86)	
Inadequate	49(49)	14(14)	χ^2=26.79; df=1; p<0.0001
Total	100(100)	100(100)	

Table 6. Respondents' ways of protection against AI.

Protective measures*	No. (%)
Protective clothing	27(27)
Face masks	53(53)
Hand gloves	16(16)
Boots	21(21)
Goggles	12(12)
Washing hands after handling birds	25(25)
Bathing after handling baths	8(8)
Use of aprons	17(17)

*Multiple answers allowed.

application of checklists showed that of the 50 bird handlers in 50 farms surveyed, only 10 used some form of protective clothing with 10 wearing boots. Five out of the 50 farms had their workers wearing masks, hand gloves and aprons, while only one farm had a few of their workers wearing goggles. Forty of these farms did not as a matter of routine practice provide any form of protective clothing for their workers. Although 20 farms claimed that they use soap and water to wash their hands after work, there was really no evidence on ground to justify that claim.Thirty farms used ordinary water for washing after attending to birds. The sanitary condition of most of the farms is everything, but good as only five farms had facilities for proper waste management. Only 3 farms had dips for vehicles and 25 had for humans. It was observed that only 4 farms had good methods of egg collection which prevents the birds coming in contact with the eggs after they are laid.

DISCUSSION

The poultry farmer by virtue of his close contact with birds is among individuals most at risk of contracting AI. The mean age of the respondents in this study was 37±3.3 years, which is similar to the mean age obtained in the study from Nepal, India (Neupane et al., 2012). However, the mean age in our study was lower than 43 years observed in Italy (Abbate et al., 2006) but higher than figures observed in other studies from Zaria and Oyo state of Nigeria (Idris et al., 2009; Fatiregun and Saani, 2008). Findings from this study showed that the mean duration of handling of birds was 9 years which is lower than 12 and 16 years observed in studies from Zaria and Hong Kong, respectively (Idris et al., 2009; Kim et al., 2011). The results of the study showed that 60% of the respondents were aware of the existence of AI, which is lower than the 93 and 97% awareness recorded in similar studies from Oyo state, Nigeria and Nepal, India, respectively (Fatiregun and Saani, 2008; Neupane et al., 2012). In contrast to the level of awareness recorded in this study, other centers have observed lower rates (Eastwood et al., 2009; Blendon et al., 2008). The level of awareness recorded in our study may not be unconnected to the low morbidity and mortality associated with the infection since it was first noticed in Nigeria, compared to that seen in other countries. The commonest source of information on AI in this study was the media (60%), particularly radio and television. The radio is a common household appliance, which is found useful in the information, education and entertainment of the populace. Equally, our respondents are avid listeners of international Hausa service radio stations e.g. British Broadcasting Corporation (BBC), Voice of America (VOA), Radio France International (RFI), De-Welle, Russia, China, etc. This finding is in consonance with those observed in other studies (Abbate et al., 2006; Eastwood et al., 2009; Neupane et al., 2012; Idris et al., 2009; Fatiregun and Saani, 2008). However, the study from Hong Kong, China (Kim et al., 2011) recorded the internet and health talks as the commonest sources of information about AI which may not be unrelated to the level of education of their subjects as compared to this study where majority (63%) of the subjects had no formal education.

At baseline, 51% of the study subjects had adequate knowledge of the cause, mode of transmission and prevention of AI, with a mean knowledge score of 64±7.01. The level of knowledge exhibited by the respondents may not be unrelated to their exposure to foreign mass media that usually broadcast in the local language, Hausa in the wake of the outbreak of the infection and this had necessitated the setting up of AI desks in all the Local Government Areas of the state. Adequate knowledge of the mode of transmission of AI will invariably assist individuals in protecting themselves from the menace of the infection.

After the intervention, 86% of the subjects had adequate knowledge of AI with a mean knowledge score of 91±17.64, and this increase in the level of knowledge post intervention was found to be statistically significant ($p<0.0001$). In agreement with our findings, the study conducted in Vietnam showed high knowledge for AI. However, low knowledge scores were observed in the studies from Zaria, Nigeria and Hong Kong (Idris et al., 2009; Kim et al., 2011).

