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BIOSECURITY MEASURES NEEDED BY RURAL POULTRY FARMERS FOR EFFECTIVE DISEASE PREVENTION

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Abstract: ***The research was carried out in Anambra State of Nigeria. Descriptive survey research design was adopted. The population of the study was 116 registered poultry farmers. This comprised of 51 males and 65 females. There was no sampling; the whole population was used because the population was manageable. The instrument used for data collection was a structured questionnaire which had 42 item statements. The questionnaire was structured on four-points rating scale of strongly agree, agree, disagree and strongly disagree with their nominal values of 4, 3, 2 and 1. The reliability of the instrument was determined using Cronbach Alpha which yielded a reliability coefficient of 0.83. The data collected were analyzed using mean with standard deviation statistics for the research questions, and hypotheses were tested using t-test statistics. Based on the analysis of the data, it was found that isolation practices, traffic control practices and good sanitation can be effectively used to prevent poultry diseases. It was recommended among others that the poultry farmers should be given workshops, seminars and conferences on application of isolation, traffic and sanitation practices for effective poultry disease prevention.***

Keywords: Biosecurity, rural poultry farmers, disease prevention.

Introduction

Agriculture is one of the most important sectors that contribute to the growth of GDP of the Nigeria sustainable economy. Agriculture contributes greatly to the nation's foreign exchange earning before the petroleum boom (CBN, 2007). In Nigeria, agricultural sector, especially poultry industry has become one of the most leading industries when compared with other agricultural sectors. Poultry according to Adedeji, Alabi and Opebiyi (2004) are birds domesticated or reared purposefully for meat and eggs production. Birds are reared virtually in every parts of the world as it provides protein that is nourishing to most people.

During the last decades, many countries have adopted intensive poultry production in order to meet the demand for this form of animal protein (CBN, 2007). Birds can survive anywhere in the world and are relatively reproduced simultaneously and grow to maturity very fast (FAO, 2008). Intensive system of poultry production involves the confinement of birds purposefully by establishment of condition such as temperature and light in order to extend the length of the day to boost production. Poultry include chicken, turkey, guinea fowl, pigeon, ostriches, pheasant, quail, peafowl, duck and goose.

Poultry in the context of this study is referred to as fowls or chicken domesticated for the purpose of meat and egg production. Poultry production out numbers all other forms of livestock production in Nigeria and it thrives well in any part of the country. Although, pigeons, ducks, guinea fowl and some turkey are reared everywhere, chicken are by far the most common. In poultry production specifically, birds of local breeds are reared traditionally at low number at free range system, while substantial numbers of exotic birds are bred intensively on the commercial basis mostly in the southern parts of Nigeria (Adeyemo and Onikoyi, 2012).

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The importance of poultry production to the national economy is enormous as it has become popular industry for the farmers and has greatly contributed to the economy. Okonkwo and Akubue (2001) reported that about 20 percent of Nigeria population is engaged in poultry production. Furthermore, they stressed that rearing of bird is attractive because birds can survive anywhere easily, have high economic yielding value, short gestation period and produce at high rate in terms of meat which matures at eighteen weeks and first egg is about the same time. Poultry production is an important source of animal protein, income generation, employment, industrial raw materials, manure and financial security. Ojo (2004) reported that poultry production had emerged to be leading in terms of livestock production and more profitable when compared to other livestock production. Poultry meat is a nice source of protein and contains iron, zinc and B complex vitamins except folic acids. It contains a well balanced supply of minerals including calcium and phosphorus especially if the bones are eaten. Also, Chicken eggs contain most of the constituents of nutrients that are important to man. For example, egg is a rich source of vitamin D, retinol, Riboflavin, Iodine and protein (Ojo, 2004).

Poultry production especially at the subsistence level is being carried out by the rural poultry farmers. Rural poultry farming is the act of keeping of birds of local breeds and or exotic birds within the household using family labor and possibly locally or already made feed ingredients. Birds can move around the household compound and neighborhood to find food, and obtain supplementary food from the owner occasionally.

