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A SURVEY OF VETERINARY DRUGS IN USE IN FISH FARMS IN ABEOKUTA, OGUN STATE. NIGERIA

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ABSTRACT

A cross-sectional study was conducted to characterize fish farmers in Ogun State with respect to their use of veterinary drugs and awareness of adverse effects these drugs have on human. A semi structured questionnaire was used to gather relevant data from 80 fish farmers in Abeokuta. The findings indicated that fish farmers in the study area were mostly males, married and well educated. Most of them obtain primary source of income from fish farming. Despite the fact that both skilled (41.25%) and unskilled (58.75%) labourers were employed on the farms, family members were also involved in the production. 21.25% used pelmendazole, 10.0% used melbendazole, while 26.0% used ivermectin as their anthelminthics. 78.75% used oxytetracycline, 37.5% used penicillin, while 40% used sulfadimidine as their antibiotics. 67.5% used ovaprim® while 42.5% used ovatide® as hormones to boost their fish production. 76.25% of the fish farmers do not involve veterinarians in the production, whilst 48.75% of the farmers are not aware of adverse effect of veterinary drug residue in human. The results are discussed in view of the need for more involvement of veterinarians in fish production to ensure the adoption of global standards, thus guaranteeing improved food safety and sustainability in fish production.

Keywords: anthelminthics, hormones, antibiotics, fish farms, drug residue

INTRODUCTION

Nigerians are large consumers of fish with the demand estimated to be over 1.5 million metric tons annually (Omotoyin, 2007). Out of this estimated figure, 50% percent is currently being met by the local suppliers. The demand for fish is very high because fish is a good source of protein and, unlike fatty meat products; it is not high in saturated fat. Fish is a good source of omega-3 fatty acids benefit the heart of healthy people, and those at risk of-or who have-cardiovascular disease. (Green and Teichert -coddington, 2000). On the supply side of the market, domestic fish production accounts for about 500,000 metric tons by the artisan fisher folk (85%); despite over fishing in many water bodies across the country (Adekoya, 2004). The fish industry therefore, remains the most virgin investment in Nigeria compared with the importation of frozen fish in the domestic market (Ndu, 2006).

The gap created by the shortage of supply creates unrestricted entrance into fish production by anyone. In ensuring market demands are regularly met and to boost the production, majority of fish farmers adopt the use of various veterinary drugs. Some of these drugs include hormone (gonadorelin),

antibiotic, (oxytetracycline and penicillin) and antihelminthic (ivermectin and melbendazole).

While there is need to support every effort to boost fish production, misuse of these drugs has adverse effect on the consumers. In fact, indiscriminate use of antibiotics for veterinary purposes has increasingly become a matter of public concern. In the fish farming sector, the widespread use of antibiotics for treating bacterial diseases has been associated with development of antibiotic resistance (De Paola et al., 1995).
This study is aimed at characterizing the fish farmers in Ogun state with respect to their use of veterinary drugs and awareness of adverse effects of these drugs on human. This is vital since a large number of people are shifting to fish farming because of economic benefits and the outcomes would be of importance to policy makers, farmers and veterinary extension with mandates or interest in fish production and related activities.

METHODOLOGY

A cross-sectional study was carried out to characterize the fish farmers in Abeokuta and its environs. One hundred Fish farmers were selected to participate in the study. A semi structured questionnaire was used to gather relevant information most especially on the basic characteristics of the fish farmers, involvement of veterinarian in prescription of drug being used, awareness of drug residue with the public health implications and problems associated with fish farming in Abeokuta.

RESULTS AND DISCUSSION

A total of eighty respondents returned the questionnaires, which were coded and analyzed. Data presented in Table 1 shows the result on basic characteristics of the fish farmers; 71.25% were males while 28.75% were females; 12.5% of the respondents were below the age of 25years while 76.3% of the farmers were between 25 and 44years, only 11.3% are above 45years old; 2.5% of the respondent did not have any formal education, 2.5% had only primary education, 13.8% had secondary education, while the remaining 81.2% had tertiary education; majority (66.25%) are married, 33.75% are single while only 1.3% are divorced. These basic characteristics show that most people involved in fish farming are within productive age and can easily adopt new innovation (Odoemenem and Obinne 2010).

