ISSN (Online): 2455-3662
EPRA International Journal of Multidisciplinary Research (IJMR) - Peer Reviewed Journal
Volume: 8| Issue: 7| July 2022|| Journal DOI: 10.36713/epra2013 || SJIF Impact Factor 2022: 8.205 || ISI Value: 1.188

ASSESSING THE EFFECT OF ORAL HEALTH STATUS AMONG THE VARIOUS BREEDS OF GOATS IN TAMILNADU, INDIA – A CROSS-SECTIONAL SURVEY

Elakiya S[1], Raj Mohan M[2], Bharathwaj V V[3], Sindhu R[3], Dinesh Dhamodhar[2], Prabu D[5], Gousalya V[1]

[1]Post graduate student, Master of dental surgery, Department of Public Health Dentistry, SRM Dental College and Hospital, Ramapuram, Chennai, Tamilnadu, India
[2]Master of Dental Surgery, Reader, Department of Public Health Dentistry, SRM Dental College and Hospital, Ramapuram, Chennai, Tamilnadu, India.
[3]Master of Dental Surgery, Senior lecturer, Department of Public Health Dentistry, SRM Dental College and Hospital, Ramapuram, Chennai, Tamilnadu, India.
[4]Master of Dental Surgery, Reader, Department of Public Health Dentistry, SRM Dental College and Hospital, Ramapuram, Chennai, Tamilnadu, India.
[5]Master of Dental Surgery, Professor and Head, Department of Public Health Dentistry, SRM Dental College and Hospital, Ramapuram, Chennai, Tamilnadu, India.

Corresponding Author: Dr. Prabu D, Master of Dental Surgery, Professor and Head, Department of Public Health Dentistry, SRM Dental College, Ramapuram, Chennai, India

ABSTRACT

The aim is to evaluate the association of oral health status among various breeds of goats.
A total of 120 goats were recruited for the cross-sectional study from the blue cross of Tamilnadu and various veterinary colleges based on a simple random sampling method. The oral health status of goats was recorded using the DMFT index, plaque index, tooth erosion index, gingival index, tooth mobility index, and tooth wearing index. The data is collected and tabulated using chi-square. P-value < 0.05 was considered to be statistically significant.
In the present study, gingivitis, calculus, plaque, recession, and malocclusion are the other findings found about the oral health status of various breeds of goats. The overall percentage of gingivitis in goats is 40%, and there is no statistically significant relationship between the various breeds of goats. There was statistically significant relation was found between trauma (0.02) and attrition (0.03) among various breeds of goat. The study concluded that while comparing with various breeds of goat, it has a strong impact on oral health status such as trauma and attrition.

KEYWORDS: ***Oral health, goats, dental caries, periodontitis, attrition.***

INTRODUCTION

Oral disease is a common significant health problem seen among all breeds of animals (1). Dental disorders of goats can result in various clinical presentations like gingiva, periodontal disease, attrition, erosion, trauma, dental caries, and malocclusion (2). The development of these disorders occurs due to nutrition (1). The progression of dental caries results in highly refined carbohydrates, microflora, and substrates. The factor includes the mineralization of tissue and protein matrix (3).

The eruption of the milk teeth and permanent teeth occurs in mammals following a determined order and in chronologic periods relatively independent of the animal's physiological state (4). Factors that must be in place for caries to develop include natural tooth structure with susceptible surfaces exposed to the oral environment, complex indigenous microflora, and food ingested by mouth(3).

Irregular or sharp occlusal points will manifest either as painful or abnormal mastication or, when chronic, as weight loss secondary to incomplete or painful chewing. Extensive wear, periodontal disease, or loss of the incisor teeth and molars is common, particularly in older animals (5). Periodontitis and excessive tooth wear are frequent oral diseases in small ruminant herds and have repercussions on the health, production, and welfare of animals (6). Dental wear is the slow and irreversible loss of the structure of the outer surface, which apparently occurs without bacterial involvement. Excessive wear of the dental crown causes a high economic impact on small ruminants. In sheep, periodontitis has been described in several countries, while in goats, it was reported in Japan and associated with various periodontopathogens (7).

