

**AWARENESS OF RABIES PRE-EXPOSURE VACCINATION AMONG  
CLINICAL VETERINARY STUDENTS AND AT-RISK STAFF IN TWO  
UNIVERSITIES IN EASTERN NIGERIA**

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**ABSTRACT**

*Two hundred well structured questionnaires were used to assess the level of awareness and current of rabies pre-exposure vaccination status of staff and students of two Veterinary institutions in southeastern Nigeria. The study revealed that 57.5% of staff in University 1 and 35.0% of staff in University 2 had received the rabies pre-exposure vaccination while 10% and 6.7% of the clinical students in University 1 and University 2 were vaccinated. The results imply that most people at-risk of contracting rabies at these veterinary institutions did not receive the pre-exposure vaccination. Duration of service, year of study and job description were significantly associated with the rabies pre-exposure vaccination in both institutions. The results also revealed the inadequacies in the level of awareness of rabies pre-exposure vaccination and therefore highlight an urgent need to re-educate at-risk individuals on the need for regular pre-exposure vaccination against rabies.*

**Keywords:** Rabies, pre-exposure vaccination, students, staff, Universities, Nigeria

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**INTRODUCTION**

Rabies continues to claim the lives of many humans yearly, especially in developing countries of Africa, despite the availability of effective human and animal anti-rabies vaccines [1]. According to the World Health Organization [2], the annual global number of human deaths due to rabies was about 61,000 with the vast majority (84%) occurring in rural areas. Routine vaccination of dogs against rabies in Nigeria and most African countries is low [3]. Consequently, staff and students that come in contact with these dogs are at great risk, and should be properly vaccinated.

Global efforts to eliminate rabies have focused on adequate mass vaccination of the reservoir animals as well as pre-exposure prophylaxis and post-exposure vaccination of at-risk individuals and exposed victims [4]. The only approach to human rabies prevention is pre- and post-exposure vaccination. Pre-exposure vaccines should be offered to at-risk human populations [5] including veterinarians, veterinary students, animal handlers, zoo keepers and wildlife officers.

According to the WHO [6], persons at-risk of rabies should obtain pre-exposure vaccination given serially at days 0, 7, 21 or 28 respectively. Sero -monitoring may be done at two year intervals to evaluate the need for booster dose if antibody titer is lower than protective titer. Pre-exposure vaccination protects persons whose post-exposure therapy is delayed and provides protection for in-apparent exposure to rabies [5,7].

There is a dearth of information in available literature on rabies pre-exposure vaccination awareness among veterinary clinical students and at-risk staff in Nigeria, hence the present study. The aim of this study, therefore, was to evaluate the rabies pre-exposure vaccination awareness of veterinary clinical students and at-risk staff in two Universities in southeastern Nigeria.

## **MATERIALS AND METHODS**

The study population included Veterinary clinical students, veterinary consultants, clinicians, resident doctors and animal handlers drawn from two Universities in southeastern Nigeria that have a Veterinary College or Faculty and Veterinary Teaching Hospital: Michael Okpara University of Agriculture, Umudike, Abia State (University 1) and the University of Nigeria, Nsukka, Enugu State (University 2). The study was carried out between August and November 2017.

Two hundred structured questionnaires containing relevant questions were administered to clinicians, consultants, resident doctors, animal handlers and clinical students. The questionnaires were owner administered.

Data collected was inputted into IBM SPSS version 20 for analysis. Data generated were summarized as frequencies and percentages while Chi square was used to establish the degree of association between the variables.

