
Full Length Research Article

Ten-Year (1993 – 2002) Retrospective Evaluation of Vaccination of Dogs against Rabies at the University of Ibadan, Nigeria.

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Abstract

Record books in form of one thousand, four hundred and seventy eight (1478) registers, case notes and vaccination certificates of registered dogs were assessed for rabies vaccination and its booster coverage. The dogs which consisted of 850 males and 628 females were presented at the Small Animal and Preventive Veterinary Medicine Clinics, Veterinary Teaching Hospital, University of Ibadan between January 1993 and December 2002. Among the registered dogs, 155 (10.5%) with annual mean of $9.1 \pm 9.1\%$ were vaccinated. Although more females (83 or 13.2%) were vaccinated than male dogs (72 or 8.5%), the difference was not significant ($p > 0.05$). Most vaccinated dogs (121 or 78.1%), were at the initial vaccination age of 3 months and had the highest vaccination coverage (51 dogs (males and females) or 44.3%) while 53 (males and females) dogs (43.8%) were adequately vaccinated. Also, 12 (35.3%) among 34 dogs with booster vaccination were adequately protected against rabies. The current study showed increase in registration of dogs and the cost of vaccination in the clinics. However declined vaccination and booster coverages were observed compared to the previous 5 – year observations of 36.5% vaccination and 59.5% booster coverages. These observations were far below the recommendation of WHO (1989, 1990, 2001) to prevent urban rabies epizootics and epidemics in the area. Since rabies is zoonotic, the study indicated increase danger of contracting rabies by veterinarians, their assistants, dog owners, their family members and the general public.

Key words:

Dog-rabies, zoonosis, vaccination and booster coverage, public health, Nigeria.

INTRODUCTION

Rabies, also known as hydrophobia is an acute, viral disease of all warm blooded animals including man (Radostiis *et al*; 1995). The disease is characterized by the disturbance of the central nervous system leading to paralysis and death. Once the symptoms of the disease develop, rabies becomes fatal to both animals and humans (WHO, 2001). Unlike wild (sylvatic) rabies which involves wild animals such as foxes, wolves and other canidae, dog is the main reservoir host of urban rabies (Acha and Szyfres, 1987). It could also be

transmitted to a lesser extent by cats. The common method of rabies transmission is by the bite of rabid animals bite of other susceptible animals and humans. The annual number of human deaths due to rabies world-wide is estimated to be between 40,000 and 70,000 (WHO, 2001). Additionally, an estimated 10 million people received post exposure vaccination treatment each year due to bites from rabid suspected animals (WHO, 2001). Rabies is an important public health problem especially in the developing countries including Nigeria. This is because dog bites are common and regular

routine vaccination of dogs are very low (Adeyemi and Zessin, 2000) while mass campaign with free vaccination against dog rabies has been abandoned for a long time in Nigeria. Some workers (Boulger and Hardy, 1960; Ezebuoro *et al*; 1980; Ikede and Adeyemi, 1984; Ogunkoya *et al*; 1984; Okoh, 1989; Oboegbulem, 1994) reported that dogs were the predominant reservoir of rabies in Nigeria. Because of the dominant role dogs play in the anthrophilic transmission of rabies to humans (Teulieres *et al*; 1988), the idea of routine prophylactic vaccination of dogs has been generally accepted for effective control of urban rabies world-wide (Anonymous, 1988, WHO, 1989).

Among various measures recommended for urban rabies control world wide, such as compulsory registration and licensing of dogs, elimination of stray dogs, routine prophylactic vaccination of dogs and cats as well as mass education / public campaign, vaccination has been the main solution so far applied against dog rabies (Lombard *et al*; 1988). WHO recommends 70 - 80% minimum vaccination coverage of the dog population at risk in all areas (WHO, 1989, 1990, 2001). This is in order to effectively interrupt urban rabies transmission cycle.

Both local and imported rabies vaccines are used to protect dogs and cats in Nigeria. However, some workers have reported problems of purity and immunogenic inadequacies of the low and high egg passage (LEP, HEP) Flury strain rabies vaccine produced in Nigeria (Okoh, 1989; Adeyemi *et al*; 1993; Ogunkoya *et al*; 2003). For dogs, initial vaccination against rabies is at 3 months of age with the immunity lasting between 2 to 3 years, whereas an annual booster vaccination is recommended in Nigeria because of enzootic nature of rabies in most areas (Nawathe *et al*; 1981). The voluntary routine vaccination in the Veterinary clinics places responsibility on the individual dog owners to bring their dogs to the clinic or to book for ambulatory services at a fee with registration of the dogs and issuance of rabies vaccination license and certificate. Alternatively, mass immunization campaigns sponsored by government and non-government agencies usually cover more areas and dogs since it is commonly free of charge or at subsidized cost. However such programmes have been abandoned for a long time in Nigeria.

