A SURVEY ON FARMERS' AWARENESS OF DANGERS ASSOCIATED WITH THE USE OF ANTIMICROBIAL AGENTS IN FISH HATCHERIES, IJEBU-ODE, NIGERIA

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ABSTRACT
The study assessed the level of awareness of farmers on the dangers associated with the use of antimicrobial agents in fish hatcheries. Thirty-six fish hatcheries farmers were randomly selected for the survey using structured questionnaire. The questionnaire was used to gather information on the socio-demographic characteristics of farmers, pattern of application of antimicrobial agents and the level of awareness of farmers on dangers of use of antimicrobial agents. Descriptive statistics was used to analyze the results. The result showed that both males and females were involved in fish hatchery practices and all the farmers had one form of education or the other. Antimicrobial agents were administered by 85.71% of the farmers themselves without the supervision of an authorized personnel with 64% applying them prophylactically. The mode of application of antimicrobial agents is through water, in-feed application, and injection. About 42% gave no response on whether they think indiscriminate use of antimicrobials in fish hatcheries is dangerous while 38.71% believe it is dangerous. This indicates that the awareness level of most of the farmers is low. Hence, there is need for adequate sensitization of farmers on the dangers associated with the use of antimicrobial agents in fish health management.
Keywords: public health, food safety, advocacy, drug abuse

INTRODUCTION

Antimicrobials are drugs of natural or synthetic origin that can kill (bactericidal) or inhibit the growth of micro-organisms (bacteriostatic) (Canada-Canada *et al*., 2009). Expansion in aquaculture production has led to growing problems with diseases that require the intensive use of antimicrobials for treatments (Romero *et al*., 2012). This increase in productivity has been accompanied by an increased use of antimicrobial agents which are commonly used for prevention and treatment of infectious diseases (Miranda, 2012). Traditionally, antimicrobial agents have been widely used in aquaculture to prevent and treat diseases (Romero *et al.*, 2012). Although, excessive use of these substances in aquaculture in many countries have caused problems and concerns as a result of the development of bacterial resistance, food safety hazards and environmental issues (World Health Organization, 2016; Soltani *et al*., 2014). Many are used indiscriminately without knowing their necessity, effectiveness, proper dose and method of application and associated public health risks (Durojaiye *et al*., 2018; WHO, 2016)

In Nigeria, the administration of anti-microbial agents in food animals including fish production is characterized by indiscriminate use without appropriate veterinary supervision, regulation and control to protect the consumers. This misuse of veterinary drugs as well as violative residues of antimicrobials in Nigerian livestock products have been reported in different studies (Olatoye and Ehinmowo, 2010; Olatoye and Bashiru, 2013). A recent study by Durojaiye *et al*., (2018) revealed that antimicrobials were actively used by fish farmers in Ijebu-Ode, Ogun State, Nigeria; antimicrobials were prophylactically applied by 77.27% of the farmers; 91.11% of the farmers applied these antimicrobials without any prescription nor supervision of authorized personnel(s) and 79.55% of the farmers were not aware of any public health-related hazards associated with such applications. However, the study did not assess fish hatcheries from where fingerlings were obtained before stocking in production farms. Hence, this study was carried out to assess the level of awareness of the fish hatchery farmers on the dangers associated with indiscriminate use of these substances.

MATERIALS AND METHODS

Description of Study Area

The study was carried out in Ijebu-Ode Local Government Area of Ogun State. The city is located in South-Western Nigeria, with an estimated population of 218,600. The city is located 110km by road, North East of Lagos; it is within 1000km of the Atlantic Ocean in the eastern part of Ogun State and possesses a warm tropical climate. Its coordinates are 6o49'15"N 3o55'15"E. The study period was between April and August 2019.

Research Design

Quantitative research design was adopted using structured questionnaire (close-ended/multiple choice). The questionnaires were used to gather information on the socio-demographic characteristics of farmers such as gender, level of education, knowledge of fish hatchery and years of practice. Pattern of application of antimicrobial agents measured

variables such as mode of application and applicant of antimicrobial agents. The level of awareness of farmers on dangers in the use of antimicrobial agents was measured using Likert 5-point scale.