ISSN (Online): 2455-3662
EPRA International Journal of Multidisciplinary Research (IJMR) - Peer Reviewed Journal
Volume: 8| Issue: 7| July 2022|| Journal DOI: 10.36713/epra2013 || SJIF Impact Factor 2022: 8.205 || ISI Value: 1.188

It is a recurrent problem in sheep breeding that hampers grazing, severely reduces the productive efficiency of the animals, as well as compromises their longevity and productive life due to the deterioration of the dental and periodontal conditions. In goats, the intensity of dental wear generates irreparable losses by affecting ingestion, chewing, and rumination and by influencing the immune status of the animals (8). However, despite the existing data on the clinical and microbiological aspects of periodontitis in other animal species, particularly in ruminants, due to the multifactorial nature of these diseases, it is not possible to extrapolate these data to caprine periodontitis, which still lacks adequate characterization about its occurrence, severity, and microbiological aspects as well as the problem of tooth wear, that together form a complex capable of seriously compromising the health of the individual and the herd as a whole(9).

Small ruminants appear to have an outside life span of 20 to 25 years, with the average somewhere in the mid to upper teens. If poor body condition is a presenting complaint in the small adult ruminant, a thorough dental exam is warranted (10). Ruminants have narrow mouths that do not open very far, thus hindering visual exam of the molars. Careful palpation through the cheeks will give you preliminary information, but a thorough oral exam will require the use of a mouth speculum, gag or bite block (either homemade or designed for sheep), a good flashlight or headlamp, and sedation (11).

Correlations between body score and incisor wear in sheep are low, but between body score and molar loss is high. In sheep, nutritional factors, including vitamin and mineral levels, do not appear to be a predisposing cause of periodontal disease; rather, it begins as a localized bacterial plaque-induced gingivitis that progresses to damage of the periodontal ligaments and eventual tooth loss (4). Dental health plays a crucial role in maintaining general health, not only for humans but also for animals. The oral health of the goat should be given utmost importance for the overall well-being of the goat. There]are no previous studies that have been conducted based on the oral health of the goat. Hence, this present study aims to assess the effect of oral health status among various breeds of goats in Tamilnadu.

MATERIALS AND METHODS

A cross-sectional study was conducted among goats to evaluate the oral health status among various breeds of goats in Tamilnadu. The study is to evaluate the association oral health status of goats; to determine the association between oral health among various breeds of goats. The study was conducted for a period of 3 months, from February 2021 to April 2021, until the desired sample of subjects was recruited for the study. The study samples were recruited from Blue cross and Madras Veterinary College in the department of OPD. Ethical approval was obtained from the head of the department of public health dentistry.

Inclusion criteria:

1. Those individuals who want their domestic animals to be a part of this study.
2. Those goat owners who fulfilled the consent form were included
3. Only healthy goats were included.

Exclusion criteria:

1. Any diseased goats were excluded.
2. Those goat owners who didn't fulfil the consent form and questionnaire were excluded from the study.

The sample size calculated was 120 by setting a confidence level of 95% and a margin of error of 5%. A total of 120 goats were recruited from blue cross and various Veterinary colleges in Tamilnadu based on the simple random sampling method. Before conducting the study, permission was obtained from the official head of blue cross of Tamilnadu, Chennai, by explaining the objectives of the study in a detailed manner, and the owner of the goats was asked to fulfil the consent form.

The questionnaire consists of demographic data such as breed name, age, and sex, which were obtained. The oral health status of goats, such as dental caries, dental erosion, calculus, plaque, gingivitis, attrition, dental trauma, malocclusion, and periodontitis, were recorded using DMFT index, plaque index, tooth erosion index, gingival index, tooth mobility index, and tooth wearing index. The data is collected and tabulated using descriptive statistics and the chi-square test.

RESULTS

The Normality tests, Kolmogorov-Smirnov, and Shapiro-Wilks tests results reveal the study followed a normal distribution. Therefore, to analyze the data, the parametric test was applied. Descriptive statistics were performed using Frequency and percentage distribution. To find out the association between various breeds and oral health status, a chi-square test was performed. To analyze the data SPSS (IBM SPSS Statistics for Windows, Version 26.0, Armonk, NY: IBM Corp. Released 2019) is used. Significance level is fixed as 5% ($\alpha = 0.05$). P-value <0.05 is considered to be statistically significant.