Data presented in table 2 shows the results of characteristic of the fish farms involved in the study. About 78.75% of the fish farmers have their primary income from the fish farm, while 21.25% has other major source of income. Kudi and others (2008), reaffirm that there is high level of profitability in fish farming, emphasis needs to be laid on the economic empowerment ability of fish farming which if sustained with proper regulation can increase rural development, lead to an improved food security and reduce rural poverty (Olawumi *et al.,* 2010,).

Table 1: Personal characteristics of the fish farmers in Abeokuta, Ogun state

	Personal Characteristics	Frequency	Percentage
A	**Sex**		
	Female	23	28.75
	Male	57	71.25
	Total	80	100
B	**Age**		
	15-24	10	12.5
	25-34	42	52.5
	35-44	19	23.8
	45 & Above	9	11.3
	Total	100	100.0
C	**Marital Status**		
	Married	53	66.25
	Single	26	33.75
	Divorced	1	1.3
	Total	80	100.0
D	**Highest Educational Qualification**		
	None	2	2.5
	Primary	2	2.5
	O Level/GCE	11	13.8
	OND	14	17.5
	HND/B.Sc.	43	53.8
	M.Sc./Ph.D.	8	10.0
	Total	**80**	**100.0**

Table 2: Information about the fish farms

Fish	Farm Parameter	Frequency	Percentage
A	Primary Source of Income		
	Fish Farm	63	78.75
	Others	17	21.25
	Total	80	100.0
B	No. of Labour		
	Less than 5	60	75.1
	6-9	13	16.3
	10-14	4	5.0
	Above 15	3	3.8
	Total	80	100.0
C	Farmland Ownership		
	Lease	27	33.8
	Rent	16	20.0
	Inherited	16	20.0
	Purchased	21	26.3
	Total	80	100.0
D	Sources of Farm Labour		
	Family Members	37	46.3
	Non-Family Members	32	40.0
	Both	11	13.8
	Total	80	100.0
E	Type of Labour		
	Skilled Labour	33	41.25
	Unskilled Labour	47	58.75
	Total	80	100.0

Table 3: Information about the fish farms (contd.).

Fish Farm Parameter		Frequency	Percentage
A	Type of Farming		
	Mixed	34	42.5
	Fishery Only	46	57.5
	Total	80	100.0
B	Principal Enterprise on the Farm		
	Poultry	11	13.75
	Fishery	59	73.75
	Piggery	2	2.5
	Food Crop Production	4	5.0
	Others	4	5.0
	Total	80	100.0
C	Size of Farm		
	Less than 1 Acre	61	76.3
	1-2 Acres	11	13.8
	3-4 Acres	2	2.5
	Above 5 Acres	6	7.5
	Total	80	100.0

Furthermore, 75.1% of the farmers make use of less than five labourers on the farm, 16.3% make use of between six and fourteen, however only 3.3% of the farmer employ above 15 labourers. This shows that fish farming is not labour intensive as 46.2% of the farmers involve family members in farm labour, 40.0% involve only hired labour while 13.8% make use of both family members and hired labour to work on the farm. Of the farm labour 41.25% are skilled while 58.75% are unskilled labour; 42.5% of the fish farmers practice integrated farming, while the remaining 57.5% have only fish on their farm. Integrated fish farm has been advocated because of the benefits that can be accrued from its such as increased yield, improved water management with multiple use of water, increased revenues and finally poverty reduction. (Othman, 2006).

Principal enterprise on the sampled farms is fishery with 73.75%, 3.75% had poultry, 2.5% had piggery, and 5.0% had other enterprises on the farm.

Among the fish farmers, 33.8% of land is on lease, 20.0% rented the land, and 20.0% inherited it while 26.3% purchased the land. Majority of the fish farms utilize less than one acres of land, 16.3% use between one and four acres while 7.5% use above five acres of land for production.

