

Research Article

Impact of Avian Influenza Outbreaks on Stakeholders in the Poultry Industry in Jos, Plateau State, Nigeria

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Abstract: Avian influenza devastated the poultry industry and economy of Plateau State during the 2006 epidemic. A survey was conducted among some targeted stakeholders in the poultry industry in Jos north and Jos south local government areas of Plateau state using structured questionnaire to assess the impact of 2006 highly pathogenic avian influenza outbreak on their businesses. A total of 84 questionnaires were administered among the stakeholders in the poultry industry out of which 76 (90.5%) were returned and analyzed. The 76 stakeholders that returned their questionnaires included 8 (10.5%) veterinary drug sellers, 6 (7.9%) toll millers, 10 (13.2%) commercial feeds distributors, 8 (10.5%) feed raw material and 12(15.8%) poultry equipment sellers, 15 (19.7%) fowl and 17 (22.4%) egg sellers. There was a sharp decline to complete loss of income by egg and bird traders and more than 50% decline in the sale of poultry drugs and vaccines, toll milled and commercial feeds, poultry raw materials and equipment. The epidemic had a significant negative impact (loss) on toll millers (70%) and commercial feed distributors (74%), fowl (60%) and egg sellers (35%); poultry drug (50%), feed raw material (50%) and poultry equipment sellers (55%) and was more severe on commercial feed distributors. Poultry input providers should also be compensated as was done poultry farmers to minimize the effect of their losses.

Keywords: Avian influenza, impact, poultry industry, stakeholders, sellers

INTRODUCTION

Based on the estimates from the National Bureau of Statistics (NBS) in Nigeria, since 2000, the poultry subsector in Nigeria grew at 5.9 per cent per year, reaching a population of 150 million in 2005 until the appearance of Highly Pathogenic Avian Influenza (HPAI) in 2006 (National Bureau of Statistics, Nigeria (NBS) 2006). Since then, a significant reduction in the poultry trading activities (imports and exports) has been observed in Nigeria (Obi *et al.*, 2008). Outbreaks of HPAI undoubtedly pose serious consequences on the livelihood of many poor households, disrupting an important source of cash income for producers and a source of protein for consumers' diets (You and Diao, 2007).

After the disease was confirmed in Nigeria in February, 2006, there was a lot of anxiety within the poultry industry because people refuse to buy poultry and poultry by products leading to a sharp drop in the prices of eggs, day old chicks, broilers and spent layers. For example in Kaduna state the prize of a create of egg dropped from four hundred and fifty naira (3.6 US Dollars) to as low as one hundred and seventy naira (1.4 US Dollars) and the cost of day old pullet drop

from one hundred and fifty naira (1.2 US Dollars) to as low as sixty naira (0.4 US Dollars) per chick (Sa'idu *et al.*, 2008). Apart from the negative effect of the disease on marketing of the poultry products and their consumption, the disease also caused serious unemployment because most of the farm hands lost their jobs due to the disease and a lot of the farmers lost their income. Losses due to decreased productivity, high mortality in poultry and subsequent loss of jobs by workers have been reported in farms affected by HPAI outbreaks (Terry, 2006).

Plateau state was among several states in Nigeria that reported the outbreak of HPAI (Avian Influenza Control Project (AICP), 2008). Suspected cases of HPAI in about 47 farms in two local government areas (LGA) of the state were reported with about 22 farms confirmed positive in 2006. A total of 13,853 birds died of the disease, while 63,483 were officially culled from a total of 77,336 birds (Head of Diagnostic Laboratory NVRI and Plateau State AICP Desk Officer, 2007 Personal Communication). Therefore, this study is aimed at assessing the impact of HPAI outbreak on some stakeholders in the poultry industry in two LGAs of Plateau state.