Table 1 depicts the frequency and percentage of oral health status among goat breeds distributed as normal, mild, moderate and severe grades. The poorest oral health status seen is calculus. Table 2 shows the association of various breeds and oral health parameters among goats. The dental erosion, gingivitis and malocclusion were found to be not statistically significant with various breeds of goats (P=0.81), whereas dental trauma (P<0.02) and attrition (P<0.03) were statistically significant in relation was found between various breeds of goats. The calculus (P=0.48), dental caries (P=0.39), plaque (P=0.64), recession (P=0.45) and periodontal disease (P=0.13) were found to be not statistically significant with various breeds of goats (P=0.81). In contrast, a statistically significant relation was found between various breeds of goats and dental trauma (P<0.02).

Graph 1 shows the distribution and percentage of goat breeds involved in this study. Graph 2 shows the prevalence between various breeds of goats and trauma involved in this study, and graph 3 shows the prevalence between various breeds of goats and attrition involved in this study.

ISSN (Online): 2455-3662
EPRA International Journal of Multidisciplinary Research (IJMR) - Peer Reviewed Journal
Volume: 8| Issue: 7| July 2022|| Journal DOI: 10.36713/epra2013 || SJIF Impact Factor 2022: 8.205 || ISI Value: 1.188

DISCUSSION

Oral health plays a role in maintaining the overall health of people, including animals. Nutrition has a major impact on oral health due to the intake of unhealthy foods and lifestyle habits. Various studies had conducted regarding the oral health status of goats. This present study focused on the association of various breeds and the oral health status of goats. Attrition, trauma, and periodontal disease are the two major oral health problems among goats. The previous study conducted by Paula et al. (9) in the year 2019 discussed the association between periodontal disease is 70.7%, attrition is 96.0%, and trauma among goats and concluded that the microorganisms of periodontal disease are associated with the goat of periodontitis, and excessive loss of tooth wear are distinct oral diseases.

Another study conducted by Ibrahim et al. (12) in the year 2017 and Marta Ruiz et al. (13) in the year 2019 had concluded that 33 % of dental diseases were detected, and attrition was a major common oral health disease found in this present study is also found similar with Ibrahim et al. 2017 and increases with age above four years, and 93.3% oral lesions were found in both maxilla and in the mandible and in this present study shows contrast with Marta Ruiz et al. 2019. In the previous study conducted by Ibrahim et al. 2017 also conducted with the overall prevalence of the periodontal disease was 70% and attrition was 37.3% found in that study, but in the present study, the periodontal disease shows a prevalence of 25%, and attrition shows the prevalence of 16.7%, and it shows a contrast with the previous study. This might be due to improper feeding habits and irregular maintenance of oral health.

Periodontitis is a multifactorial disease in nature, and it leads to resorption of bone and widening of periodontal ligaments resulting in mobility and leads to tooth loss. Goat periodontal disease usually starts with impaction of food, gingival inflammation, diastema formation and due to periodontal pocket formation. Also, it has worn of tooth loss, i.e. attrition, trauma malocclusion due to periodontal disease. This process proceeds toward the dentoalveolar space, causing detachment of tooth-supporting periodontal fibres. In the current study, the prevalence of gingivitis among goats was 40%. The unhealthy inflammatory precedes the development and rapid progression of periodontal problems. The deepening of the periodontal pocket paves the pathway for food impaction, which rapidly increases the rate of progression of periodontal problems among goats. Diet plays a role in maintaining oral health among goats. The attrition and trauma show a statistically significant result when compared with various breeds of goats.

Goat caries (PC) is an increasingly recognized disorder that causes premature wear of teeth and dental fractures and thus has major welfare implications. Little information is available on its prevalence or severity, and there are no proven associations with any risk factors. In the current study, the dental caries prevalence among goats was found to be 25.8%%.

The study conducted by Erjavec et al. in the year 2010 discussed the traumatic disorders among goats. Out of 100 goats, the traumatic fracture of teeth and as well as dental wear abnormalities is 33% [14]. In the current study, 17.5% of goats had dental trauma, and 4.2% of had dental erosion. The dental erosion was found to be not statistically significant with various breeds of goats, whereas a statistically significant relation was found between various breeds of goats and dental trauma.

In the present study, gingivitis, calculus, plaque, recession, and malocclusion are the other findings found about the oral health status of various breeds of goats. The overall percentage of gingivitis in goats is 40%, and there is no statistically significant relationship between the various breeds of goats. The other finding of the study is the calculus of goats is 36.7%, and there is no statistically significant relationship between the various breeds of goats. The overall percentage of plaque in goats is 17.5%, and there is no statistically significant relationship between the various breeds of goats. The other finding of the study is malocclusion of goats is 4.2%, and there is no statistically significant relationship between the various breeds of goats.