Sampling Procedure

Multi-stage sampling was done. First, Ogun State was selected for the study and divided into regions: Yewa, Ijebu, Egbado and Remo. Ijebu region was selected and different districts were identified. The districts include Ikenne, Ijebu-Igbo, Ijebu-Ode, Odogbolu, Atan, Ijebu-Ife amongst others. Ijebu-Ode was finally selected due to availability of appreciable number of functional fish hatcheries.

Fish farm survey

A total of 52 fish hatcheries were identified (from a preliminary study), of which 70% (36 hatcheries) were randomly selected for the study. The questionnaires were then administered to the fish hatchery farmers selected.

Data Analysis

After collection of the questionnaires, they were sorted and responses were coded. The data obtained were entered into Microsoft Excel 2016 and analyzed using descriptive statistics. The results are presented in charts, graphs, and tables as applicable.

RESULTS

Socio-demographic Characteristics of Fish Hatchery Farmers

Table 1 shows the socio-demographic characteristics of the fish hatchery farmers. 69.44% of the farmers were male while the others were female. All the farmers had a form of education with the least level being secondary school education (13.89%) and the highest level being post-graduate education (11.11%). Seventy-five percent (75%) of the farmers got their knowledge through training while the other routes were through school and personal reading. The years of experience of farmers ranged from 0 years to 16 years with the highest percentage in the range of 4-6 years (63.89%). Twenty-four farmers (66.67%) engage in other occupation asides fish hatchery business.

The pattern of application of antimicrobial agents

Figures 1 and 2 show the mode of application and applicants of antimicrobial agents. The modes of application are through water, in-feed, and injection; 85.71% of the farmers applied these substances themselves without any form of training or supervision of authorized personnel. Figure 3 shows that 64% of the farmers applied antimicrobial agents prophylactically.

Figure 4 shows the level of awareness of farmers on dangers associated with indiscriminate use of antimicrobial agents in the fish hatcheries; 12.9% of the farmers believed it is dangerous while 38.71% believed it is not dangerous. However, 41.94% refused to indicate their opinions. Using a Likert 5-point scale, figure 5 shows the level of awareness of farmers on the use of antimicrobial agents in fish health management. When asked if they knew use of chemicals/drugs on fish can cause another problem, 44.44% were indifferent/neutral, 13.89% strongly disagreed and 8.33% strongly agreed. When asked if it is better to apply chemicals /drugs even before the onset of diseases, 61.11% of the farmers agreed while 5.56% strongly disagreed. On whether it is essential trained personnel apply chemicals/drugs or not, 47.22% agreed, 25% strongly agreed and 5.56% strongly disagreed. 41.67% agreed, 5.56% strongly disagreed and 33.33% were indifferent/neutral, when asked if it possible not to raise fish without using chemicals and drugs. When asked if training of farmers on the application of chemicals/drugs in fish hatcheries is important, 36.11% were indifferent/neutral, 19.44% strongly disagreed and 16.67% agreed. 61.11% strongly agreed while 2.28% strongly disagreed that nothing can work better than drugs/chemicals to treat fish diseases. 6.11% of the farmers strongly agreed to adopt any other alternative to chemicals/drugs while 2.78% strongly disagreed.

Table 1: Socio-Demographic Characteristics of Respondents

Gender	Number of Respondents	Percentage
Male	25	69.44
Female	11	30.56
Total	36	100
Level of Education	**Number of Respondents**	**Percentage**
No formal education	-	-
Secondary school/	5	13.89
Technical Post-Secondary	8	22.22
First degree	19	52.78
Post-graduate Total	4	11.11
	36	100
Fish Hatchery Knowledge	**Number of Respondents**	**Percentage**
School	5	13.89
Training	27	75.00
Reading	-	-
School and Training	2	5.56
School, Training and Reading	2	5.56
Total	36	100

Years of Practice	Number of Respondents	Percentage
0-3 years	4	11.11
4-6years	23	63.89
7-9year	5	13.89
11-13years 14-	2	5.56
16years No	1	2.78
response Total	1	2.78
	36	100

Other Occupation	Number of Respondents	Percentage
Yes	24	66.67
No	10	27.78
No response	2	5.56
Total	36	100