Rural farmers according to Majoba and Igwebuike (2010) are the male and female farmers that dwell in the rural communities, situated outside the town, that engage in land cultivation, animal husbandry and every other aspect of agricultural production. Rural poultry farmers are those poultry farmers that reside in a geographical area located outside cities and towns that raise flocks of improved or unimproved breeds of poultry at extensive or intensive farming system (FAO, 2008). Some rural poultry farmers often are not well educated and as such have limited skills in their farming activities (FAO, 2008).

In Nigeria, rural poultry farmers produce approximately 94 percent poultry products which represents the highest percentage of estimated value of livestock production in the country (Ameji, 2010). Rural poultry farmers play vital role in food security. Such as production of quality locally bred poultry meat and eggs, provision of employment opportunities for alleviation of poverty in the socially (Ameji, 2010).

Despite the advantages of poultry production in the rural areas, farmers are posed with lots of serious challenges ranging from diseases infestation, high cost of feed and poor management practices. Poultry diseases are diseases that afflict poultry birds. Nyaga (2007) stated that poultry disease is an impairment of the normal state of health of poultry birds. Ogali (2004) described poultry diseases as abnormalities and disorderliness found in poultry birds leading to deviation from their normal health condition usually caused by infectious and non-infectious agents and a wide range of organisms. Adeyemo and Onikoyi (2004) believed that disease occurs from indirect causes which reduce the bird resistance or predispose it to catching a disease, as well as being affected directly by disease conditions. According to Smith (2010), poultry diseases include; Ascarid worm, Aspergillosis blackhead, botulism, cage layer fatigue, cannibalism, capillaria, cecal worm, chiggers, coccidiosis, erysipelas, E. coli, fatty liver Hemorragic syndrome, fowl choleral, fowl pox, fowl typhoid, gape worms, heximitasis, infectious bronchitis, infectious bursal disease, infectious, coryza, lice, typhoid lencosis, mycoplasmas, mareks disease, mycotoxicosis, Necrotienteritis, New castle disease, omphalitis, pullorum, quail Bronchitis, tape worm, ticks and ulcerative enteritis. Smith (2010) further classified poultry diseases based on causative agents and symptoms. These include; Bacteria caused disease such as botulism, E. coli, Necrotic enteritis, ulcerative, erysipelas, fowl cholera, fowl typhoid, infections coryza, mycoplasmas, omphalitis and pullorum. Viral caused diseases such as fowl pox, infectious bronchitis, infectious bursal disease, hymphoidlencosis, mareks disease, Newcastle disease. Fungi caused diseases such as Aspergillosis, moniliasis, mycotoxicosis. Also protozoan caused disease such as black head, coccidiosis, hexamitisis. Parasitic diseases of poultry such as Ascarid worm, capillaria, fecal worm, chigger, gapeworm, lice, mites, tape worm and ticks. Diseases from Miscellaneous Causes include; cage layer fatigue, cannibalism, fatty liver, hemorragic syndrome and rickets.

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According to Lukman, Ridwan, Wibowo, Basri and Sundarnika (2011), diseases have been pointed as an impediment to profitable poultry farming. Most diseases are gotten through egg transmission or through the use of infected breeds. Other diseases are spread in the poultry through the movement of vectors such as birds, rodents, parasites and even the poultry attendant. Therefore, effective disease prevention in poultry farm requires primarily on the use of sound management practices, planning to keep infectious and non-infectious disease far from birds before they start. Prevention of poultry diseases is secured by operating a health program which combines medicinal and biological prophylaxis, adapted to local conditions, such as pathological climate or nutritional and to the strains of poultry used (Lukman et al, 2011).

Disease prevention in the context of this study is the action taken by the poultry farmer to stop the occurrence of the disease. The interactions of different poultry birds within the farm such as fowl contacts, uncontrolled introduction of new stocks that have recovered from disease but are now carriers, shoes and clothing of visitors or caretakers who move within bird houses, contacts with inanimate objects and equipment contaminated, carcasses of dead birds that has not been disposed of properly, unclean water, gutters, rodents, wild animals and free-flying birds, insects, contaminated feed and feed bags, contaminated delivery trucks, live handling lorry, Air-borne fomites and egg transmission are forms in which infectious diseases spread (Nyaga, 2009).

