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Assessment of risk factors associated with dog bite victims in Umuahia North and South LGA of Abia state, Nigeria

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ABSTRACT

Aim: Purpose of the study was to assess risk factors associated with dog bite victims in Umuahia North and South LGA of Abia State, Nigeria.

Method and materials: Data collection was obtained from hospitals staff and patients and residents of selected communities within Umuahia North and South LGA through the aid of a well-designed questionnaire. A total of 100 Questionnaires were randomly distributed and filled questionnaires were collated same day for proper documentation. The questionnaire was analyzed using descriptive statistics. The relationship and associations between the variables were analyzed using CHI square. The level of significance was accepted at $p<0.05$.

Results: There was 4% mortality rate of dog bite victims. Those that preferred hospital treatment (48%), (5%) chemist, (2%) traditional medicine (1%) self-medications. Those that sustained dog bite on the Leg (27%), (29%) hand, (1%) other parts). Questionnaires distributed in Umuahia North (57%), (43%) Umuahia South. The age bracket of 41-50 yrs is more at risk of dog bite. Males (52%) more at risk of dog bite than female (32%). The percentage of those exposed to dog bite unemployed (21%), Civil servant (25%), Business (18%), Farmer (18%), Hunter (2%). First degree (29%), Undergraduate (10%), SSCE (37%), FSLC (8%). There's no sig. association ($p<0.05$) btw LGA of respondents and dog bite cases. There was sig. association btw age and dog owner ($X_2$125.630, df (10), sig .000), Sex (X_2 100.481, df (4), sig .000), occupation ($X_2$128.417, df (10), sig. .000), level of education ($X_2$125.234, df (8), sig..000), local govt. area ($X_2$2.736, df (2), sig..000). There was sig. association btw dog owners and dog bite cases ($X_2$101.042 df (4), sig .000), dog bite victims and provoked bite (X_2=96.170, df (4), sig. .000). Dog bite victims and those that received medication (X_2=101.329, df (10), sig. .000). Dog bite victim and the type of exposure (X_2=96.099) df (4), sig. .000). Dog bite victims and outcome of dog (X_2=100.00 df (8), sig. .000).

Conclusion: It was concluded that risk factors of dog bite in humans includes age, sex, occupation and level of education. Efforts are geared towards public education particularly high-risk groups on dog's behavior, bite prevention, and post-bite care.

Keywords: Dog bite, victims, Umuahia, North, South

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Introduction

The Rabies is a disease of all warm-blooded animals causing serious, acute, highly contagious and fatal disease marked by a long variable incubation period (Awoyemi *et al.*, 2007). The disease ranked the tenth most common lethal infectious disease causing approximately 50, 000-60, 000 annual deaths worldwide (WHO, 1998; CDC, 2003). It Rabies kills an estimated 35, 000 people per year, mostly in Africa, Asia and Latin America (Beard, 2001). The source of infection is always an infected animal, and the method of spread is almost always by bite of an infected animal, although contamination of skin wounds by fresh saliva may result in infection (WHO, 1998). However, not all bites from rabid animals result in infection because the virus is not always present in the saliva and may not gain entrance to the wound if the saliva is wiped from the teeth by the clothing or the coat of the animal (Winner *et al.*, 2012).

In Nigeria, rabies poses a substantial threat to humans and animal health, with thousands of reported cases annually (CDC, 2024). It has been estimated that about 10, 000 humans are exposed to rabies each year in Nigeria from dog rabies (Nwaribe, 1980). Abia State, located in south-eastern Nigeria, is not exempted from the burden of rabies. Umuahia North and South Local Government Areas (LGAs) are densely populated regions where human-dog interactions are frequent, increasing the risk of dog bites and rabies transmission (Nwoha and Ugwuoke, 2017). It is therefore expedient to assess risk factors associated

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with dog bite victims in Umuahia North and South LGA of Abia State.

