



Assessment of veterinary drug retail outlets in two rural areas of Kwara state, north-central Nigeria

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Abstract

Meeting the challenges of sustainable growth in livestock production in sub-Saharan Africa requires significant improvements in animal health with adequate access to veterinary services. Since the 1980s, veterinary services in developing countries including Nigeria has witnessed a decline in government involvement and is currently almost private sector driven. Veterinary retail shops have emerged as important players in the provision of animal health services. However, diseases such as helminthiasis continue to occur with a high proportion in Nigerian livestock, despite the availability of veterinary drug retail outlets. A cross sectional survey was carried out in Tsaragi and Lafiagi rural areas of Kwara state, to assess the owners', sales persons' and business characteristics of veterinary retail outlets with the aid of structured questionnaire administered at interview and transect walk, carried out to appraise their capacities to provide adequate veterinary services. A total of 27 veterinary retail outlets made up of 13 agro-veterinary shops, 4 pharmacies, 4 general shops and 6 open market veterinary shops were interviewed. Majority of the veterinary shop owners and sales persons lacked professional qualification despite having an average of 10 years of experience retailing veterinary drugs. All respondents received veterinary drugs from wholesalers. Albendazole was the only type of anthelmintic stocked by the shops. Veterinarians and Animal Health Workers were the most important source of information about veterinary drugs. Dosage and drug dispensing of recommended quantities based on animal body weight was the greatest challenge in the sale of veterinary drugs. This study concludes that there is an urgent need for involvement of Veterinarians in the veterinary drug chain and the need to consider training and certification of Animal Health Workers in the veterinary pharmaceutical industry in Nigeria.

Keywords: Agro-vet, Livestock, Veterinary shops, Veterinarian, Veterinary services, Livestock development

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Introduction

The improvement of livestock productivity has been identified as one of the essential factors for poverty reduction in sub-Saharan Africa (AHM, 2016). However, livestock productivity is often hampered by poor animal health (Alawa *et al.*, 2002), for which livestock diseases and lack of adequate access to veterinary inputs and health services are some of its major causes (Bett, 2001). The veterinary pharmaceutical industry is an important input required for improved livestock health and productivity (Baars, 1984), especially with annual

losses due to preventable livestock diseases in sub-Saharan Africa being estimated at US\$ 4 billion (Grasswitz *et al.*, 2004). However, the veterinary drug sector is a neglected research area with only a few studies carried out in some parts of Africa (Bett *et al.*, 2004, Higham *et al.*, 2016); few focusing on substandard drugs (Kingsley, 2015) and none available to specifically characterize veterinary drug retailers in Nigeria.

Prior to 1980s, veterinary drugs were largely controlled by the government who often ensure the

authenticity and quality of drugs (Kingsley, 2015). This system has become non-existent in developing countries including Nigeria, as presently veterinary drugs are wholly private sector driven with no government involvement (Bett *et al.*, 2004, Grasswitz *et al.*, 2004). This decline of government participation in animal health services was due to economic policies as a result of recession in the 1980s that transferred responsibility to the private sector (de Haan, 2004). Veterinary drug retail shops have therefore emerged as important players in the provision of animal health services (Bett, 2001). Access to and availability of veterinary drugs is an important part of modern veterinary practice. Because of the emergence of the private sector driven industry and its importance in livestock productivity, there is the need to monitor its status and efficiency and to identify areas of challenges in order to ensure that it continues to serve its purpose. There is also the need to assess the

available veterinary drug retailers to take stock of their preparedness in terms of drug availability during disease outbreaks, because they are often the first line of treatment even before livestock keepers patronise veterinary hospitals. Furthermore, there are reports that current drugs are no longer effective in treating sick animals, of which respondents expressed their disappointment with the drugs they bought from veterinary shops as being no longer effective (Kingsley, 2015). This is also against the backdrop of resistance to veterinary drugs such as anthelmintics, acaricides, antibiotics and trypanocidals which occurs due to improper administration (Grasswitz *et al.*, 2004). In addition, there is risk of drug residues in meat and other animal products that end up in food meant for human consumption, if the correct dosing and administration are not adhered to (FAO, 2012). Drug residue levels in food products from treated animals beyond certain thresholds could be harmful to consumers (Sidibe, 2002). This present study seeks to assess the gap in distribution chain of veterinary drugs and to review the current status of veterinary pharmaceutical chain in two rural areas in Kwara state, with the aim of proffering solutions for improvement and overall access during animal health care.