Poultry diseases can be prevented by many techniques such as good sanitation, vaccination and use of biosecurity measures (Okoli, 2004).

Biosecurity measure of disease prevention is the practice of keeping infectious organisms out of poultry production area (Bizimenyera, Nyaga and Oloya, 2001). Biosecurity measures of poultry disease prevention involves isolation, traffic controlling and sanitation. Isolation means the practice of separating birds from sources of infection. Isolation according to (FAO, 2008) is the practice of keeping different bird species separately, preventing birds from having contact with potential sources of diseases, avoidance of mixing new birds from markets or neighbors with older flocks, quarantining those new birds for some time before joining them to the older flock, quarantining any bird that has gone out for sale or returned from exhibition to join back into the same bird house and preventing wild bird from having contact with the flocks. These are called bio-exclusion and bio-containment that limits the spread of diseases (Kasiti, 2007). Bio-exclusion is a measures taken to minimize the risk of introduction of pathogens into individual unit of production, while bio-containment is the practices implored to mitigate the spread of diseases agent outside the facility.

Traffic Control in poultry production involves provision of fencing, doors and locking of gates, control of human and vehicle within and into the farm, notifying the visitors that flock areas are out of bound for people, control of the movement of machines, animals, equipment and products to and fro the farm (Musiime, 2005). Sanitation can be achieved through effective cleaning, sterilization and disinfection. Sterilization is the act of destruction of all vegetative and spores of micro organisms especially bacteria, fungi, and virus that are highly resistant (Musiimi, 2005). Disinfection is the act of destruction of pathogenic organisms using agro-chemicals called disinfectants. On the other hand, sanitation practically reduces the amount of pathogenic organism and reduces quantity of contaminating organisms to its minimum level such that they pose no disease threat to birds through the practice of regular cleaning of equipment, washing of protective clothing and maintaining personal hygiene that will lead to destruction of disease organisms. It includes hand sanitizing, wearing of clothing exclusively made for the chicken house, using personal protective equipment like overalls, boots, and headwear. Cleaning, disinfection of vehicle, houses and equipment, fumigation of poultry house, frequent washing of hands and feet before and after handling poultry materials (Nyaga 2007). Disinfectants are chemicals that are used for disinfection on inanimate objects only while antiseptic is mild form of disinfectant that is used externally on living tissues to destroy the activities of microorganisms. Sainsbury (2009) reported that limiting diseases spread in poultry farm, involves implementation of effective biosecurity that has a comprehensive range of clear procedure aiming at minimizing the possibility of introduction of undesired pathogen into the poultry production area.

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Poultry diseases have been identified as one of the major challenges in poultry production at subsistence and commercial level. Many poultry farmers in Anambara state have folded while many farmers battle daily to break even in the business due to diseases. This situation has led to low output of poultry meat and eggs as well as high cost of the poultry products. It is on the basis of this that this work is designed to determine the biosecurity measures needed by rural poultry farmers for effectives disease prevent.

Statement of the Problem

In the year 1995 during the first detection of highly pathogenic avian influenza in Nigeria, there was serious loss of birds by poultry farmers because of the sudden outbreak of the deadly diseases. It was observed that this emanated from one infected poultry flock and spread to virtually all the birds within the same house of which about 2,500 birds died within the space of one month and two weeks. This high mortality rate of the birds was due to high epidemic of poultry diseases. This has made many poultry farmers in the study area to suffer huge financial loss as a result of diseases. This has led to folding up of many poultry farms in the study area and has invariably led to high cost of poultry products and scarcity of it. It also has led to malnutrition on children and adults due to lack of protein that is derived from poultry meat and its products. It has also led to unemployment directly or indirectly because poultry provides job opportunity to many people. In addition to this, the situation had increased the cost of poultry production in an attempt to control the diseases. Therefore, the major problem of this study is that poultry farmers in the study areas are suffering huge loss due to diseases and this has resulted to complete crumble and failure of poultry business in the area. Therefore, it is on this basis that this work was designed to determine the biosecurity measures needed by rural poultry farmers for effective disease prevention in poultry farms.