Materials and Methods

Study was conducted in Abia state which is located in the south eastern region of Nigeria. It has seventeen Local government area (LGA) in which Umuahia North and South are among the LGA of the state. Umuahia North has its headquarters in the city of Umuahia. It is comprised of about thirty-eight 38 villages It has about 324,900 population projection and about 1,265/km population density and 256.8km area. (Brinkhoff, 2022). Umuahia South local government area has its headquarters in Apumiri in Ubakala and is comprised of more than forty villages and town. Umuahia south is located in the Southeastern part of Abia state with about 202,500 population,141.6km area and population density of 1,430/km (Brinkhoff, 2022).

Study Design

Out of the Villages in Umuahia North, ten (10) were purposively sampled because of the availability of government owned and private Hospitals. In Umuahia South, nine (9) communities were purposively sampled due to the availability of government owned and private hospitals. In each of the communities, questionnaires were randomly distributed to both residents, hospital staff and patients.

Procedure

Data collection was obtained from hospitals staff and patients and residents of selected communities within Umuahia North and South LGA through the aid of a well-designed questionnaire. A total of 100 Questionnaires were randomly distributed and filled questionnaires were collated same day for proper documentation.

Designed questionnaires

Information on dog bite and rabies cases were obtained through a reliable and well-designed questionnaire. The questionnaire was structured with appropriate variables that addresses the research objectives. The reliability test of the questionnaire was 8.0 showing a strong consistency in addressing the research objectives.

Ethical Permission

Ethical approval was obtained from the hospital's administrative department with the help of request letter endorsed by the head of Department of veterinary medicine, College of Veterinary medicine, Michael Okpara University of Agriculture, Umudike. The approval was used in visiting the public health sections of the hospitals. Individual consent was sought for and permission granted by patients and hospital staff.

Statistical Analysis

The questionnaire was analyzed using descriptive statistics. The relationship and associations between the variables were analyzed using CHI square. The level of significance was accepted at $p<0.05$.

Results and Discussion

The frequency of those that have been exposed to dog bite was higher (56%) than those not exposed to dog bite (28%). Majority of the respondent (49%) do not consume dog meat compared to those that consume (21%) dog meat. Most of the dog bite victims got treated at the hospital (48%), others visit the chemist (5%), few consult traditionalist (2%) while very few (1%) administer self-medication. Majority of the dog bite victims (44%) preferred orthodox treatment, 7% prefer unorthodox, while few prefer both orthodox and traditional (6%). Most of dog bite victims sustain deep bites (42%) while a few (15%) had mere scratches. Majority of dog bite cases were sustained on the hand (29%), others were on the leg (27%) and few (1%) were on other parts of the body (Table 1).

Table 1. Evaluation of the public awareness on dangers of Rabies in dogs in Umuahia North and Umuahia South LGA of Abia State, Nigeria

ITEM	FREQUENCY	PERCENT (%)
Those bitten by a dog	Yes (56)	56
	No (28)	28
Dog meat eaters	Yes (21)	21
	No (49)	49
Outcome of victims of dog bite	Alive (26)	26
	Dead (1)	1
	Don't know (1)	1
Management of dog bite	Treated in hospital (48)	48
	Nothing was done (1)	1
	Treated traditionally (2)	2
	Treated in chemist (5)	5
	Self-medication (1)	1
Preferred treatment	Orthodox (44),	44
	Unorthodox (6)	6
	Combination (7)	7
Type of exposure	Bite (42)	42
	Scratch (15)	15
Location of bite	Leg (27)	27
	Hand (29)	29
	Other parts (1)	1

Majority of the questionnaires were purposively shared within Umuahia North (57%) compared to Umuahia South (43%). Majority of the respondents were within the age bracket of (41-50) yrs (31%), very few (6%) were beyond the age of >50yrs.

Those within the age bracket of (20-30) yrs were more eager to participate (20%) than those within the age bracket of (31-40) yrs (18%). Majority of the respondents were males (52%) than females (32%). Majority of the respondents were civil servants (25%), (21%) were unemployed, 18% were both business men and farmers while few (2%) were hunters. Most of the respondents were SSCE holders (37%), while few (8%) were FSLC holders. A greater number of them were graduates (29%) while 10% were undergraduates (Table 2).