Pattern of application of antimicrobial agents

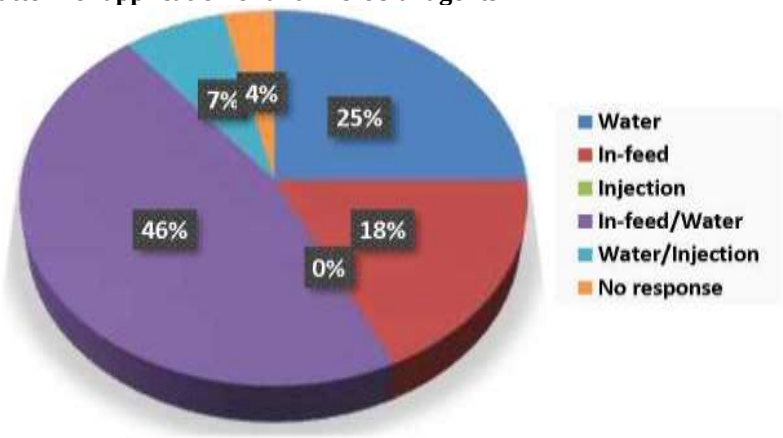

Figure 1: Mode of antimicrobial agent application

Figure 2: Applicant of antimicrobial agents

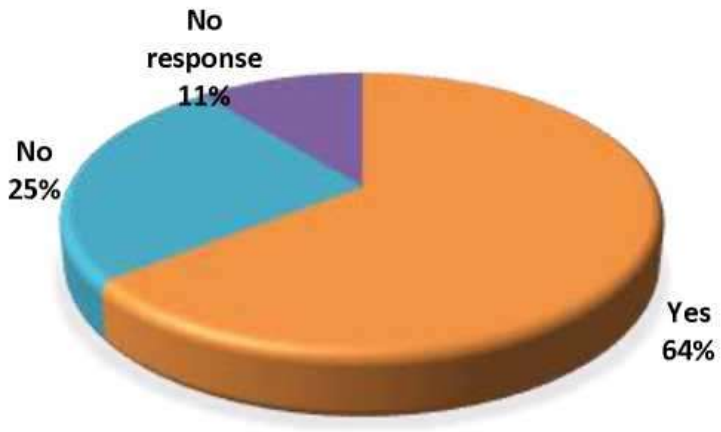

Figure 3: Prophylactic application of antimicrobial agents

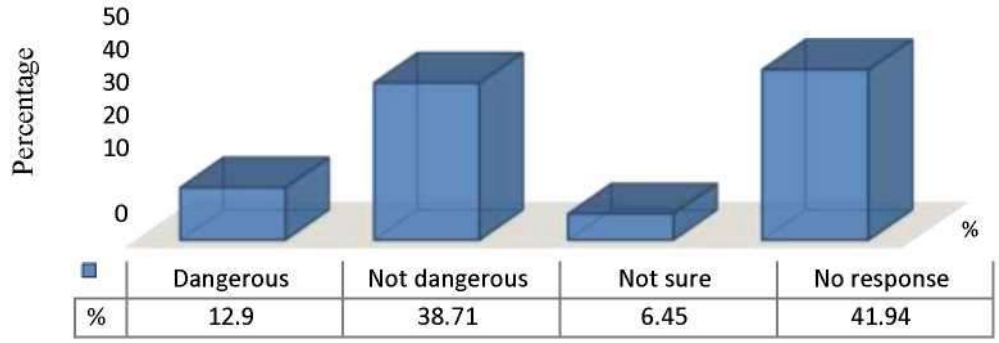

Figure 4: Awareness of farmers on whether indiscriminate use of antimicrobial agents in a hatchery is dangerous or not