Purpose of the Study

The general purpose of this study was to determine the biosecurity measures needed by rural poultry farmers for effective diseases prevention in poultry farms. Specifically, the study sought to:

1. Determine isolation practices needed as biosecurity technique for the prevention of poultry diseases by the rural poultry farmers.
2. Determine traffic control practices needed as biosecurity technique for effective diseases prevention in poultry farm by the rural poultry farmers.
3. Determine sanitation practices needed as biosecurity technique for effective prevention of poultry diseases by the rural poultry farmers.

Research Questions

These research questions guided the study;

1. What are the isolation practices needed by rural poultry farmers for effective prevention of poultry diseases?
2. What are the traffic control practices needed by rural poultry farmers for effective prevention of poultry diseases?
3. What are the sanitation practices needed by rural poultry farmers for effective prevention of poultry diseases?

Hypotheses

The hypotheses below were tested using t-test at 0.05 levels of significance;

$H0_1$: There is no significant difference between the mean response of male and female poultry farmers on isolation practices needed by rural poultry farmers for effective prevention of diseases of poultry.

$H0_2$: There is no significant difference between the mean rating of male and female poultry farmers on the traffic control practices needed by rural poultry farmers for effective prevention of diseases of poultry.

Ho_3: There is no significant difference between the mean response of male and female poultry farmers on the sanitation practices needed by rural poultry farmers effective the prevention of poultry diseases.

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Methodology

The study was carried out in Anambara State of Nigeria. Descriptive survey research design was adopted. The population of the study was 116 registered poultry farmers. This comprised of 51 males and 65 female poultry farmers. There was no sampling, the entire population was studied because the population was manageable. The instrument used for data collection was a structured questionnaire which had 42 item statements. The questionnaire was structured on four points rating scale of strongly agree, agree, disagree and strongly disagree with the nominal values of 4, 3, 2 and 1 respectively. The instrument was validated by 3 specialists in measurement and evaluation and agricultural educationists from Ebonyi State University. The reliability of the instrument was determined by the use of Cronbach Alpha statistics which yielded a reliability coefficient of 0.83. The data collected were analyzed using mean statistics with standard deviation while the hypotheses were tested using t-test statistics at 0.05 level of significance.

Decision on the research questions were taken by using 2.50 as the bench mark. The 2.50 was derived by dividing the nominal values of the rating scales by the number of cases. Any item with the mean score of 2.50 and above was regarded as a measure that can be used to prevent poultry diseases while any item with the mean score less than 2.50 was regarded as a measure that cannot be used to prevent poultry diseases.

In testing the hypotheses, the t-calculated were compared with the t-critical, and where the t-calculated was less than the t-critical, the null-hypothesis was accepted, but where the t-calculated was greater than the t-critical the null-hypothesis was not accepted.

Results

Research Question 1

What are the isolation practices needed by rural poultry farmers as biosecurity technique for effective prevention of poultry diseases?

Table 1: Mean and standard deviation of the respondents on Isolation Practices Needed by Rural Poultry farmers as Biosecurity Techniques for the Prevention of Poultry Disease

S/N	Items	SA	A	D	SD	$\bar{X}$	SD	Interpretation
1	Keep birds of different species separate from each other	47	28	26	15	2.92	1.07	Agree
2	Keep birds away from pets and pathogens	49	32	21	14	3.00	1.05	Agree
3	New birds from market should be kept separate, quarantined before joining order flocks.	53	27	19	17	3.00	1.10	Agree
4	Use wire netting to prevent wild birds, pets and other animals from having contact with birds on the farm.	43	49	11	13	3.05	0.96	Agree
5	Sick birds should be isolated from the healthy ones.	69	21	14	12	3.26	1.03	Agree
6	Birds returning from shows and exhibitions should be isolated.	45	41	13	17	2.98	1.05	Agree
7	Birds should be kept according to their age groups	58	35	12	11	3.21	0.97	Agree
8	Prevent visitors from having contact with the birds	50	31	20	15	3.00	1.06	Agree
9	Poultry house should be far away from public roads and residential houses	70	20	13	13	3.26	1.05	Agree
10	Stock birds from only reliable source	46	29	17	24	2.83	1.16	Agree
11	Isolation of sick birds from health ones are not practiced in the farm	10	20	32	54	1.88	0.99	Disagree
	Grand Mean					**2.94**		Agree

Key $\bar{X}$ = Mean

SD = Standard Deviation

From the data in Table 1, item number 11 had mean value of 1.88 which is below 2.50 while items 1-10 had their mean scores above the cut-off point of 2.50 with their standard deviation ranging between 0.96-1.10 and the grand mean of 2.94. Therefore, the respondents agreed that isolation is one of the biosecurity techniques for effective prevention of poultry diseases.