Table 2. Descriptive statistics of the Demographic section of the questionnaire used in the study

Item	Frequency	Percent (%)
Umuahia North	57	57
Umuahia South	43	43
Age	< 20 yrs (9)	9
	20-30yrs (20)	20
	31-40yrs (18)	18
	41-50yrs (31)	31
	>50yrs	6
Sex	Male (52)	52
	female (32)	32
Occupation	Unemployed (21)	21
	Civil servant (25)	25
	Business (18)	18
	Farmer (18)	18
	Hunter (2)	2
Highest Education	First degree 29	29
	Undergraduate 10	10
	SSCE 37	37
	FSLC 8	8

There was a significant association between the categories and the variable have been bitten by a dog; Age (X_2 25.630), df (10), Asym sig. (.000), Sex (X_2=100.481), df (4), Asym sig. (.000), Occupation (X_2 =128.417) df (10), Asym sig. (.000) and Level of education (X_2 =125.234), df (8), Asym sig. (.000). There is no significant association between local govt area of respondents and have been bitten by a dog (X_2=2.736) df (2), Asym sig. (.255) (Table 3).

There was a significant association between those that keep dogs and have been bitten by a dog (X_2=101.042) df (4), Asympt sig. (.000). There was a significant association between dog bite victims and sustained provoked bite from dogs (X_2=96.170), df (4), Asympt sig. (.000), Those that received medication (X_2=101.329), df (10), Asympt sig. (.000), The type of exposure sustained (X_2=96.099) df (4), Asympt sig. (.000) and the outcome of dog (X_2=100.00) df (8), Asympt. sig. (.000). (Table 4).

Majority of victims of dog bite (26%) were unaware of the outcome of the offensive dog. This finding exposed apparent lapses on the government to sensitize the public on the need to present themselves to appropriate quarters in hospitals for post exposure prophylactic treatment

Table 3. Showing association between categories and variables (Have been bitten by a dog) in Umuahia North and Umuahia South LGA of Abia State, Nigeria

Category	x_2	Df	Asympt sign. 2 tailed
Age	125.630	10	.000
Sex	100.481	4	.000
Occupation	128.417	10	.000
Level of Education	125.234	8	.000
Local Govt. Area	2.736	2	.255

Table 4. Showing association between category those that keep dogs and variables on the questionnaire addressing dog bite and rabies cases in Umuahia North and Umuahia South LGA of Abia State, Nigeria

Category	Have been bitten by a dog	x_2	Df	Asympt sig. 2 tailed
Those that keep dogs		101.042	4	.000
Those bitten by a dog	Provoked bite	96.170	4	.000
Those bitten by a dog	Received medication	101.329	10	.000
Those bitten by a dog	Type of exposure	96.099	4	.000
Those bitten by a dog	Outcome of dog	100.000	8	.000

and to the Veterinary clinics for follow up on dog bite cases to enforce adequate monitoring and surveillanced to forestall untoward effects both on the dog and the victim. Management of dog bite cases require One health strategic approach by both human medics and veterinarians towards effective management of exposed individuals and continuous surveillance on the offensive dog (Acharya *et al.*, 2020). This approach would help to ascertain the outcome of the offensive dog which would inform the right treatment regimen for the victim (Acharya *et al.*, 2020). Surveillances were initiated on the dog through restrictions and quarantine processes to ensure effective compliance if rabies must be eradicated from dogs in Africa by 2030 (WOAH, 2022). Rabies is classified under world health organization's 2021-2030 Road maps for the strategic global control of neglected tropical diseases, an approach to end human deaths from dog mediated rabies by 2030 (WHO, 2024).

The study showed high number of dog bite victims (48%) that preferred hospital treatment than

other options. This development may be connected with efforts recently engaged by veterinarians towards sensitization of the public on prevention and management of dog bites cases. It could also be connected to high level of education and awareness of the respondents. This however differs from the work of Mshalbwala *et al.,* (2014) who recorded high patronage of the respondent on traditional medicine for treatment of dog bite cases (80%) than to hospitals. This attributed to the low level of education of the respondents which also agrees with the research findings of Audu (2011).