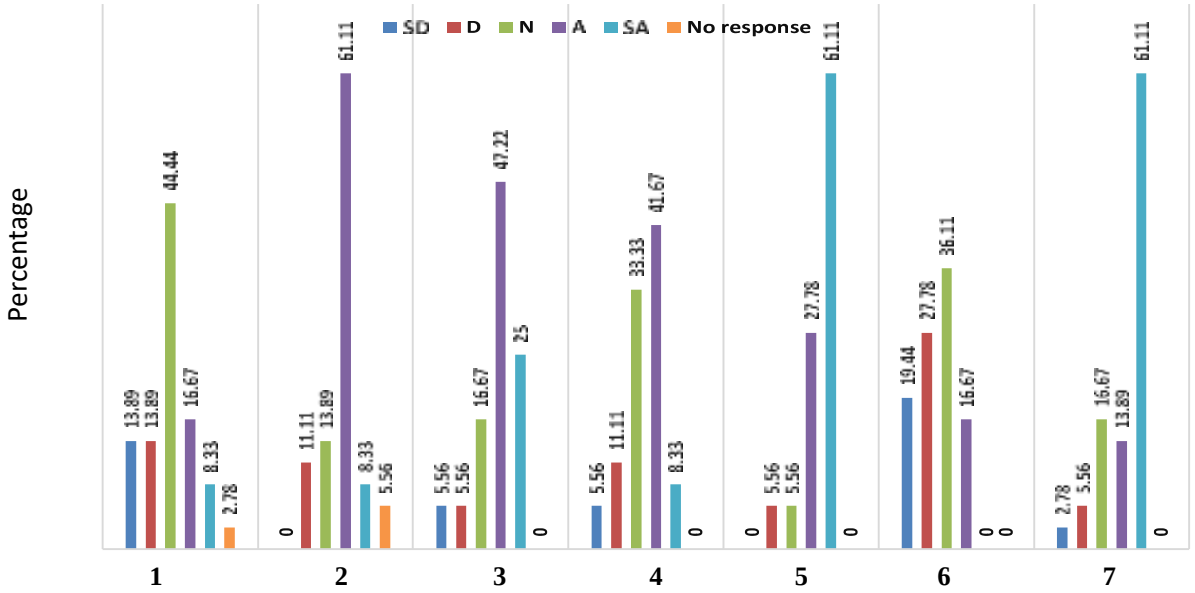

Figure 5: Awareness of farmers on the use of antimicrobial agents for fish health management

1: Use of chemicals/drugs on fish can cause another problem
2: It is better to apply chemicals /drugs even before the onset of diseases 3: I don't need trained personnel to apply chemicals/drugs on my farm 4: It is not possible to raise fish without using chemicals and drugs
5: Training of farmers should be provided on the application of chemicals/drugs in fish hatcheries. 6: Nothing can work better than drugs/chemicals to treat fish diseases
7: I will adopt any other alternative to chemicals/drugs

DISCUSSION

Catfish farming is a rapidly growing business in Nigeria with people from all walks of life engaged in it. A study by Olaoye *et al*., (2011) confirmed that both male and female farmers were engaged in fish breeding in four agricultural extension zones (Abeokuta, Ijebu-Ode, Ikenne, and Ilaro) of Ogun State, which is similar to the results obtained from this study.

The study revealed that all the farmers had a form of education with the least being Secondary/Technical education and the highest level being post-graduate education. This was in agreement with Olatoye and Badiru (2013), in a study carried out in Ibadan, Oyo State. Infectious and non-infectious diseases constitute major constraints to aquaculture productivity (Bagumire *et al*., 2010). In a bid to reduce this menace, farmers' use of antimicrobial agents in and this has become a great public health concern especially in the developing country where they are administered indiscriminately and may be administered through feed or direct application in pond water (Romero *et al*., 2012). This is in agreement with the result of this study.

Education is an important factor that can influence farm productivity and determine farmers' level of understanding and adoption of sustainable fish farming techniques. However, despite the level of education of the farmers, production was characterized by indiscriminate use of antimicrobial agents without authorized supervision. In this study, a high proportion (64%) of the farmers applied antimicrobial agents prophylactically and 88.71% practicing self-medication with no knowledge of the public health implications of such abuse. This supports the assertion that antimicrobial agents have not always been used responsibly in aquaculture (WHO, 2016). This misuse, as well as violative residues of antimicrobials in Nigerian animal products, have been reported by Olatoye and Ehinmowo, 2010, and Olatoye and Bashiru, 2013. However, some of the farmers showed a willingness to adopt safer alternatives if available.

CONCLUSION

The study revealed that antimicrobial agents are actively used in fish hatcheries in Ijebu-Ode. A majority of the farmers believe there is no danger in the application of antimicrobial agents for fish health management, while a few believe other safe alternatives can be helpful and adopted in managing fish health. Hence, creating awareness of the dangers of indiscriminate use of these substances has been proposed. Though the study didn't assess if the substances were being abused in terms of quantity used, however, studies on quantity used and residual levels in farmed product have been initiated. In addition, future researches should focus on the identification and production of safer alternatives.

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