MATERIALS AND METHODS

Jos city is located between Lat. 9°56'N and 8°53'E. It has a population of about 900,000 residents and a poultry population of 400,689 exotic (commercial) birds (National Disease Information and Surveillance (NADIS), 2006; NPC (National Population Commission), 2006). It has a near temperate climate with an average temperature of between 18°C and 22°C. The people of the state are predominantly farmers. Plateau State has a total of 4,389,894 birds which consist of 3,997,800 local birds and 400,689 exotic (commercial) birds (National Disease Information and Surveillance (NADIS), 2006). The city is divided into 3 LGAs of Jos North, Jos South and Jos East and the study was carried out in Jos North and Jos South LGA (Plateau state Government, 2003).

Administration of questionnaires: A structured questionnaire was distributed to targeted poultry stakeholders in Jos North and South LGAs to assess the impact of the 2006 outbreaks of HPAI on their businesses. The stakeholders were the veterinary drug sellers, fowl sellers, poultry feed toll millers, poultry feed raw material dealers and commercial poultry feed distributors, poultry egg and poultry equipment dealers. A total of 76 stakeholders in the poultry industry answered questions on their demographic data, business ownership and business activities before and during the 2006 outbreaks of HPAI in the two LGAs.

Data analyses: Data obtained from the 76 questionnaires returned were entered into Excel (2007)

and retrieved for analyses using Statistical Package for Social Sciences Version 20.0 (SPSS Inc. Chicago, IL., USA) and presented as percentage in tabular forms.

RESULTS AND DISCUSSION

A total of 84 questionnaires were administered among the stakeholders in the poultry industry out of which 76 (90.5%) were returned and analyzed. The 76 stakeholders that returned their questionnaires included 8 (10.5%) veterinary drug sellers, 6 (7.9%) toll millers, 10 (13.2%) commercial feeds distributors, 8 (10.5%) feed raw material and 12 (15.8%) poultry equipment sellers, 15 (19.7%) fowl and 17 (22.4%) egg sellers. Among the targeted stakeholders in the poultry industry, only 10% of the total numbers were women. However, all those in the fowl selling and toll milling business were men. The age group for the stakeholders was between 20-50 years among which the fowl sellers fall between 20-30 years. Majority (75%) of the stakeholders had attended at least secondary school while few (15%) had a tertiary education and none (0%) is a civil servant. Before the outbreak of avian influenza, 50% of the veterinary drug sellers usually sell more than 50 sachets of any of the antibiotics in their stores per week, 30% sold more than 50 sachets of any of the anticoccidia on their drug shelf while 60% of the outlets sold more than 50 sachets of any multivitamins in their stores every week and 33% of the stores sold at least 30 vials of any vaccine in their cold rooms and none of the outlets closed each week without selling at least 10 sachets of any of the other classes of

Table 1: Impact of avian influenza outbreak on veterinary drug sellers in Jos North and South local government areas in Plateau state, Nigeria

Drugs/Vaccines	Before outbreak		During outbreak		
	Drug sellers (%)	Sachet/vial sold/week	Drug sellers (%)	Sachet/vial sold/week	Drop (%)
Antibiotics	0	<10	40	<10	40
	10	20	10	20	4
	20	30	15	30	10
	5	40	15	40	+5
	15	50	15	50	5
Anticoccidia	50	>50	5	>50	45
	0	<10	50	<10	+50
	5	10	17	10	+12
	10	20	13	20	+3
	25	30	10	30	25
	11	40	7	40	4
	19	50	3	50	16
Multivitamins	30	>50	0	>50	30
	0	<10	30	<10	+30
	0	10	33	10	+33
	0	20	8	20	+8
	8	30	7	30	1
	14	40	7	40	7
	18	50	5	50	13
	60	>50	10	>50	50
Vaccines	5	<10	40	<10	+35
	13	10	31	10	+18
	27	20	17	20	10
	33	30	12	30	21
	17	40	0	40	17
	5	50	0	50	5
	0	>50	0	>50	0

drugs in their stores. However, during the outbreak of avian influenza, majority of the outlets, (40%, 50% and 30%) sold less than 10 sachets of any of the antibiotic, anticoccidia or multivitamins respectively per week and 40% of the stores sold less than 10 vials of any vaccine in a week (Table 1).