Previous 5year (1988 – 1992) evaluation of the voluntary dog rabies vaccination in the same area showed low vaccination coverage (36.5%) of the registered dogs and (59.5%) booster coverage (Adeyemi and Zessin, 2000). As a zoonosis and

an important public health problem worldwide (especially in the developing countries such as Nigeria), early, less expensive and effective control of urban rabies is in dogs. This is because the urban human rabies problems are commonly initiated by increase number of cases in dogs/cats populations which are the common reservoirs of infection to humans. When animal rabies control measures are inadequate, animal rabies then spills to human population at risk due to the bite of man by rabid animals. By the legal provisions (Anonymous, 1988; WHO, 1989; Ogunkoya *et al*; 2003) rabid suspected dogs are to be quarantined. Rabid dog commonly shows clinical and post mortem signs before human bitten victims. Thus, early diagnosis of rabies in dogs and other animals forms the basis for post-exposure human rabies vaccination and treatment. Single dose of human rabies vaccine is three times more expensive than animals rabies vaccines in Nigeria. Also five doses of human rabies vaccines are required for post-exposure treatment of each confirmed rabid dog-bite victim (Pasteur Merieux, 1995).

This study attempts to assess current status of routine vaccination of dogs against rabies at the University of Ibadan and the implications on the prospect of urban rabies control in the area.

MATERIALS AND METHODS

Records on the date of dogs registration, dog identification, age, sex, period of clinic attendance and rabies vaccination history of 1478 dogs were collated from the Veterinary Teaching Hospital (VTH), University of Ibadan. The data were obtained from the register and case notes which were kept in the Record Sections of Small Animal and Preventive Veterinary Medicine Clinics of the VTH.

Registered dogs were classified according to years of registration, sex, age, vaccination and the booster status. The annual and total 10-year vaccination and the booster coverage were assessed based upon the following parameters (Adeyemi and Zessin, 2000);

(i) $Vaccination\ coverage\ (\%) = \frac{No\ of\ dogs\ vaccinated}{Total\ No\ of\ dogs\ registered}$

(ii) Adequate rabies vaccination - Recommended number of rabies

Vaccinations per dog with regard to age
 (iii) Booster vaccination - Annual revaccination following expiry of initial

vaccination at the age of 3 months. The data obtained were analysed and evaluated using students t- test.

RESULTS

Between January 1993 and December 2002, a total of One thousand, four hundred and seventy-eight (1478) dogs were presented and registered

in the Small Animal and Preventive Veterinary Medicine Clinics of the VTH, University of Ibadan, Ibadan, Nigeria. However, 155 (10.5%) of the registered dogs (83 or 13.2% males and 72 or 8.5% females) were vaccinated against rabies (Table 1). More than half of the dogs presented (861 or 58.3%) were in ages below 3 and 6 months. Most of the vaccinated dogs (121 or 78.1%) were at the initial vaccination ages (3 to 15 months).

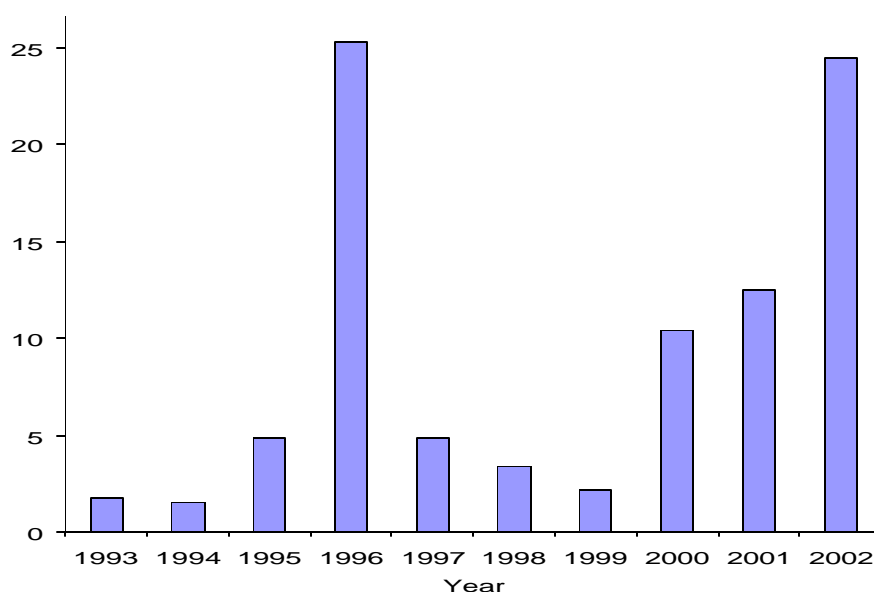


Fig. 1: Rabies vaccination coverage (%) in dogs at the University of Ibadan (1993-2002)