LIMITATION OF THE STUDY

The limitation of this study is only a small number of samples were obtained; further studies would get more appropriate results. There is a chance of occurring confounding bias due to changes in various breeds and oral health status.

CONCLUSION

The study concluded that there is no difference seen among the various breeds of a goat while assessed with the oral health status. The overall study concludes that the major oral health status of goats are periodontal diseases, attrition, and trauma are the major oral health problems found among the various breeds of goats. Proper measures such as a healthy diet and regular dental check-ups of goats should be followed under the guidance of goat caretakers to overcome the problem.

ACKNOWLEDGEMENT: Nil

CONFLICTS OF INTEREST: Nil

REFERENCES

1. *Logan EI. 2006. Dietary influences on periodontal health in dogs and cats. Veterinary Clinics: Small Animal Practice,1;36(6):1385-1401. DOI: 10.1016/j.cvsm.2006.09.002.*
2. *AL Ridler and DM West. 2010. Examination of teeth in sheep health management. Small Ruminant Research, 92: 92-95. DOI: 10.1016/j.smallrumres.2010.04.014*
3. *Hale FA.1998. Dental caries in the dog. J Vet Dent., 15:79–83. DOI: 10.1177/089875649801500203.*
4. *C R Vigal and A Machordom.1985. Tooth Eruption and Replacement in the Spanish Wild Goat. Acta Theriologica.,30(19):305- 320.*

ISSN (Online): 2455-3662
EPRA International Journal of Multidisciplinary Research (IJMR) - Peer Reviewed Journal
Volume: 8| Issue: 7| July 2022|| Journal DOI: 10.36713/epra2013 || SJIF Impact Factor 2022: 8.205 || ISI Value: 1.188

5. *M C Smith and D M Sherman Digestive system. 1994. In Goat medicine, M C Smith and D M Sherman, (Eds.) (Philadelphia: Lea &Febiger)*
6. *Spence, J.A., Aitchison, G.U.1986. Clinical aspects of dental disease in sheep. Vet. Rec., 8: 128–135*
7. *West, D.M.2002. Dental disease of sheep. New Zeland Vet. J., 50 (3): 102–104. DOI: 10.1080/00480169.2002.36282.*
8. *McGregor, B.A.2011. Incisor development, wear and loss in sheep and their impact on ewe production, longevity and economics: a review. Small Ruminant Res.,95:79-87.*
9. *Paula L. Campelloa , Ana C. Borsanellib , Sabrina D. Agostinhoa , Christiane M. Schweitzerc , Elerson Gaetti-Jardim Jr.d , Jürgen Döbereinere , Iveraldo S. Dutra.2019. Occurrence of periodontitis and dental wear in dairy goats. Small Ruminant Research,175:133-141. DOI: 10.1016/j.smallrumres.2019.05.004*
10. *P L Wolff. 2007. Geriatric small ruminants – how to keep them healthy and happy. The North American Veterinary Conference.*
11. *D G Pugh. 2002. Sheep and Goat Medicine. (Philadelphia: WB Saunders)*
12. *Ibrahim Canpolat, Enis Karabulut, Sema Cakir.2017. The Effect on Production Loss of Dental Disorders in Adult Goats. Journal of Agriculture and Veterinary Science, 10(8): 76-80. DOI: 10.9790/2380-1008017680*
13. *Marta Ruiz de Arcaute, Delia Lacasta, José María González, Luis Miguel Ferrer, Miren Ortega, Héctor Ruiz, José Antonio Ventura and Juan José Ramos. 2020. Management of Risk Factors Associated with Chronic Oral Lesions in Sheep. Animals, 10:1-11. DOI: 10.3390/ani10091529*
14. *V Erjavec and D Crossley. 2010. Initial observations of cheek tooth abnormalities in sheep in Slovenia. Vet. Rec., 167(4): 134- 137. DOI: 10.1136/vr.c3328.*

Table 1: Prevalence of oral health parameters among goats

Oral health parameters	Percentage-wise distribution of variables			
	Normal (%)	Mild (%)	Moderate (%)	Severe (%)
Gingivitis	60.0	30.0	7.5	2.5
Trauma	82.5	17.5	0	0
Calculus	63.3	20.8	11.7	4.2
Dental caries	74.2	15.8	10.0	0
Plaque	82.5	14.2	3.3	0
Attrition	83.3	11.7	5.0	0
Erosion	95.8	4.2	0	0
Recession	80.8	12.5	6.7	0
Periodontal disease	75.0	16.7	8.3	0
Malocclusion	95.8	4.2	0	0