Table 4 shows the various challenges the fish farmers encountered. 16.25% of the farmers had problem of land acquisition, 21.25% had problem of finance, 23.75% had problem of how to market their product, 11.25% encountered the problem of flooding, 13.75% had problem of how to source for fingerlings, while 13.75% had problem of water source for fish production. Land is one of the most important resources readily available for production in developing country such as Nigeria. From this study it is obvious that land acquisition for fish farm in the study area is mostly by lease, closely followed by purchase. The farmers identified lack of good market for product (23.75%) lack of finance (21.25%), Problem of land acquisition (16.25%) as most important problem in fish production. This is in agreement with the findings of Kudi and others (2008) in Kaduna state, where the fish farmers identified lack of finance and lack of good market as the major constraint to fish production.

Table 4: Challenges in fish farming.

Respondent	Frequency	Percentage
Land acquisition	13	16.25
Finance	17	21.25
Marketing of product	19	23.75
Flooding	9	11.25
Source of fingerlings	11	13.75
Source of water	11	13.75
Total	80	100.0

It was observed that 21.25% used pelmendazole, 10.0% used melbendazole, while 26.0% used ivermectin as their anthelminthics. 78.75% used oxytetracycline, 37.5% used penicillin, while 40% used sulfadimidine as their antibiotics. 67.5% used ovaprim while 42.5% used ovatide as hormones to boost fish production (fig.1-3). These data showed that fish farmers make use of veterinary drugs without prescription and supervision. Due to low level of drug residue awareness and involvement of veterinarians on fish farms veterinary dug misuse and abuse cannot be farfetched from these farms.