Table 1: Rabies vaccination profile of registered dogs at the University of Ibadan (1993–2002)

Year	Total registered dogs			No. vaccinated						Total adequate vaccination coverage		Cost per dose of vaccine (₦) (₦140.00 to \$1.00)
	No	M	F	Total	%	M	%	F	%	No	%	
1993	114	81	33	2	1.8	2	2.5	0	0.0	1	50.0	300
1994	67	56	11	1	1.5	0	0.0	1	9.0	0	0.0	300
1995	142	73	69	7	4.9	4	5.5	2	4.4	2	28.6	300
1996	79	43	36	20	25.3	11	25.6	9	25.0	13	65.0	500
1997	143	83	60	7	4.9	5	6.0	2	3.3	4	57.1	500
1998	88	45	43	3	3.4	1	2.2	2	4.7	1	33.3	500
1999	138	69	69	3	2.2	0	0.0	3	4.4	1	33.3	500
2000	230	110	120	24	10.4	12	10.9	12	10.0	9	37.5	500
2001	240	180	60	30	12.5	10	5.6	20	33.3	13	43.3	500
2002	237	110	127	58	24.5	27	24.6	31	24.4	26	44.8	500
Total	1478	850	628	155	10.5	72	8.5+	83	13.2+	70	45.2	-
Mean	147.8	85 ±	62.8	15.5	9.1	7.2	8.3±	8.3±	11.9±	7.0±	39.3±	
±SD	±66.1	40.7	±36.	±18.1	±9.1	±8.3	9.4	10.1	11.4	8.4	17.9	

Table 2.

Initial vaccination of registered dogs at the University of Ibadan (1993 – 2002)

General vaccinations					Initial vaccination ages								
Year	No. of reg. Dogs	Total vacc. (%)	<3 mnths	No Vacc.	3 mnths	No. vacc. (%)	>3-6 mnths	No. vacc. (%)	>6-15 mnths	No. vacc. (%)	Total No. reg.	Total No. vacc. (%)	No. of adequate vacc.(%)
1993	114	2 (1.8)	2	0	8	0(0.0)	49	0.0(0.0)	28	0 (0.0)	85	0(0.0)	0 (0.0)
1994	67	1 (1.5)	1	0	5	0(0.0)	25	0(0.0)	17	1 (5.9)	47	1(2.1)	0 (0.0)
1995	142	7 (4.9)	0	0	9	0(0.0)	85	0(0.0)	35	7 (20.0)	129	7(5.4)	2 (28.6)
1996	79	20(25.3)	8	0	8	8(100.0)	43	5(11.6)	12	7 (58.3)	63	20(31.8)	8 (0.4)
1997	143	7 (4.9)	6	0	11	4(36.4)	65	0(0.0)	18	2 (11.1)	94	6 (6.4)	4 (66.7)
1998	88	3 (3.4)	2	0	6	1(16.7)	40	0(0.0)	9	0 (0.0)	55	1 (1.8)	1 (100.0)
1999	138	3 (2.2)	5	0	9	0(0.0)	53	0(0.0)	28	0 (0.0)	90	0 (0.0)	0 (0.0)
2000	230	24(10.4)	9	0	15	8(53.3)	113	1(0.9)	40	4 (10.0)	168	13 (7.7)	8 (61.5)
2001	240	30(12.5)	8	0	22	9(40.9)	139	7(5.0)	57	8 (14.0)	218	24 (11.0)	9 (37.5)
2002	237	58(24.5)	13	0	22	2(9.1)	80	7(8.8)	76	21(27.6)	178	49(27.5)	21 (42.9)
Total	1478	155 (10.5)	54	0	115	51(44.3)	692	20(2.9)	320	50(15.6)	1127	121(10.7)	53 (43.8)
Mean ± SD	147.8 ±66.1	15.5 ±18.1	5.4 ±4.2	0	11.5 ±6.2	5.1 ±6.7	69.2 ±35.5	2.0 ±3.1	32.0 ±21.1	5.0 ±6.5	112.7 ±58.1	12.1 ±15.5	5.3 ±6.6

Table 3.
Booster vaccination profile of registered dogs at the University of Ibadan (1993 – 2002)