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Research Question 2

What are the traffic control practices needed by rural poultry farmers as biosecurity techniques for effective prevention of poultry disease?

Table 2: Mean and standard deviation of the respondents on Traffic Control Practices Needed by Rural poultry Farmers as a biosecurity measure for effective Disease Prevention in Poultry farms.

S/N	Items	SA	A	D	SD	$\bar{X}$	SD	Interpretation
12	The farm gates are closed always to prevent easy entry of personnel	65	25	12	14	3.21	1.05	Agree
13	Guard the farm with fence or wire netting to prevent movement of people into the farm	58	32	14	12	3.17	1.01	Agree
14	Poultry biosecutiry rules should be pasted on the farm entrances to inform visitors on the dos and don't in the farm	36	34	30	16	2.78	1.04	Agree
15	There is direction for visitor's car park in the farm	17	15	40	44	2.04	1.05	Disagree
16	Disinfect vehicles and all equipments before entry into the farm.	20	22	31	43	2.16	1.11	Disagree
17	Ensure that traffic in the poultry farm flow from the youngest to the oldest flock house.	49	35	15	17	3.00	1.07	Agree
18	Ensure that equipment that has gone to the market do not get to the production unit without disinfection	26	23	34	33	2.36	1.12	Disagree
19	Ensure that farm workers do not visit other farms during operation	50	31	16	19	2.96	1.11	Agree
20	There visitors log book that states who enters the farm.	60	24	21	11	3.15	1.03	Agree
21	Ensure that free ranging animals such as pets are restricted from entering the farm.	45	35	18	18	2.92	1.08	Agree
22	Provide footbath at the entrance of the poultry house	28	40	23	25	2.61	1.07	Agree
23	Ensure that visitors wear protective clothing's and foot wears on entering the farm.	15	13	42	46	1.97	1.01	Disagree
24	Visitors are completely restricted from entering the poultry house unless absolutely essential	54	26	22	14	3.03	1.07	Agree
25	Ensure that machinery and equipments are cleaned and disinfected within the production unit before moving them to another unit.	52	33	16	15	3.05	1.05	Agree
26	Ensure that any authorized visitor, other producers and suppliers wash and change cloth and booth upon entering the farm.	18	27	34	37	2.22	1.06	Disagree
27	Traffic control is practiced in the farm	26	31	31	28	2.50	1.01	Agree
	Grand Mean					**2.69**		**Agree**

Key: $\bar{X}$ = Mean

SD = Standard Deviation

In Table 2, items number 15, 16, 18, 23 and 26 were disagreed by the respondents because they had mean value below 2.50 which is the cut off point while items number 12, 13, 14, 17, 19, 20, 21, 22, 24, 25 and 27 were rated agreed because they have their mean value 2.50 and above, the cutoff point and the grand mean value of 2.69. The standard deviations ranged between 1.01 and 1.12. This shows the closeness of the dispersion of responses of the respondents. Therefore, the respondents agreed that traffic control could be adopted as biosecurity measure for effective prevention of poultry diseases.

Research Question 3

What are the sanitation practices needed by rural poultry farmers as biosecurity technique for effective prevention of poultry diseases?

