

Research Article

A Descriptive Study on Obesity and Animal Exposure Cases attending an Anti-Rabies Clinic, Tertiary Care Hospital, Urban Bengaluru

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A B S T R A C T

Introduction: India is endemic for rabies and at the same time, obesity is assuming an epidemic proportion. There is a need to find out proneness of animal bites among overweight/ obese people as they are less agile and mobile.

Objective: To determine the proportion of obesity among animal exposure cases and compare the type and severity of exposure between obese and non-obese cases.

Methodology: A descriptive study was conducted among 287 animal exposure cases visiting the anti-rabies clinic of a tertiary care hospital from June to December 2023.

Results: Of the cases, 185 (64.5%) cases were overweight/ obese. Majority (88.7%) of bites were by dogs, 63.3% were by stray animals, and 62.8% were unprovoked bites. All the category II and category III cases had received post-exposure prophylaxis.

Conclusion: The majority of the cases were overweight/ obese and had category III exposures. There was no significant difference in animal exposure between obese and non-obese cases.

Keywords: Obese, Animal Exposure, Rabies, Category

Introduction

Rabies is a viral zoonotic disease which results in 59,000 deaths.¹ India is endemic for rabies and accounts for 36% of the world's rabies deaths.² In India, the annual incidence of animal bites has increased from 42 lakhs in 2012 to 72 lakhs in 2020.³

The packs of dogs roaming on the streets are quite a common occurrence. The animal-man conflicts are on the rise, as they live in close proximity to each other. The recent National Family Health Survey 5 (NFHS 2019–21) data shows a commendable rise in the prevalence of obesity from

19.8% (NFHS 4) to 23.5%.⁴ It is presumed that people who are obese are more prone to animal exposure compared to non-obese people as they are less agile and mobile. However, there is a paucity of studies regarding animal exposure and obesity. The present study was conducted with the objectives of finding out the proportion of obesity among animal exposure cases and comparing the type and severity of exposure between the obese and non-obese cases.

Methodology

A descriptive study was conducted from June to December

2023 at the Anti-Rabies Clinic (ARC), Tertiary Care Hospital, Bengaluru. Cases attending the ARC with a history of animal exposure were the study subjects. The prevalence of obesity in India was 23.5% (NFHS 5),⁴ and the sample size was calculated using the formula $n = 4pq/d^2$ ($4 * 23.45 * 76.55 / 52$) = 287. All cases aged 18 years or above were selected until the required sample size was met. Study subjects willing to give written informed consent were included. Ambulatory cases and those where the incidence of exposure occurred during travel by two-wheeler were excluded from the study.

A pre-tested, semi-structured questionnaire was administered, collecting details regarding socio-demographic profile, history of animal exposure, previous history of an animal bite, vaccination status of the case, whether the animal was a pet or stray, availability of the animal for observation, vaccination status of the animal, and circumstances of the exposure. Height was measured using a stadiometer, and weight was measured using a digital weighing scale that was calibrated daily by following standard guidelines. Anthropometric measurements such as weight and height for Body Mass Index (BMI)- based on proposed WHO Asia-Pacific guidelines classified as underweight (< 18.5 kg/m²), normal weight (18.5-22.9 kg/m²), overweight (23.0-24.9 kg/m²), obesity class-I (25.0-29.9 kg/m²) and obesity class-II (≥ 30 kg/m²).⁵

Institutional Ethics Committee clearance was obtained, and confidentiality of the data was maintained at all times. The data was then entered in MS Excel 2019 and analyzed for frequencies and percentages. Inferential statistics, such as univariate analysis, were applied, and p < 0.05 was considered statistically significant.

Results

A total of 287 subjects were studied. The majority were males (60.4%), Hindus (94.1%), resided in urban localities (90.9%), were married (59.2%), and belonged to the upper middle class (43.2%) according to the Modified BG Prasad scale,⁶ as depicted in Table 1. The age range of the cases was between 18 and 85 years.

Table 1. Distribution of Cases Based on Sociodemographic Profile (N = 287)

Variables		Frequency (%)
Age (years)	18–60	262 (91.3)
	> 60	25 (8.7)
Gender	Male	174 (60.6)
	Female	113 (39.4)
Marital status	Married	170 (59.2)
	Unmarried	117 (40.8)

Religion	Hindu	270 (94.1)
	Muslim	13 (4.5)
	Christian	3 (1.0)
	Others	1 (0.4)
Region	Urban	261 (90.9)
	Rural	26 (9.1)
Socio-economic status (Modified BG Prasad scale)	Upper	118 (41.1)
	Upper-middle	124 (43.2)
	Middle	41 (14.3)
	Upper-lower	1 (0.4)
	Lower-middle	3 (1.0)

According to the WHO Asia-Pacific guidelines,⁷ 44.6% of the subjects were obese, 19.9% were overweight, 31% were normal, and 4.5% were underweight, as depicted in Figure 1. A total of 185 (64.5%) cases were overweight/obese. The median BMI of the subjects was 24.25 (IQR: 21.6–27.6). The minimum and maximum BMI ranged from 14.9 to 37.4.