## **RESULTS AND DISCUSSION**

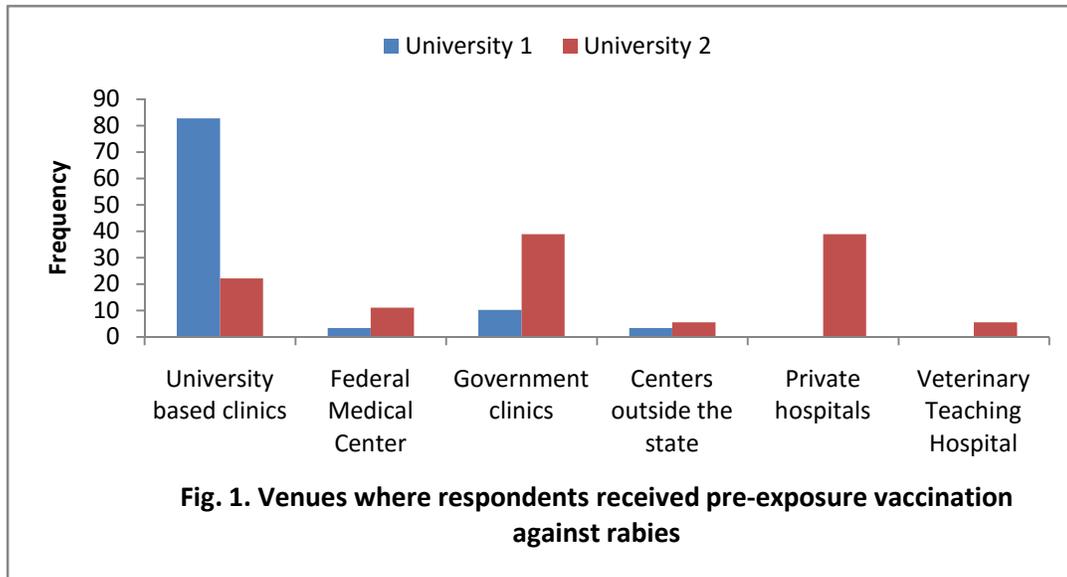
### **Demographics of study population**

Majority (62.5%) of the respondents were males while 37.5% were females. Sex of the respondents was not significantly associated with the rabies pre- exposure vaccination in both institutions. Sixty percent (60%) of the respondents were students while 29.5%, 2.5%, 1.5%, 5.0%, 1.0%, 0.5% were academic staff, resident doctors, animal handlers/livestock attendants, laboratory workers, animal health workers and animal health superintendents respectively. Out of the 80 clinicians/academic staff that responded 42.5%, 31.3%, 7.5%, 12.5%, 6.3% have been in service for 1-5 years, 5-10 years, 10-15 years, 15-20 years and more than 20 years, respectively. The clinical students involved in this study were either in their final (DVM V) (43.3%) or penultimate (DVM IV) (26 %) year.

Job description, duration of service and student's year of study was significantly associated with the rabies pre- exposure vaccination in both institutions.

### **Pre-exposure vaccination status**

Only 57.5% of staff in University 1 had received the pre-exposure vaccination against rabies while 35% of staff in University 2 had received the pre-exposure vaccination at some point. Only 10% of students in University 1 had received the pre-exposure vaccination against rabies while 6.7% of students in University 2 had received the pre-exposure vaccination. These figures are low considering the fact that these individuals come in close contact with dogs of variable rabies antibody status.



**Fig. 1. Venues where respondents received pre-exposure vaccination against rabies**

The strikingly low figure for the pre-exposure vaccination status of veterinary medicine students is consistent with the findings of Daodu *et al.* [8] who stated that there is low turn up over rabies pre exposure vaccination among veterinary medicine students.

Among the vaccinated staff, only 27.7% and 42.9% received the complete dose in University 1 and University 2 respectively while 33.3% and 50.0% of the students respectively received the complete doses in these Universities.

Although University 2 had a lower percentage (35%) of people that had received the pre exposure vaccination when compared to University 1 (57.7%), they (University 2) had higher number of people at risk who had received the complete dose of the vaccine.

**Respondents’ reasons for not receiving the pre-exposure vaccination**

The respondents from University 1 who were not vaccinated gave the following reasons; the vaccine was not available in their schools (80.3%), they did not know about the pre-exposure vaccination (11.3%), did not want to receive the vaccination (7.0%) or were away when the vaccination was done (1.4%). On the other hand, respondents in University 2 indicated that the vaccine was not made available in their school (69.5%), that they did not know about the pre-exposure vaccination (7.3%), that they did not want to receive the vaccination (1.2%), felt they did not need the vaccination (2.4%), had no reasons for not receiving the vaccination (2.4%), had not really thought about it (1.2%) or it was not yet time to receive the vaccination (15.9%). Consequently, the major reason given for not receiving the vaccination was that the vaccine was not made available in these schools and this highlights the need for Colleges and Faculties of Veterinary Medicine in Nigeria to provide free vaccination for their students and staff.