Fowl sellers in the two LGA usually sell different types of birds before the outbreak of avian influenza. Table 2 shows that half of the seller's sold spent layers. They usually buy and sell between 200-250 birds per week. However, during the outbreak of avian influenza, none of the sellers bought or sold spent layers and broilers but 7% and 2% bought and sold between 5-10 local chickens and other type of bird like guinea fowls etc respectively per week.

Majority of the toll millers (70%) milled layer's mash with each of the millers milling between 11-15 tonnes per week. Meanwhile, 10% of the millers milled between 1-5 tonnes of layer's mash, grower's mash or broiler starter per week. On the other hand, during the outbreak, only 13% of the toll millers milled between 1-5 tonnes of layer's mash but majority of the millers

(70%) milled between 1-5 tonnes of broiler starter per week (Table 3).

In the case of poultry feed raw material dealers, 50%, 45%, 30% and 25% usually sale between 11-15 tonnes of maize, groundnut cake and soya beans cake, palm kernel cake or other raw material respectively each week before the outbreak. Each of the dealers also sold between 1-5 tonnes of any of the raw material every week. However, during the outbreak, majority of the dealers (66, 70, 40, 23 and 20%, respectively) sold between 1-5 tonnes of maize, groundnut cake, soya bean cake, palm kernel cake or other raw materials respectively each week (Table 4).

Before the outbreak of avian influenza, 10 and 11% of commercial poultry feeds distributors sold between 11-15 tonnes of layer's mash and grower's mash respectively each week, while 70, 67, 82, 64 and 63%, respectively of the distributors sold between 1-5 tonnes of broiler starter and finisher, chick mash, grower's mash and layer's mash respectively each week. However, during the outbreak, none of the distributors sold feeds in high quantity. Only 5, 10, and 8%

Table 2: Impact of avian influenza outbreak on fowl sellers in Jos North and South local government areas of Plateau state, Nigeria

Type of bird	Before outbreak			During outbreak			
	Fowl sellers (%)	No. of bird bought/week	No. of birds sold/week	Fowl sellers (%)	No. of bird bought/week	No. of birds sold/week	Drop (%)
Local chickens	58	50-100	65-90	7	5-100	50-100	51
	28	101-150	120	0	0	101-15	28
	14	151-200	160	0	0	151-200	14
	0	201-2500	0	0	0	201-250	0
Spent layers	13	50-100	80-95	0	0	50-100	13
	20	101-150	120-140	0	0	101-150	20
	17	151-200	220-250	0	0	151-200	17
	50	201-250	201-250	0	0	201-250	50
Broilers	60	50-100	80-90	0	0	50-100	60
	23	101-150	130-145	0	0	101-150	23
	17	151-200	180-190	0	0	151-200	17
	0	201-250	0	0	0	201-250	0
Other type of bird	10	50-100	70	2	10	50-100	8
	0	101-150	0	0	0	101-150	0
	0	151-200	0	0	0	151-200	0
	0	201-250	0	0	0	201-250	0

Table 3: Impact of avian influenza outbreak on poultry feed toll millers in Jos North and South local government areas of Plateau state, Nigeria

Type of feed milled	Before outbreak		During outbreak		
	Toll miller (%)	No. of tones milled (Week)	Toll miller (%)	No. of tones milled (Week)	Drop (%)
Broiler starter	10	1-5	70	1-5	+60
	40	6-10	24	6-10	16
	50	11-15	6	11-15	44
Broiler finisher	45	1-5	33	1-5	12
	30	6-10	0	6-10	30
	0	11-15	0	11-15	0
Chick mash	40	1-5	16	1-5	24
	32	6-10	0	6-10	32
	28	11-15	0	11-15	28
Growers mash	10	1-5	11	1-5	+1
	30	6-10	13	6-10	17
	60	11-15	0	11-15	60
Layers mash	10	1-5	13	1-5	+3
	20	6-10	0	6-10	20
	70	11-15	0	11-15	70

Table 4: Impact of avian influenza outbreak on poultry feeds raw material dealers in Jos North and South local government areas of Plateau state, Nigeria