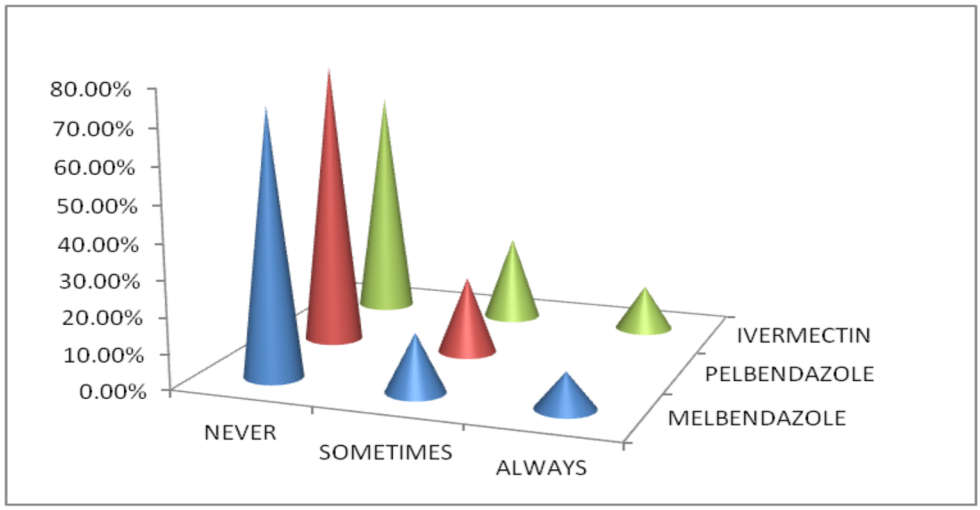

Figure I. Bar chart showing percentage of farmers using antihelminthics

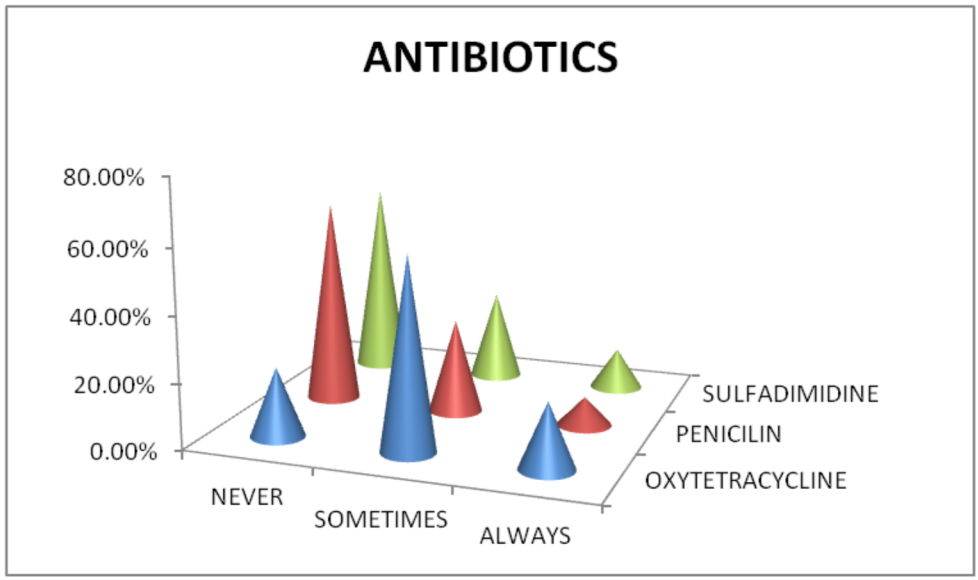

Figure II. Bar chart showing percentage of farmers using antibiotics

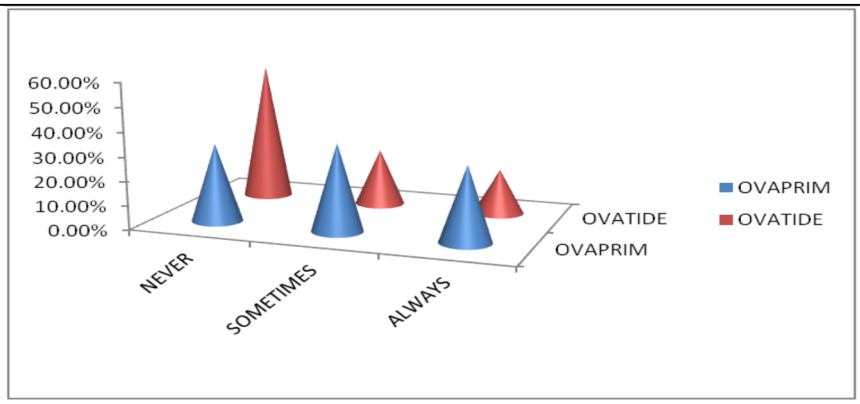

Figure III: Bar chart showing percentage of people using hormones

Table 5 showed the awareness of fish farmers to the possibility of drug residue in fish and it adverse effect on man. After the administration of the drugs, 17.5% sell the fish at one week after, 30.0% sell between 2 -3 weeks after, while 52.5% sell above 4 weeks. 48.75% of the farmers are not aware of the fact that drug residue can have adverse effects on man, while 51.25% are aware. 76.25 of these farmers do not engage the services of veterinarians on their farms while only 23.75% of them do. Furthermore 75.0% of the farmers administer veterinary drugs for their fish(es) by themselves; some (15%) even allow farm attendants to apply veterinary drugs, while only 10.0% of the farmers involve veterinarians in drug administration.

Table 5: Awareness of the drug residue in fish and its adverse effect in human

Respondent		Frequency	Percentage
A	Time of Sale After Administration		
	1 Week	14	17.5
	2-3 Weeks	24	30.0
	Above 4 Weeks	42	52.5
	Total	80	100.0
B	Awareness of Adverse Effects of Drug residue in human		
	No	39	48.75
	Yes	41	51.25
	Total	80	100.0
C	Veterinary Consultant on Farm		
	No	61	76.25
	Yes	19	23.75
	Total	80	100.0
D	Application of Drugs		
	Veterinary Doctor	8	10.0
	Attendant	12	15.0
	Self	60	75.0
	Total	80	100.0