Most dog bite cases were sustained on the hand (29%) perhaps due to accidental bite during manipulation or similar provocation. Apeh *et al.,* (2021) observed increase dog bite cases on the lower limb (59.2%). Most of the household dogs were unvaccinated attributed to lack of willingness of dog owners to indulge in proper management of their dogs. It may also be dependent on unavailability of adequate resources to maintain routine vaccination of dogs (Ezeokoli and Umoh, 2003). This aligns with the observation of Mshelbwala *et al.,* (2021). Few numbers of respondents were dog meat consumers (21%) compared to those that don't consumer dog's meat (49%). This may have contributed to the relatively low incidence of dog bite and zero rabies within the study area. Consumption of dog meat may exposure consumers to the risk of dog bite and contamination with rabies as some rabid dogs are apparently healthy while secreting rabies in their saliva (Dobson *et al.,* 2002; Mshelbwala *et al.,* 2014; Ezeokonkwo and Ohaeri, 2015). Higher number of questionnaires were shared (57%) within Umuahia North than in the South (43%) due to higher population strength recorded in Umuahia North according to census 2022 (Brinkhoff, 2022).

The demographic study on dog bite showed variations in exposure rate in various age, sex, occupation and level of education. In this study, the age bracket of 41-50 years was more at risk of exposure to dog bite. This could be related to the age bracket of most adults that keep dogs but do not have close relationship with their dogs apparently due to their work engagement. Dogs tended to associate and be more affiliated to their caregivers than to their owners due to little or absence of close association with their owners. This however differed from the work of Mshelbwala *et al.,* (2014) who recorded more dog bite cases in 20-40yrs age brackets. Males (52%) were more at risk of dog bite than their female (32%) counterparts. This may be related to the different interactions exhibited between males and females with dogs, especially males were exposed to different environments that informed their risk of being bitten (WHO,2018). This corroborated the findings of (Apeh *et al.*, 2021). The high prevalence rate of dog bite cases in male compared to females could equally be attributed to the boisterous nature of males and sometimes their attitude that makes them act in ways that dogs perceive as threatening or aggression (Rosenberg *et al.,* 1995). Civil servants recorded high risk (25%) of dog bite cases compared to other occupations. Some civil and public servants, such as veterinarians, animal handlers, or outdoor workers, may be at higher risk of dog bites due to their increased exposure to dogs which constitute occupational risk in the profession. There was therefore need for routine upward review of hazard allowance of veterinarians and health care givers in animal industry as a policy by the government as a result of the daily risk of exposure to dog bite and rabies. Most of the respondents were senior secondary school certificate examination (SSCE) holders (37%) compared to others. The level of education may influence an individual's knowledge and awareness of dog behavior, bite prevention, and post-bite care (Oboegbulem and Anyanwu, 2018). There's no significant association ($P<0.05$) between local government areas of respondents and dog bite cases. This could imply that dog bites are more related to individual circumstances or behaviors rather than geographical or environmental factors.

There was a significant association ($P<0.05$) between those that keep dogs and dog bite cases due to their close association with their dogs. Studies have shown that up to 50% dog owners have been bitten by their own dogs (CDC, 2002). Nonetheless there was need for dog owners to understand the risk and adapt to preventive measure of vaccination of their dogs to reduce the risks of exposure.

There was a significant association ($P<0.05$) between dog bite victims and provoked dog bite, as it highlights the importance of understanding canine behavior and body language to prevent dog bites. Dogs that were fearful or anxious may become aggressive when provoked (Mazigo *et al.,* 2013). Approaching or touching a dog without permission can be perceived as a threat to dog and leads to provocation of the dog (Avner *et al.,* 1991).

There's a significant association (P<0.05) between dog bite victims and those who received medications, and this highlighted the importance of prompt medical attention in preventing infections, promoting healing, and reducing the risk of rabies transmission (WHO, 2024). Dog bites can lead to infections, particularly if the wounds are deep or not properly treated (WHO, 2024).

Conclusion

There were risked factors associated with exposure to dog bite in humans which includes age, sex, occupation, and level of education. It was recommended geared efforts towards public education particularly high-risk groups on dog's behavior, bite prevention, and post-bite care. There is need for One health approach in handling cases of dog bite. These efforts would ensure effective interventions, sustainability in decrease dog bite and rabies cases and promotes the health and well-being of the community.

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