Type of raw material sold	Before outbreak		During outbreak		
	Raw material dealer (%)	No. of tones sold (Week)	Raw material Dealer (%)	No. of tones sold (Week)	Drop (%)
Maize	17	1-5	66	1-5	+49
	33	6-10	44	6-10	+11
	50	11-15	0	11-15	50
Groundnut cake	20	1-5	70	1-5	+50
	35	6-10	12	6-10	23
	45	11-15	0	11-15	45
Soya bean cake	45	1-5	40	1-5	5
	25	6-10	5	6-10	20
	30	11-15	0	11-15	30
Palm kernel cake	24	1-5	23	1-5	1
	43	6-10	15	6-10	28
	33	11-15	0	11-15	33
Other type of raw material	27	1-5	20	1-5	7
	48	6-10	13	6-10	35
	25	11-15	0	11-15	25

Table 5: Impact of avian influenza outbreak on commercial poultry feed distributors in Jos North and South local government areas of Plateau state, Nigeria

Type of feed sold (%)	Before outbreak		During outbreak		
	Distributor (%)	No. of tones sold (Week)	Distributor (%)	No. of tones sold (Week)	Drop (%)
Broiler starter	70	1-5	8	1-5	62
	30	6-10	0	6-10	30
	0	11-15	0	11-15	0
Broiler finisher	67	1-5	8	1-5	59
	33	6-10	0	6-10	33
	0	11-15	0	11-15	0
Chick mash	82	1-5	8	1-5	74
	17	6-10	0	6-10	17
	1	11-15	0	11-15	1
Growers mash	64	1-5	10	1-5	54
	25	6-10	3	6-10	22
	11	11-15	0	11-15	11
Layers mash	63	1-5	5	1-5	58
	27	6-10	0	6-10	27
	10	11-15	0	11-15	10

Table 6: Impact of avian influenza outbreak on egg dealers in Jos North and South local government areas of Plateau state, Nigeria

Type of egg sold	Before outbreak			During outbreak			
	Egg dealers (%)	No. of create bought/week	No. of create sold/week	Egg dealer (%)	No. of create bought/week	No. of create sold/week	Drop (%)
Chicken	5	50-100	90-100	3	50-100	5-10	2
Egg	13	101-150	130-150	0	101-150	0	13
	22	151-200	170-190	0	151-200	0	22
	25	201-300	250-300	0	201-300	0	25
	35	>300	>300	0	>300	0	35

sold between 1-5 tonnes of layer's mash, grower's mash and chick mash respectively (Table 5).

Majority (35%) of poultry egg dealers in Jos North and South LGAs usually buy and sale more than 300 creates of eggs each week and only 5% of the dealers bought and sold between 50-100 creates of eggs each week before the outbreak of avian influenza. But during the outbreak, only 3% of the dealers bought and sold between 5 and 10 create of eggs in a week (Table 6). Poultry equipment dealers are those who sell poultry plastic water drinkers, plastic feeding trays, metal feeding troughs etc. Before the outbreak, 55%, 45% and

20% of the dealers sold more than 15 dozens of plastic water drinkers, plastic feeder trays and metal feeders respectively each week. However, during the outbreak, none of the dealers sold any product (Table 7).

The 2006 outbreak of avian influenza in Jos North and South LGA of Plateau state caused a serious decline in business activity of the stakeholders in the poultry industry. The result of the study showed that there was a decline of over 50% in the sale of poultry drugs and vaccines. This probably arose from the fact that farmers no longer buy day old chicks during the outbreak and even those that are in production were

Table 7: Impact of avian influenza outbreak on poultry equipment sellers in Jos North and South local government areas of Plateau state, Nigeria

Type of equipment sold	Before outbreak		During outbreak		
	Distributor (%)	No. of dozens sold (Week)	Distributor (%)	No. of dozens sold (Week)	Drop (%)
Plastic drinkers	0	1-5	0	1-5	0
	10	6-10	0	6-10	10
	35	11-15	0	11-15	35
	55	>15	0	>15	55
Plastic feeder trays	7	1-5	0	1-5	7
	26	6-10	0	6-10	26
	22	11-15	0	11-15	22
	45	>15	0	>15	45
Metal feeders	20	1-5	0	1-5	20
	40	6-10	0	6-10	40
	27	11-15	0	11-15	27
	13	>15	0	>15	13

selling off their birds to reduce loss (Sa'idu *et al.*, 2008; Bawa *et al.*, 2010). This activity resulted negatively in the trade of poultry drugs. For example, a sachet of antibiotic cost N450 before outbreak and majority (>50%) of the pharmaceutical stores sold more than 50 sachets in a week. However, during the outbreak, these stores were able to sell less than 10 sachets of the same antibiotic in a week. This resulted in decrease in the turn over value of antibiotic.