Veterinary drugs administration in fish farming could be indicated for treatment and prevention of diseases, control of parasites, tranquilizer and growth promoters. Due to the fact that few drugs are approved for aquaculture farmers tend to use non-approved drugs, or use the approved one in a manner that deviates from the labeled instructions (Price and Tom, 1997). The use of antibiotic has significantly improved fish health, and production efficiency in aquaculture operation. However, the extensive use of antibiotics for chemoprophylaxis or growth promoters can result in antibiotic residues in fish for human consumption, which could cause allergic reaction and increase the probability of developing antimicrobial resistance in resident microbiological flora. Ogbondeminu and Olayemi (1993) observed that the indiscriminate use of antimicrobial drugs and other synthetic chemotherapies to treat fish has resulted in an increase in population of antibiotic resistant bacteria as well as resistance R-plasmid in food producing animals. Apart from drug residue problem, misuse of veterinary drug has the potential for causing environmental pollution since the use of fish feed as delivery vehicles for antimicrobial may inevitably lead to a certain amount of leach into the surrounding water**.**

Drug residue in fish could result first from improper usage due to lack of knowledge of withdrawal period or actual disobedience to manufacturers instruction on withdrawal period. Secondly it could be due to proper drug use but wrong managerial practices like improper husbandry of live fish, live fish harvested being held in a tank with medication, improper monitoring and finally lack of record keeping. From the findings of this work, it is expedient to balance increased fish production with the safety of the consumers. To reduce the risk associated with increased usage of veterinary drugs in fish production, the following recommendations are therefore put forward:

1. Registration and monitoring of all fish farms.
2. Involvement and interest of veterinarians in fish production.
3. Overhauling of the curriculum of veterinary medicine at undergraduate level to include comprehensive fish medicine

Finally, systematic and continuous extension services for fish farmers which will not only be based on improving production but also on effects of various practices on the farm on public health.

REFERENCES

Adekoya B.B., Miller J.W. 2004. Fish cage culture potential in Nigeria- An overview. National Cultures. *Agriculture Focus.* 1(5): 10.

De Paola, A., Peeler, J.T., Rodrick, G. 1995**.** Effect of oxytetracycline-medicated feed on antibiotic resistance of Gram-negative bacteria in catfish ponds. *Applied and Environmental Microbiology,* **61**: 2335–2340.

Green, W., Teichert-coddington, D. R. 2000**.** Human food safety and environmental assessment of the use of 17 alpha-methyltestosterone to produce male Tilapia in the United States. *J. World Aqua. Soc*., 31: 337.

Kudi, T. M., Bako, F. P. Atala, T. K. 2008**.** Economics of Fish Production In Kaduna State Nigeria. *ARPN Journal of Agricultural and Biological Science*, 3: 5-6.

Ndu N. R. 2006**.** Fish Farm Layout, Pond Construction, Management and Maintenance

- Techniques. A paper presented at the National Workshop on the Principles and Techniques of Fish Farming organized by Nigerian Agricultural, Cooperative and Rural Development Bank Kaduna with collaboration of Life Riches Consulting.

Odoemenem, I.U., Obinne, C.P.O. 2010**.** Assessing the factors influencing the utilization of improved cereal crop production technologies by small scale farmers in Nigeria. *Indian Journal of Science and Technology* 3 (1): 180-183

Ogbondeminu F.S., Olayemi A. B. 1993**.** Antibiotic resistance in enteric bacterial from fish and water media. *J. Aqua. Trop*. 8: 207-212.

Olawumi, A.T., Dipeolu, A. O., Bamiro, O. M. 2010. Economic Analysis of Homestead Fish Production in Ogun State Nigeria. *J Hum Ecol*, 31(1): 13-17

Omotoyin, B.O. 2007: Introduction to fish farming in Nigeria. University of Ibadan Press. P. 90.

Othman, K. 2006. Integrated farming system and multifunctionality of agriculture in Malaysia. *Acta Hortic.*, 655: 291-296.

Price, R.J., Tom, P.D. 1997. Compendium of Fish and Fishery Product Processes, Hazards and Controls. Sea Grant Extension Program, Food Science and Technology, University of California, Davis. UCSGEP 97-1W

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