Plate I: Open Market Veterinary Store in Bacita Market, Tsaragi, Kwara state, north-central Nigeria

Materials and Methods

Study area

The study was carried out in Tsaragi (located between 8°49'50.8"N and 4°59'03.7"E) and Lafiagi (located between 8°51'12.4"N and 5°24'31.6"E) wards of Kwara State, north-central, Nigeria. Both wards are among of the major livestock producers in Kwara state, north-central, Nigeria.

Identification, selection and classification of the shops

With the help of the area Veterinary Officer, all shops that traded in veterinary drugs located in the major markets and town centres within the two study locations were identified. A total of 27 shops were

enumerated. Shops were then classified into agro-veterinary, pharmacy, general shops and open market veterinary shops depending on the range of products stocked. Plate 1 shows a typical open market veterinary shop visited in the study. In each shop visited, a structured questionnaire with questions on socio-demographic characteristics of shop owners and main sales person as well as questions related to types of products stocked, drug supplier, types of anthelmintics (a previous study identified helminthiasis as a major concern of pastoralists in the area), sources of drug information and major challenges in the sale of veterinary drugs were administered at interview. The questionnaire used was adapted from that used in Kenya by Bett *et al.* (2004).

Statistical analysis

The data were entered into Microsoft Excel 2010 (Microsoft Corporation) software for data clean up and later exported to IBM SPSS® statistics version 16 software (IBM Corp.) for statistical analysis. Fisher’s exact test (due to expected counts in some cells less

than 5) was used to test the significance of associations between sociodemographic characteristics and business characteristics with the type of veterinary shop. The level of significance was set at a value of $p < 0.05$.

Results

Shop owner characteristics

A total of 27 retail outlets were identified throughout the 2 study areas and classified into 13 agro-veterinary shops, 4 pharmacies, 4 general shops and 6 open market veterinary shops. The mean age of shop owner was 47.5 (Range 25-56) years. The shop owners have between <1 year and up to 30 years of experience selling veterinary drugs (mean 9 years). Table 1 summarises the results of the characteristics of veterinary outlets based on shop owners. Almost all respondents were male with the only female owning a general shop. Less than half (40%) of respondents have had tertiary education while about one-third (29.6%) have had no formal education. Majority of respondents

Table 1: Characteristics of veterinary retail shop owners in Tsaragi and Lafiagi wards of Kwara state, Nigeria

Owner’s characteristics		Type of Veterinary Retail Outlet				Total N (%)	Fisher’s exact test
		Agro-Veterinary	Pharmacy	General Shop	Open Market Vet Shop		
Sex	Male	13	4	3	6	26 (96.3)	0.296
	Female	0	0	1	0	1 (3.7)	
Level of Education	No Formal Education	4	0	1	3	8 (29.6)	0.078
	Primary	3	0	0	1	4 (14.8)	
	Secondary	1	0	1	0	2 (7.4)	
	Tertiary	5	4	2	0	11 (40.0)	
	Quranic	0	0	0	2	2 (7.4)	
Professional qualification	Animal health	5	0	0	0	5 (18.5)	0.022
	None	7	1	4	2	18 (66.7)	
	Nursing	0	2	0	0	2 (7.4)	
Experience retailing vet drugs in years	0-5	8	2	4	2	16 (59.3)	0.0001
	6-10	0	1	0	0	1 (3.7)	
	>10	4	1	0	4	9 (33.3)	
Animal ownership	Yes	11	0	0	3	14 (53.8)	0.0001
	No	2	4	4	2	12 (46.2)	
If yes, what type of animal	Poultry	0	0	0	1	1 (3.7)	0.002
	Small ruminants	5	0	0	0	5 (18.5)	