Year	No of registered dogs	Total vaccinated (%)	>15-36 months	Not vaccinated (%)	>36 months	No vaccinated (%)	Total No of dogs	Total No vaccinated (%)	No of adequate booster (%)
1993	114	2 (1.8)	27	2 (7.4)	0	0 (0)	27	2 (7.4)	1 (50.0)
1994	67	1 (1.5)	11	0 (0.0)	8	0 (0.0)	19	0 (0.0)	0 (0.0)
1995	142	7 (4.9)	7	0 (0.0)	6	0 (0.0)	13	0 (0.0)	0 (0.0)
1996	79	20 (25.3)	3	0 (0.0)	5	0 (0.0)	8	0 (0.0)	0 (0.0)
1997	143	7 (4.9)	21	0 (0.0)	12	1 (8.3)	33	1 (3.0)	0 (0.0)
1998	88	3 (3.4)	16	2 (12.5)	15	0 (0.0)	31	2 (6.5)	0 (0.0)
1999	138	3 (2.2)	32	2 (6.3)	11	1 (9.1)	43	3 (7.0)	1 (33.3)
2000	230	24 (10.4)	41	8 (19.5)	12	3 (25.0)	53	11 (20.8)	1 (9.1)
2001	240	30 (12.5)	11	3 (27.3)	3	3 (100.0)	14	6 (42.9)	4 (66.7)
2002	237	58 (24.5)	30	7 (23.3)	16	2 (12.5)	46	9 (19.6)	5 (55.6)
Total	1478	155 (10.5)	199	24 (12.1)	88	10 (11.4)	287	34 (11.8)	12 (35.3)
Mean \pm SD	147.8 \pm 66.1	15.5 \pm 18.1	19.9 \pm 12.3	2.4 \pm 2.9	8.8 \pm 5.3	1 \pm 1.3	28.7 \pm 15.3	3.4 \pm 3.9	1.2 \pm 1.8

Among the vaccinated dogs at the initial vaccination ages, 53 (43.8%) dogs were adequately vaccinated. Also, in this category of initial vaccination ages, dogs at exactly 3 months of age were 115 and they had the highest vaccination coverage (51 dogs or 44.3%) (Table 2). Two hundred and eighty seven (287) or 19.4% of the registered dogs were in booster vaccination ages and 34 (11.8%) of them were vaccinated while 12 (35.3%) of the dogs were adequately boosted (Table 3). Tables 1, 2, 3 and Fig. 1, show the details of the observations.

DISCUSSION

Although the cost of rabies vaccination for a dog went up from ₦300.00 (\$2.14) to ₦500.00 (\$3.57) (66.6%) increase since 1995, this study showed increase in registration of dogs in the study area. The observation may be due to the higher income of public servants and increasing crime rate which is thus increasing the tendency to keep dogs for security. However, the annual mean vaccination $9.1 \pm 9.1\%$ and 10 year period (10.5%) vaccination coverage were far below the minimum rabies vaccination coverage (70%) recommended by WHO (WHO, 1989) to prevent dog rabies epizootic spread in the community under study. Also, the 10 year period vaccination coverage showed drastic decline compared to the previous 5-year (Adeyemi and Zessin, 2000) rabies vaccination coverage (36.5%) with annual mean of $37.9 \pm 13.3\%$ vaccination coverage in the same clinics.

As reported (Ogundipe *et al*; 1989), incomplete records especially in the aspects of revaccination dates might probably be responsible for the low booster vaccination. The special rabies case notes designed to address the problems of incomplete record information were not properly filled. The record quality in this regard needs to be improved by the veterinarians who are attending to vaccination cases especially rabies vaccinations in the clinics.

It has been observed (Adeyemi and Zessin, 2000) that dog-trade across the country is common and unregulated, therefore, rabies control problems in Ibadan city may exacerbate the public health problems of urban rabies in Nigeria. Low antirabies vaccination tendency builds up susceptible dog populations and favours large – scale epizootic or focal outbreaks with an increase of rabies risk to veterinarians and their assistants, owners and their family members as well as the general public.

The decline and general inadequate dog rabies vaccination coverage observed in this study may be due to lack of crucial factors recommended by the WHO (WHO, 1989) for adequate dog rabies vaccination and urban rabies control programmes in the area of study. Such factors include enforcement of registration of dogs and compulsory routine vaccination, free/subsidized vaccination cost, regular vaccination campaigns and increase creation of awareness on rabies in the public. In addition, stray dog elimination, imported/interstate dog movement control, quarantine and consistent community – wide rabies monitoring in an area have been effective means of preventing urban rabies epizootic (Lombard *et al*; 1988).

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