Table 4: Mean and the standard deviation of the Respondents on Sanitation Practices Needed By Rural Poultry Farmers as Biosecurity Technique for effective Prevention of Poultry Disease

S/N	Items	SA	A	D	SD	$\bar{X}$	SD	Interpretation
28	Ensure that all visitors and employees wash hand before entering and when leaving the farm	48	32	18	18	2.95	1.09	Agree
29	Enforce disinfection of visitors to the poultry house and change of cloth before entering the farm	56	34	16	10	3.17	0.97	Agree
30	Regularly clean and disinfect all equipment used in the poultry house	45	38	26	7	3.04	0.93	Agree
31	Avoid contaminated feed and stagnant water	70	25	12	9	3.34	0.95	Agree
32	Ensure specific clothing and foot wear for use in the farm	16	34	32	34	2.27	1.03	Agree
33	Keep the poultry house and its environment clean regularly	62	32	10	12	3.24	0.99	Agree

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34	Ensure adequate drainage system for easy cleaning and washing of equipment	58	37	12	9	3.24	0.93	Agree
35	Engage in proper waste management	49	41	15	11	3.10	0.96	Agree
36	Ensure recommended disinfectants are used in disinfecting poultry premised	55	25	21	15	3.03	1.08	Agree
37	Equipment such as buckets and wheel barrow are regularly cleaned	45	35	19	17	2.93	1.07	Agree
38	Keep composting area clean before and after use	30	30	32	24	2.67	1.09	Agree
39	Machinery such as vehicles, trucks, fork lift are cleaned regularly	15	13	42	46	1.97	1.02	Disagree
40	Dirt bins are kept closed regularly except during litter removal	48	38	15	15	3.03	1.03	Agree
41	Use low ;pressure water to wash dirt, lice and tick off the birds	9	19	33	55	1.84	0.9	Disagree
42	Footbath or foot dip are provided at the entrance of the farm	45	41	16	14	3.01	1.01	Agree
	Grand Mean					**2.85**		**Agree**

Key: $\bar{X}$ = Mean

SD = Standard Deviation

Table 3 revealed that items 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 40 and 42 had their mean scores within 2.50 and above, while items 39 and 41 had their mean scores less than the cut-off point of 2.50 with their corresponding standard deviations and grand mean of 2.85. This, implies that the respondents agreed that sanitation as a biosecurity measure is vital for effective prevention of poultry diseases.

Hypotheses One:

There is no significant difference in the mean responses of male and female poultry farmers on the isolation practices needed by rural poultry farmers as biosecurity techniques for effective prevention of poultry diseases at 0.05 level of significance.

Table 4: t-test Analysis of the responses of Respondents on the Isolation practices as a Biosecurity Measure Needed by Rural Poultry Farmers for effective prevention of Poultry Disease

Items	Gender	N	Mean	SD	t.cal.	Df	t.crit.	Interpretation
1	Male	51	3.06	1.08				
					1.22	114	1.96	*
	Female	65	2.82	1.06				
2	Male	51	3.06	1.08				
					0.46	114	1.96	*
	Female	65	2.97	0.99				
3	Male	51	3.18	0.99			1.96	*
					1.62	114		
	Female	65	2.85	1.16				
4	Male	51	3.27	0.83				
					2.27	114	1.96	**
	Female	65	2.88	1.02				
5	Male	51	3.37	0.92				
					0.97	114	1.96	*
	Female	65	3.18	1.12				
6	Male	51	3.16	0.88				
					1.59	114	1.96	*
	Female	65	2.85	1.15				
7	Male	51	3.45	0.86				
					2.62	114	1.96	
	Female	65	2.98	1.02				**

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8	Male	51	3.27	0.98	2.35	114	1.96	**
	Female	65	2.82	1.09				
9	Male	51	3.49	0.88				
					2.14	114	1.96	**
	Female	65	3.08	1.19				
10	Male	51	3.14	1.09				
					2.65	114	1.96	**
	Female	65	2.57	1.19				
11	Male	51	2.09	0.92				
					1.97	114	1.96	**
	Female	65	1.74	1.02				

Key * = Not significant difference

** = Significant difference

Table 4 revealed that items 1, 2, 3, 4, 5, 6, 10 and 11 had their t-calculated less than the t-critical of 1.96 at 0.05 level of significance and at 114 degree of freedom. Therefore, the null-hypothesis was accepted, but items 4, 7, 8 and 9 had their t-calculated greater than the t-critical, for that, the null-hypothesis was not accepted. This means that the opinions of the male and female poultry farmers did not differ significantly, but differs in terms 4,7,8 and 9.