Cattle	6	0	0	1	7 (25.9)
None	2	4	4	2	12 (44.4)

Table 2: Characteristics of veterinary retail outlet sales person in Tsaragi and Lafiagi wards of Kwara state, Nigeria

Sales person characteristic	Type of Veterinary Retail Outlet				Total N (%)	Fisher's exact test
	Agro-veterinary	Pharmacies	General shop	Open market vet shop		
Sex						
Male	12	1	2	4	19 (90.5)	0.048
Female	0	1	1	0	2 (9.5)	
Level of Education						
No formal education	5	0	1	1	7 (35)	0.526
Primary	4	0	0	1	5 (25)	
Secondary	1	0	1	1	3 (15)	
Tertiary	2	1	1	0	4 (20)	
Quranic	0	0	0	1	1 (5)	
Professional qualification						
Animal health	4	0	0	0	4 (21.1)	0.398
None	8	0	3	4	15 (78.9)	
Experience retailing veterinary drugs in years						
0-5	8	0	1	2	11 (40.7)	0.001
6-10	1	0	0	0	1 (3.7)	
>10	3	0	0	4	7 (25.9)	
Relationship of sales person to shop owner						
Employee	7	1	0	2	10 (45.5)	0.641
Self (owner)	3	1	2	3	9 (40.9)	
Family member	2	0	0	1	3 (13.6)	

(66.7%) have no form of professional training in animal health.

Sales persons' characteristics

Majority of sales persons in the veterinary retail outlets visited had no formal education and have had no professional qualification. About 40% of respondents have spent between 0-5 years selling veterinary drugs (Table 2).

Veterinary retail shop characteristics

All the respondents in this study got their drugs from wholesalers with none from manufacturers. The agro-veterinary shops stock most classes of drugs including trypanocidals, anthelmintics, antibiotics, acaricides, agro-chemicals like fertilizers, vaccines and surgical materials. The main types of veterinary drugs stocked by the pharmacies were antibiotics and acaricides. Albendazole was the most available

anthelmintic stocked under several trade names such as Albido1250®, Albenor 600®, Tubazole®, Seqazole 600®, Pomazole®, Eqazole® and were stocked by all the shops visited except the pharmacy shops. Most of the respondents reported that Veterinarians and Animal Health Workers were their most important source of information about veterinary drugs. Lack of knowledge on the appropriate dosing and dispensing of drugs based on required body weight was the greatest challenge in the sale of veterinary drugs as reported by respondents in the agro-veterinary shop. Other reported financing of drug retail stores and misuse of drugs purchased by livestock farmers as the other challenges of retailing veterinary drugs (Table 3).

Observations during transect walk

Generally, the retailers visited were largely unregulated. Veterinary retail shops were seen

Table 3: Characteristics of veterinary retail shops in Tsaragi and Lafiagi wards of Kwara state, Nigeria