From Fig 1 and Table 1, majority of the respondents in University 1 received their pre-exposure vaccination in university- based clinics while those in University 2 received theirs in government clinics and private hospitals.

The finding that majority of the respondents in University 1 were vaccinated at the university-based clinic can be attributed to the fact that rabies vaccinations received at the university based clinic are free for Veterinarians and clinical students of Veterinary medicine. This could also be the reason why they did not

receive complete doses of the pre exposure vaccine unlike those in University 2 that received complete doses from government clinics and private hospitals.

**Table 1: Vaccination exposure information of respondents.**

VARIABLES	FREQUENCIES	
	UNIVERSITY 1	UNIVERSITY 2
Pre-exposure vaccination status		
Yes	29	18
No	71	82
No of doses received		
One	31	33.3
Two	44.8	22.2
Three	20.7	44.4
Four	3.5	
Venue of vaccination		
University based clinic	82.8	22.2
Federal medical centre	3.4	11.1
Government clinics	10.3	38.9
Royal veterinary college	3.4	5.6
Private clinics	-	38.9
Veterinary Teaching Hospital	-	5.6
Reason for not receiving the vaccination		
Not available in school	80.3	69.5
Did not know about the pre exposure vaccination	11.3	7.3
Did not want to receive the vaccination	7	1.2
Was away when the vaccination was carried out	1.4	-
Did not need the vaccine till recently	-	18.3
Had no reason	-	2.4
Did not think it necessary	-	1.2

### **Hazards that can predispose to rabies**

Although majority of staff in both University 1 and University 2 were not pre-vaccinated against rabies, they had treated/handled or assisted in treating/handling dogs most of which did not have any history of prior vaccination against rabies. Furthermore, many of the respondents had handled apparently rabid dog cases in the course of their duties and most may have experienced unprovoked attacks from which they sustained injuries such as lacerations, bites, scratches, needle pricks or a combination of these while handling these dogs (Table 2). Consequently, since Veterinarians are faced with several hazards in the course of their duty, they should therefore deliberately take the rabies pre- exposure vaccination to forestall these hazards.

The fact that majority of the respondents (95.8% and 88.5% in University 1 and University 2 respectively) had handled rabid cases in dogs, emphasizes the role of dogs in the epidemiology of rabies in Nigeria. This finding is consistent with the fact that the pattern of rabies in Nigeria implicates dogs as the principal host of the disease [9] and the main source of human rabies [10].

### **Awareness of animal rabies vaccination status/ restrain of animal before handling**

A high proportion (31.0% and 33.0% in University 1 and University 2) of the respondents did not know the vaccination status of the animals before handling and thus stand a reasonable chance of contracting

rabies and subsequently spreading it. Presently, most indigenous breed of dogs in Nigeria are either unvaccinated or of unknown vaccination history [11].

**Table 2. Attitude of respondents towards preventive measures against rabies**

VARIABLES	FREQUENCIES (100%)	
	UNIVERSITY 1	UNIVERSITY 2
Treated or assisted in treating a dog or cat		
Yes	92	89
No	8	11
Handled any rabid case before		
Yes	24	26
No	76	74
In which animal		
Dog	95.8	88.5
Cat	4.2	11.5
Bitten or scratched or injured by a dog or cat		
Yes	44	46
No	56	54
Circumstance of injury		
Unprovoked attack	31.8	30.4
During handling	68.2	69.6
Awareness of animal vaccination status		
Yes	61	67
No	39	33
Restraint of animal before handling		
Yes	94	90
No	6	10
Type of injury		
Scratch	52.3	63
Bite	36.4	26.1
Lacerations	0	8.7
Needle prick	9.1	2.2
All of the above	2.3	0

According to Table 2, , 6% and 10% respectively of the respondents in University 1 and University 2 did not bother restrain animals before handling; thus increasing the chances of contracting rabies from such animals. Consequently, majority of the injuries sustained were usually provoked and occur during handling. This agrees with previous reports [12].