Hypotheses Two: There is no significant difference in the mean responses of male and female poultry farmers concerning the traffic control practices as biosecurity technique for effective prevention of poultry diseases at 0.05 level of significance.

Table 5: t-test Analysis of the Respondents of the male and female poultry farmers on the Traffic Control practices needed by Rural Poultry Farmers as Biosecurity Technique for effective Poultry Disease Prevention

Items	**Gender**	**N**	**Mean**	**SD**	**t.cal.**	**Df**	**t.crit.**	**Interpretation**
12	Male	51	3.47	0.90				
	Female	65	2.98	1.12	2.51	114	1.96	**
13	Male	51	3.43	0.92				
	Female	65	2.95	1.04	2.58	114	1.96	**
14	Male	51	3.00	1.00				
	Female	65	2.60	1.07	2.05	114	1.96	**
15	Male	51	2.27	0.98				
	Female	65	1.88	1.07	2.06	114	1.96	**
16	Male	51	2.24	1.19				
	Female	65	2.14	1.07	0.46	114	1.96	*
17	Male	51	2.73	1.11				
	Female	65	3.18	0.99	2.34	114	1.96	**
18	Male	51	2.51	1.16				
	Female	65	2.25	1.08	1.27	114	1.96	*
19	Male	51	3.04	1.09				
	Female	65	2.92	1.11	0.56	114	1.96	*
20	Male	51	3.22	1.03				
	Female	65	3.08	1.05	0.71	144	1.96	*
21	Male	51	3.05	1.05			1.96	*
	Female	65	2.78	1.14	1.33	114		

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22	Male	51	2.86	0.98				
	Female	65	2.43	1.13	2.16	114	1.96	**
23	Male	51	2.29	0.99				
	Female	65	1.78	0.99	2.75	114	1.96	**
24	Male	51	3.29	0.99				
	Female	65	2.78	1.11	2.58	114	1.96	**
25	Male	51	3.37	0.87				
	Female	65	2.78	1.12	3.08	114	1.96	**
26	Male	51	2.51	1.03				
					2.63	114	1.96	**
	Female	65	2.00	1.05				
27	Male	51	2.86	1.00				
	Female	65	2.18	1.07	3.48	114	1.96	**
			2.88.					

* = Not significant difference

** = significant difference

Table 5 revealed that items 16, 18, 19, 20, 21 had their t-calculated less than the t-critical of 1.96,so the null hypothesis was accepted on these items, while items 14, 15, 22, 23, 24, 25, 26 and 27 had their t-table greater than the t-critical at 0.05 level of significance at 114 degree of freedom. The null-hypothesis was not accepted on these items, which means that the opinions of the male farmers were different from the female farmers on the use of traffic control practices for prevention of diseases on these items.

Hypothesis Three; There is no significant difference between the mean responses of the males and the female poultry farmers on the use of sanitation practices as a Biosecurity Technique for Poultry Disease prevention.

Table 6: t-test Analysis of the Respondent's opinions on the use of sanitation practices by the rural farmers as a biosecurity measure for effective poultry disease prevention.

Items	Gender	N	Mean	SD	t.cal.	Df	t.crit.	Interpretation
28	Male	51	3.24	0.99				
					2.56	114	1.96	**
	Female	65	2.72	1.13				
29	Male	51	3.22	0.99				
					0.79	114	1.96	*
	Female	65	3.06	1.09				
30	Male	51	3.02	0.97				
					0.33	114	1.96	**
	Female	65	3.08	0.89				
31	Male	51	3.65	0.72				
					3.21	114	1.96	**
	Female	65	3.09	1.06				
32	Male	51	2.63	0.96				
					3.29	114	1.96	**
	Female	65	2.02	1.02				
33	Male	51	3.55	0.73				
					3.06	114	1.96	**
	Female	65	3.00	1.10				
34	Male	51	3.45	0.88				
					2.19	114	1.96	**
	Female	65	3.08	0.94				
35	Male	51	3.22	1.03		114	1.96	**
					1.11			
	Female	65	3.02	0.91				
36	Male	51	3.29	0.97				