Shop characteristics	Type of Veterinary Retail Outlet				Total	Fisher's exact test
	Agro-veterinary	Pharmacies	General shop	Open market vet shop		
Type of products stocked						
Veterinary drugs	13	1	1	6	21	0.0001
Human drugs	0	3	0	0	3	
Fertilizer	0	0	2	0	2	
Animal feeds	10	0	0	0	10	
Agro-chemicals	7	0	0	0	7	
Fertilizer	1	0	0	0	1	
Major supplier of drugs						
Wholesaler	10	4	4	6	24	*
Manufacturers	0	0	0	0	0	
Type of drugs stocked						
Trypanocidals	13	0	1	6	20	0.369
Antibiotics	13	1	1	6	20	
Acaricides	13	1	1	5	20	
Agrochemicals	1	0	0	0	1	
Anthelminthics	13	0	1	6	20	
Vaccines	2	0	0	0	2	
Surgical materials	1	0	0	0	1	
Specific anthelminthics stocked						
Albedazole	13	0	1	3	17	0.044
Ivermectin	0	0	0	2	2	
Most Important source of information about veterinary drugs						
Vet./Animal Health worker	13	1	0	1	15	0.000
Drug companies/wholesalers	0	0	0	3	3	
Posters	0	0	0	2	2	
Leaflets	0	0	0	1	1	
Greatest challenge in the sale of veterinary drugs						
Finance	0	0	0	3	3	0.106
Lack of education	0	0	0	1	1	
Introduction of new drugs to farmers	1	0	0	0	1	
Dosage and dispensing of drugs	6	0	0	0	6	
Misuse of drugs and dosing by livestock farmers	2	0	0	0	2	
Resistance to drugs by animals	1	0	0	0	1	

*No statistics are computed because major supplier of drugs is a constant

indiscriminately located in market places with no minimum standards such as record keeping of purchase/sales and expiration date of drugs. Most of the shops visited also lacked suitable storage environment such as refrigeration facilities for drugs requiring refrigeration.

Discussion

Most shop owners and sales person in this study have no professional qualification, a significant deficiency observed in the veterinary drug chain. Although past studies have shown that majority of

animal health services are provided by veterinary shops known as 'agro-vets' and mixed-goods shops, the professional involvement of a trained veterinarian holds the advantages of providing higher quality expertise in animal health care, compared to other service providers (Grasswitz *et al.*, 2004). In the developed countries, veterinary professionals play an important role in the supply and distribution of veterinary services and pharmaceuticals (Grasswitz *et al.*, 2004). It is noteworthy that, out of the over 7000 registered veterinarians in Nigeria, only about 1000 are involved in veterinary practice with majority located in big cities and some rural areas (AHM, 2016). A recent report found that 78.9% of private veterinary practices in south western Nigeria operate in urban and semi-urban areas leading to shortage of veterinarians in rural areas (Faramade *et al.*, 2016). The few veterinarians in private practice can hardly cater for the Nigerian livestock population numbering approximately 170 million chicken, 19 million cattle, 111 million sheep and goats and 7 million pigs (AHM, 2016) most of which are located in rural areas. Therefore, there is a wide disproportionate relationship between veterinarians and the number of animals. Furthermore, it has been previously reported that there are approximately 30,000 animals to a Veterinarian in developing countries (Sidibe, 2002).

This study reports wholesalers as the only supplier of drugs to retail outlets. This limits access to and availability of range of new drugs to livestock farmers. Multinational drug manufacturing companies used to patronize large-scale commercial farmers and government veterinary services; however, the decline in these market bases had led to most commercial companies to relocate their operations from most African countries and many ceased to maintain local offices (Grasswitz *et al.*, 2004). With the importance of the veterinary drug sector in animal health care, there is an urgent need to re-involve large companies in the veterinary drug supply chain especially with the increasing possibilities of emerging market in Africa. The International Federation for Animal Health (IFAH) estimates the official market value for veterinary drugs in Africa to be around US\$ 400 million a year (FAO, 2012). The larger drug companies and regulatory authorities should also be encouraged to invest in research in the veterinary drug industry such as to determine the quality and cutting edge solutions to challenges of veterinary drugs supply chain in Nigeria.

Albendazole and Ivermectin were the only anthelmintic drugs stocked by the retailers. There was an absence of efficacious drugs of choice against other groups of parasites such as trematodes. Anthelmintic drugs of choice such as triclabendazole were not available in all the shops visited in this study, this may be the situation with other classes of veterinary drugs. The unavailability of these drug means that these parasites if present in the animals will continue to persist and they may remain untreated, thereby affecting overall optimal productivity.