The result also indicated that more (70%) of the fowl sellers bought and sold between 200-250 birds in a week before the outbreak. But during the outbreak, there were no sells in birds of any kind. This may be connected with the fear instilled in people by the media about the dangers of avian influenza virus infection (Sa'idu *et al.*, 2008). The results of assessment of the impact of avian influenza outbreaks in the two LGAs showed a decline of more than 50% in the sale of locally milled feeds (toll millers), commercial feeds and poultry raw materials. This could be as a result of the depopulation of birds infected with H5N1 virus and that most farmers sold out their birds to reduce loss. A similar decline of between 25 to 50% in the sale of poultry feeds was reported by Bawa *et al.* (2010) in some states of northern Nigeria.

Egg dealers reduced from buying and selling more than 300 creates a week to buying and selling no egg in a week. This is because people had stop buying or eating egg which led to a drop in the price of a create of eggs to as low as N120 from the N450 and even with the low price, people still did not want to eat eggs. Sa'idu *et al.* (2008) also reported a similar drop in the price of egg in Kaduna state during the outbreak of avian influenza.

CONCLUSION

From the results of this study, it would be concluded that; The 2006 outbreak of avian influenza in Jos North and South LGAs of Plateau state caused serious decline in business activity of the stakeholders in the poultry industry and the effect was highest on fowl, egg and poultry equipment sellers that incurred 100% loss of income and a decline of over 50% in the

sale of poultry drugs and vaccines, toll milled feeds, commercial feeds and poultry raw materials.

REFERENCES

- Avian Influenza Control Project (AICP), 2008. Highly pathogenic avian influenza surveillance and recent updates. Bird flu Watch, pp: 10.
- Bawa, G.S., P.I. Bolorunduro, M. Orumunyi, M.K. Ajala and A. Peter, 2010. Farmers perception of avian influenza epidemic in some parts of Northern Nigeria. Amer. Eur. J. Sci. Res., 5(3): 170-175.
- National Disease Information and Suiveillance (NADIS), 2006. Special "Avian Flu" Edition. 9th Edn., Pan African Control of Epizootics (PACE) Projects, Nigeria, pp: 1-3.
- National Bureau of Statistics, Nigeria, (NBS), 2006. Economic performance review. Federal Republic of Nigeria, Abuja, Nigeria.
- NPC (National Population Commission), 2006. Nigeria. Retrieved form: <http://www.population.gov.ng/> accessed 14/9/2011 6:30 pm.
- Obi, T.U., A. Olubukola and G.A. Maina, 2008. Pro-poor HPAI risk reduction strategies in Nigeria-Background paper. Africa/Indonesia Team Working Paper No. 5, IFPRI. Retrieved form: <http://www.hpairesearch.net/index.html>.
- Plateau State Government, 2003. Nigeria. Retrieved form: <http://www.plateaugov.org/history/> accessed 14/9/2011 6:35 pm.
- Sa'idu, L., A.M. Wakawa, P.A. Abdu, D.F. Adene, H.M. Kazeem, K.C. Ladan, M. Abdu, R.B. Miko, M.Y. Fatihu, J. Adamu and P.H. Mamman, 2008. Impact of avian influenza in some states of Nigeria. Int. J. Poultry Sci., 7(9): 913-916.
- Terry, M., 2006. H5N1 hits Africa head on-but all eyes are looking elsewhere. Poultry Int., 1: 5-9.
- You, L. and X. Diao, 2007. Assessing the potential impact of avian influenza on poultry in West Africa: A special equilibrium analysis. J. Agri. Econ., 58(2): 348-367.