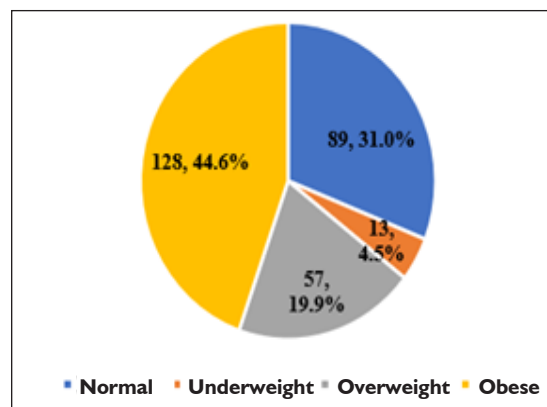


Figure 1. Distribution of Subjects as per BMI Classification (N = 287)

Among the 185 overweight/ obese cases, the majority (88.7%) of bites were by dogs, 63.3% were by stray animals, and 62.8% were unprovoked bites. The majority (57.5%) had bites over bare skin, 91.9% were category III exposures, 58.4% of bites were on the lower limb, and 59.5% did not know the vaccination status of the animal, as described in Table 2. All the category II and category III cases had received post-exposure prophylaxis with the rabies vaccine and immunoglobulin/RMab.

Table 2. Description of the Animal Exposure in the Overweight/ Obese Cases (N = 185)

	Variables	Overweight/ Obese
Age (years)	18–60	167 (90.3)
	> 60	18 (9.7)
Gender	Male	119 (64.4)
	Female	66 (35.6)
Biting animal	Dog	164 (88.7)
	Cat	18 (9.7)
	Monkey	3 (1.6)
Type of animal	Stray	117 (63.3)
	Pet	68 (36.7)
Provoked	Provoked	67 (36.2)
	Unprovoked	118 (63.8)
Circumstances of bite	Walking on the street	104 (56.2)
	Feeding the animal	14 (7.6)
	Playing with the animal	26 (14.0)
	Stepped on the animal	9 (4.9)
	Pet the animal while it was asleep	9 (5.6)
	Stay at home	9 (4.9)
	Playing on the road	8 (4.3)
	While treating the animal	3 (1.6)
	Standing at the gate of the house	2 (1.1)
	Chasing the animal	1 (0.5)
Vaccination status of the animal	Vaccinated	41 (22.1)
	Partially vaccinated	14 (7.6)
	Unvaccinated	19 (10.3)
	Don't know	110 (59.5)
Wound site	Head and neck	9 (4.9)
	Upper limb	64 (34.6)
	Trunk	3 (1.6)
	Lower limb	108 (58.4)
	Others	1 (0.5)
Category of exposure	II	15 (8.1)
	III	170 (91.9)

On binary regression, there was no statistically significant observation between obese and non-obese cases regarding various factors such as type or severity, as described in Table 3.

Table 3. Binary Regression Between Overweight/ Obese and Not Overweight/ Obese Cases to the Exposure Variables (N = 287)

Variable	Odds Ratio	CI (Upper Bound-Lower Bound)	p Value
Age group (years)			
18–60	-	0.27–1.90	0.5
> 60	0.72		
Gender			
Male	-	0.86–2.45	0.1
Female	1.45		
Socio-economic status			
Upper class	-	0.55–2.37	0.7
Lower class	1.14		
H/o alcohol intake			
Yes	-	0.51–3.5	0.5
No	1.34		
H/o previous animal bite			
Yes	-	0.84–3.69	0.1
No	1.77		
Type of animal			
Stray	-	0.60–1.85	0.8
Pet	1.06		
Type of bite			
Provoked	-	0.52–1.57	0.7
Unprovoked	0.90		
Type of wound			
Scratch/ abrasion	-	0.67–1.94	0.6
Puncture/ laceration	1.14		
Total no. of wounds			
0–5	-	0.64–3.16	0.3
> 5	1.43		
Site			
Head, neck, and trunk extremities	0.53	0.23–1.26	0.1

Discussion

In the present study, around two-thirds of the cases were overweight/ obese. This could be due to the increasing burden of overweight and obesity in urban India, especially in metropolitan cities.⁸ Obesity is on the rise in India and is one of the most neglected health problems.⁹ However, there are no studies that describe the association between obesity and the risk of animal exposure. Additionally, this study did not show any differences in the type, number, or location of wounds between obese and non-obese individuals.

Domestic dogs are the principal reservoirs and vectors of rabies. A study by Masthi et al. shows that dogs were the main biting animals, followed by cats and monkeys.¹⁰ The current study also indicates that most animal exposure cases result from dog bites, followed by cats and monkeys. Most of the cases belonged to the upper and upper-middle class according to the Modified BG Prasad scale. This is contrary to the study findings by Guljavar et al., which can be attributed to different hospital settings since the latter study was conducted in a public hospital.¹¹ Majority of reported bites were from dogs, categorized as category III, unprovoked, on the lower limb with abrasion wounds

ranging from 2 to 5 in number. Similar findings were reported by Guljawar et al., Gogtay et al., Sudarshan et al., Sachdeva et al. and Singh et al.¹¹⁻¹⁵ In the current study, 15% of the victims had a previous history of animal exposure, similar to the study by Basu et al., where 22.3% of them had a previous bite within 5 years.¹⁶ In more than half of cases, the circumstance of the bite was while walking, with stray animals, especially dogs, indicating the need to improve animal rabies control programs to reduce their numbers. The National Rabies Control Program (NRCP) has provided several tips to prevent dog bites.¹⁷

The overweight/ obese and not overweight/ obese cases were exposed equally to animal exposure indicating that overweight/ obese cases do not have a higher chance of animal exposure compared to not overweight/ obese cases. The limitations of the study include the fact that central obesity was not considered and that it was a hospital-based study.

Conclusion

The majority of the cases were overweight/ obese and had category III exposures. There was no significant difference in animal exposure between obese and non-obese cases. A larger sample size across multi-centers is required to draw any association between obesity and the risk of animal exposure.

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