This study has shown the significantly important role of the Veterinarians and other animal health workers play in providing information about drugs to veterinary drug retail shops. It is therefore important to emphasize the need to employ veterinarians in drug stores to prescribe and provide information on appropriate drug usage. There is also the need to provide certification to smaller veterinary shops by the appropriate regulatory authorities. This is the current situation in the human health pharmaceutical industry in Nigeria, a qualified Pharmacist must be employed before a shop is licensed to operate. With the increase in the number of veterinary graduates in Nigeria, it should translate to policy shift from lack of involvement of veterinarians in the drug sector, to a situation whereby drug retailers would need to employ the services of veterinarians to offer consultation and advice on drug use. Moreover, veterinarians in Nigeria should be encouraged to take a front seat in the importation, distribution, sale and administration of veterinary pharmaceuticals. The industry has been taken over by unqualified para-professionals referred to as "quack vets". Presently, there is genuine fear expressed by veterinarians on the lack of expertise of this group of non-professional "quack vets", however, the latter may provide a viable alternative especially in areas that may be hostile due to ethnic or religious conflicts or inaccessible (terrains) to veterinary services, provided they are adequately trained (Grasswitz *et al.*, 2004). Some countries in Africa have made legislation to legally train and define the roles of animal health workers/veterinary para-professionals for their supervision by qualified veterinarians (Grasswitz *et al.*, 2004). Training them should help prevent or reduce misuse of products, competition with veterinary professionals and provision of substandard services. The OIE has recommended the adoption of well-planned and well-regulated Community Animal Health Workers (CAHW)

especially in areas with severe resource and operational constraints for effective veterinary service delivery in developing countries (Leyland & Catley, 2002; Wolmer & Scoones, 2005).

Dosage and drug dispensing of recommended quantities based on animal body weight was the greatest challenge in the sale of veterinary drugs as reported by respondents in this study. Other challenges of importance reported was that of drug misuse by livestock farmers that purchase drugs with the probable contribution to development of drug resistance. Cattle owners have been implicated as the major culprit in increasing treatment failures due to their poor veterinary practice of incorrectly administering drugs (Kingsley, 2015). Factors identified as contributing to under- or overdosing which may lead to the development of drug resistance include "illiteracy, inability to estimate livestock body weights, dilution of product (e.g. spreading a small purchase over a large herd), unfamiliarity with the product and ignorance of the consequences of misuse" (Boray *et al.*, 1990). Some of the factors mentioned above by Boray *et al.* (1990) were identified in this study and may consequently lead to drug resistance in Nigerian livestock industry. In addition, illiteracy and lack of professional qualification among veterinary drug retailers could also be a major contributory factor.

Some of the shops visited during the transect walk, revealed lack of suitable environment like proper storage temperature. For example, some drugs have storage temperature that require refrigeration,

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these were not obtainable in open market veterinary shops visited where the maximum daily temperature in some places in Nigeria is between 34 and 42 degrees Celsius (Amadi *et al.*, 2014). Most drugs have a storage temperature requirement of less than that and is likely to reduce drug potency. In the United States (US), the upper limits of manufacturers' storage temperatures for approved non-refrigerated drugs are between 25 and 30 °C (Ondrak *et al.*, 2015). It may therefore be worthwhile to carry out studies to determine the effect of storage on veterinary drug potency.

In conclusion, the Nigerian veterinary drug chain could benefit from an effective regulatory mechanism that would enhance the availability of efficacious drugs in order to improve livestock productivity. Recently, the Nigeria government established the Veterinary Medicines and Allied Products Directorate (VMAP) in 2013 under the National Agency for Food Drug Administration and Control (NAFDAC) to develop standard and provide science-based advice and information on the quality, safety and efficacy of veterinary medicines, veterinary products, pesticides and agro-chemicals. There is the need to scale up these efforts in order to achieve the desired standards in the industry.

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