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					2.39	114	1.96	*
	Female	65	2.82	1.14				
37	Male	51	2.96	1.22				
					0.19	114	1.96	**
	Female	65	2.92	0.94				
38	Male	51	2.80	1.11				
					2.17	114	1.96	*
	Female	65	2.37	1.04				
39	Male	51	2.20	1.08		114		
					1.84		1.96	**
	Female	65	1.85	0.97				
40	Male	51	2.90	1.10		114		
					0.98		1.96	*
	Female	65	3.09	0.98				
41	Male	51	1.96	1.11		114		
					0.97		1.96	*
	Female	65	1.78	0.84				
42	Male	51	2.94	1.12		114		
					0.87		1.96	*
	Female	65	3.11	0.94		114		
			3.00		**.**			

The data on table 6 above revealed that items 28,31,32, 33, 34, 36,and 38 had their t-calculated greater than the t-critical of 1.96 at 0.05 level of significant. then then the null-hypothesis was accepted. This means that the opinions of the male and female poultry farmers differed significantly on these items, while their opinion did not differ significantly on items 29, 30, 37, 39, 40, 41 and 42 on the sanitation practices needed as biosecurity techniques for effective prevention of poultry diseases.

Discussion of Findings

The discussion of findings of this study is done based on the outcome of the research. The work found that isolation practices can be used as an effective biosecurity techniques to prevent poultry diseases. This finding is in agreement with Bradenbury (2008) who reported that isolation practices in poultry farm reduces the opportunities of disease transmission.

He further explained that the risk of contamination and spread of poultry diseases can effectively be minimized by application of biosecurity measure through effective isolation of the diseased birds. Furthermore, Paniago (2010) reported that when sick or infected birds are isolated from the healthy ones, it will become easy to prevent the spread of poultry diseases on the poultry farm.

Secondly, it was discovered that traffic control practice which is one of the biosecurity measures can be effectively utilized in preventing poultry diseases. This discovery agrees with Sharma (2010) who reported that the spread of poultry diseases can be mitigated by the adoption of effective traffic control practices, such as disallowing rampant movement of people, equipment and materials around the poultry farm. Equally McCrea and Bradley (2012) observed that poultry diseases can be prevented by reducing the level of visitors to the poultry farm. The finding is also in line with John and Prochaska (2013) who reported that minimizing the movement of machines, animals, equipment and number of visitors to the poultry farm can effectively be used to prevent poultry diseases.

Additionally, the work revealed that sanitation practice can be an effective biosecurity technique to prevent poultry diseases. This finding agrees with Okeke (2003) who reported that effective sanitation such as disinfection and regular cleaning of the equipment and the house helps to prevent the spread of poultry diseases. Also Shane (2004) added that effective sanitation such as scrubbing, brushing the floor, ceiling, windows, equipment, fittings as well as disinfection with recommended disinfectants help to prevent the spread and attack of poultry diseases on poultry farm. The finding is also in line with the United State of America Department of Agriculture (USDA) (2004) who stated that sanitation routines such as daily removal of the droppings of the birds and proper disposal will help to prevent poultry diseases.

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Conclusion

The problem of disease outbreak in poultry farm has been a disturbing factor to the poultry farmers. This work focused on measures of preventing poultry diseases using isolation, traffic control and sanitation practices. One hundred and sixteen registered poultry farmers served as the population of the study, the data collected were analyzed using mean and standard deviation. Analysis of data showed that effective prevention of poultry diseases can be carried out by adopting, isolation, traffic control and sanitation practices. Above all, poultry farmers can always keep the farm clean, isolate dead and diseased birds on the farm and as well restrict the movement of people and equipment on the poultry farm, in order to prevent poultry diseases.

Recommendations

Based on the findings, the following recommendations are put forward.

1. Poultry farmers should be made to attend workshops and conferences on importance of isolation on disease prevention in poultry.
2. Poultry farms should be sited away from where people are living and strict measures being placed against movement of people and equipment around the poultry farm.
3. Conferences and seminars should be organized for the poultry farmers from time to time on the benefit of good sanitation on the poultry farm.

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