## CONCLUSION

In conclusion this study revealed that there is a low level of compliance to the pre-exposure rabies vaccinations among clinical students and at-risk staff in the two Universities in southeastern Nigeria that were studied. The compliance is especially low among the students as compared with the staff. There is also inadequate knowledge/education about the preventive measures in combating the hazards associated with rabies.

## RECOMMENDATIONS

The results of this study suggest that: i) there is need to promote rabies pre-exposure vaccination awareness among clinical students, Veterinarians and at risk staff during lectures and on such occasion as

the World Rabies Day and World Veterinary Day, ii) compulsory annual vaccination of dogs aged 3 months and above against rabies, and iii) there should be a compulsory and free annual pre-exposure vaccination of clinical students and at risk staff in Colleges and Faculties of Veterinary Medicine and related institutions to be subsidized by the Government.

#### REFERENCES1.

1. Knobel, D. L., Cleaveland, S., Coleman, P. O., Fevre, G. M., Meltzer, M. I., Miranda, M. E. G., Alexandra, S., Jakob, Z. and Francois-Xavier, M. (2005). Re-evaluating the burden of rabies in Africa and Asia. *Bulletin of World Health Organization*, 83: 360 - 368.
2. World Health Organization (2004). *WHO Expert Consultation on Rabies, First Report*. WHO, Geneva, WHO Technical Report Series, 931, 121 Pp.
3. Adeyemi, G. and Zessin, K. (2000). Retrospective dog rabies vaccination evaluation at University of Ibadan, Nigeria (1988-1992). *Veterinarski Arhiv*, 70 (5): 223 – 230.
4. Cleaveland., S., Kaare, M., Tiringa, P, Mlengaya, T. and Barrat, J. A. (2003). Dog rabies vaccination campaign in rural Africa; impact on the incidence of dog rabies and human dog bite injuries. *Vaccine*, 21: 1965 - 1973.
5. Manning, S. E., Bupprecht, E. E., Fishbein, D., Hanlon, C. A., Lumtertdacha, B., Guerra, M., Meltzer, M. I., Dhankhar, P., Vaidya, S. A; Jenkins, S. R., Sun, B. and Hull, H. F. (2008). Human Rabies prevention in the United States 2008. Recommendation of the Advisory Committee on Immunization Practices. *MMWR Recommendations and Reports*, 1: 26 - 28.
6. World Health Organization (2013). *Rabies, Fact sheet N99*. Available on <http://www.who.int/mediacentra/factsheets/fsQ99/en/>.
7. CDC. (2009). Should my staff and I be vaccinated? CDC, (2009). Centers for Disease Control and Prevention. Compendium of Animal Rabies Prevention and Control. *Morbidity and Mortality Weekly Report Recommendations and Reports*, 60 (6): 1 - 14.
8. Daodu, O. B. and Oluwayelu, D. O. (2016). Rabies knowledge and pre-exposure vaccination status of clinical veterinary medicine students in Nigeria. *Vom Journal of Veterinary Science*, 11: 117 – 125.
9. Tomori, O. (1980). Wild life rabies in Nigeria: experimental infection and transmission studies with the shrew (*Crocidura sp*). *Annals of Tropical Medicine and Parasitology*, 74 (2): 151 - 156.
10. WHO, (2017). *Guide for post-exposure prophylaxis*. World Health Organization, WHO, Geneva. (Accessed 2017 Mar 18)
11. Ehimiyein AM, Nanfa, Ehimiyein IO, Jahun, B. M. (2014). Retrospective study of dog bite cases At Ahmadu Bello University, Zaria, Nigeria and its environment. *Veterinary World*, 7 (8): 617 621.
12. Rosado, B., Garcia-Belenguer, S., Leon, M. and Palacio, J. (2008). A Comprehensive study of dog bites in Spain, 1995-2004. *Veterinary Journal*, 179 (2009): 383 - 391.