In the assessment of the respondents' practices aimed at protecting themselves against AI, the commonest measure was the use of face masks (53%). In the wake of the outbreak of AI, the state government, Sokoto state branch of the Veterinary Medical Association (NVMA) and other donor agencies distributed face masks free of charge to the people most at risk, which could have accounted for high proportion of our subjects who used it. Cultures and habits are often difficult to change overnight which accounted for near average use of face masks by the respondents as most opined that for long they have been practicing their trade without contracting any infections. Similar to our findings, the use of face masks was the commonest preventive measure adopted in the study from Italy (Abbate et al., 2006).

However, the use of other personal protective equipment (PPE) was not a routine among our respondents and this is in consonance with the findings from other studies (Fatiregun and Saani, 2008; Idris et al., 2009; Kim et al., 2011; Neupane et al., 2012). Sometimes the low profit margin of these bird handlers makes it difficult to acquire these PPE. It has been observed that the distribution of promotional material during outbreaks of epidemics will instill confidence and demonstrate to the public that health authorities are transparent about the risk and have containment plans in place.

This in turn, has the added benefit of allowing people to accept socially unfamiliar control measures such as wearing masks and home quarantine, before a pandemic occurs. The strategy should also include the promotion of personal infection control practices, such as hand washing and sick leave which are all lifestyle activities that would protect individuals and the community against any communicable disease (Eastwood et al., 2009). Despite World Health Organization (WHO) recommendations on ways to prevent infection with AI virus (WHO, 2006), there has always been low adherence or outright disregard to these recommendations. Hand washing with soap and water was practiced in only 20 out of the 50 farms visited. This practice is in consonance with findings from other centers (Neupane et al., 2012; Kim et al., 2011; Abbate et al., 2006; Idris et al., 2009).It was observed that 30 farms used ordinary water for washing after attending to birds. The sanitary condition of most of the farms is everything but good as only five farms had facilities for proper waste management. Only 3 farms had dips for vehicles and 25 had for humans.

It was observed that only 4 farms had good methods of egg collection which protects the birds against the spread of infection as the birds do not come in contact with eggs after they are laid. In the market place, the disposal of waste is also poor and birds of different species are mixed together by majority off the sellers. Only few of the sellers separated sick birds from the healthy ones. This underscores the need for regular inspection of farms and other points of sale of birds to ensure adequate sanitation and adherent to safety guidelines. After intervention, it was observed that there was tremendous improvement both in the farms and the markets. Consequent upon the intervention, 30 farms bought boots, gloves, aprons and masks for their workers. As is common with practices in most work places, most workers chose to ignore safety rules thereby increasing their chances of contracting infections.

After the intervention, the sanitary conditions of most farms had improved considerably with most farms initiating a weekly environmental sanitation exercise in the farms and their environs. The provision of dips for vehicles was not done as all the farms claimed it was capital intensive. The training intervention showed considerable increase in the level of knowledge about AI, its cause, transmission and prevention while the subjects exhibited marked improvement in the practices of prevention of AI. Improvement of knowledge of transmission and the use of preventive measures is an important public health strategy for the reduction of the effects of AI and its complications amongst bird handlers.

The mixing of birds of different species reduced considerably; sick birds were often separated from healthy ones, even though the market environmental waste management was yet to be corrected as the disposal was still a major problem.

Conclusions

The health education intervention study has demonstrated increased awareness of AI among the study subjects as 86% of them had a mean knowledge score of 91±17.64 after the introduction of the intervention measures as compared to 51% with a mean knowledge score of 64±7.01 at baseline. The use of media particularly radio was found to be an effective and veritable tool for raising the awareness of bird handlers on topical issues in this environment such as AI. The findings from this study will help relevant government agencies come up with sustainable policies that will nip in the bud lapses in preventive measures in case of future outbreaks. Given the necessary education, bird handlers are more likely to take more proactive measures against the spread of diseases like AI.

ACKNOWLEDGEMENTS

The authors wish to acknowledge the efforts and cooperation of their respondents who volunteered to participate in the study, the Poultry Association of Nigeria

(PAN) Sokoto state branch, the research assistants, management of Usmanu Danfodiyo University and the NFELTP 7/FMOH/CDC facilitators, for their motivation to undertake this research.

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