Table 1 depicts the frequency and percentage of oral health parameters among various breeds of goats

Table 2: Association of oral health parameters and various breeds among goats

ORAL HEALTH PARAMETERS	VARIABLES	TYPES OF BREEDS			P-VALUE
		Kodiadu	Salem black	Kanniadu	
Gingivitis	Normal	22	25	25	0.81
	Mild	12	12	12	
	Moderate	4	3	2	
	Severe	2	0	1	
Trauma	Normal	32	29	38	0.02*
	Mild	8	11	2	
	Moderate	0	0	0	
	Severe	0	0	0	
Calculus	Normal	22	28	26	0.48
	Mild	12	7	6	
	Moderate	4	3	7	
	Severe	2	2	1	

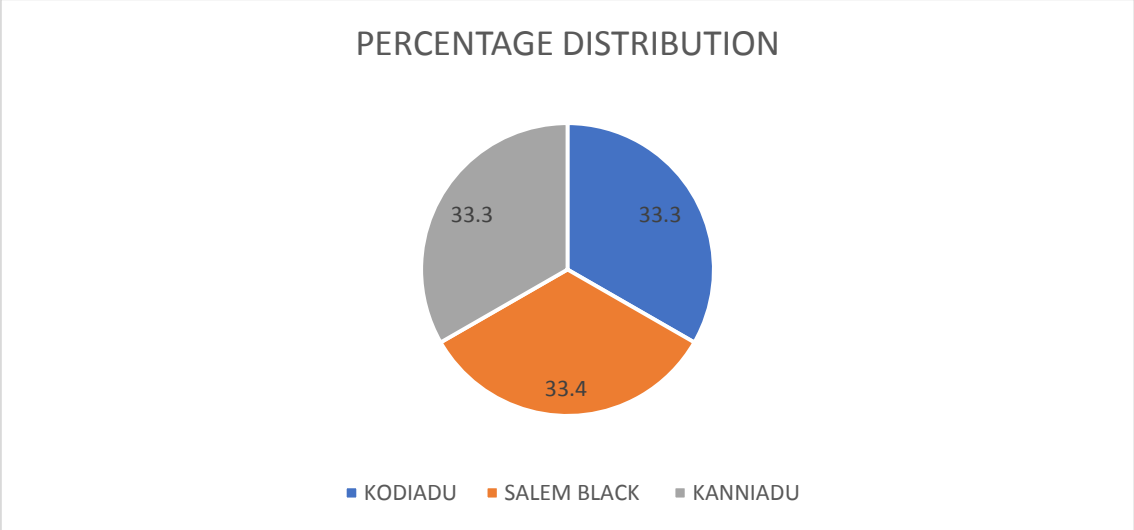
ISSN (Online): 2455-3662
EPRA International Journal of Multidisciplinary Research (IJMR) - Peer Reviewed Journal
Volume: 8| Issue: 7| July 2022|| Journal DOI: 10.36713/epra2013 || SJIF Impact Factor 2022: 8.205 || ISI Value: 1.188

Dental caries	Normal	28	30	31	0.39
	Mild	5	7	7	
	Moderate	7	3	2	
	Severe	0	0	0	
Plaque	Normal	32	34	33	0.64
	Mild	4	6	7	
	Moderate	4	0	0	
	Severe	0	0	0	
Attrition	Normal	29	38	33	0.03*
	Mild	6	2	6	
	Moderate	5	0	1	
	Severe	0	0	0	
Erosion	Normal	38	39	38	0.81
	Mild	2	1	2	
	Moderate	0	0	0	
	Severe	0	0	0	
Recession	Normal	36	31	30	0.45
	Mild	2	6	7	
	Moderate	2	3	3	
	Severe	0	0	0	
Periodontal disease	Normal	25	33	32	0.13
	Mild	9	4	7	
	Moderate	6	3	1	
	Severe	0	0	0	
Malocclusion	Normal	38	38	39	0.81
	Mild	2	2	1	
	Moderate	0	0	0	
	Severe	0	0	0	

Table 2 depicts the association of various breeds and oral health parameters among goats. There was statistically significant relation was found between trauma (0.02) and attrition (0.03) among various breeds of goat

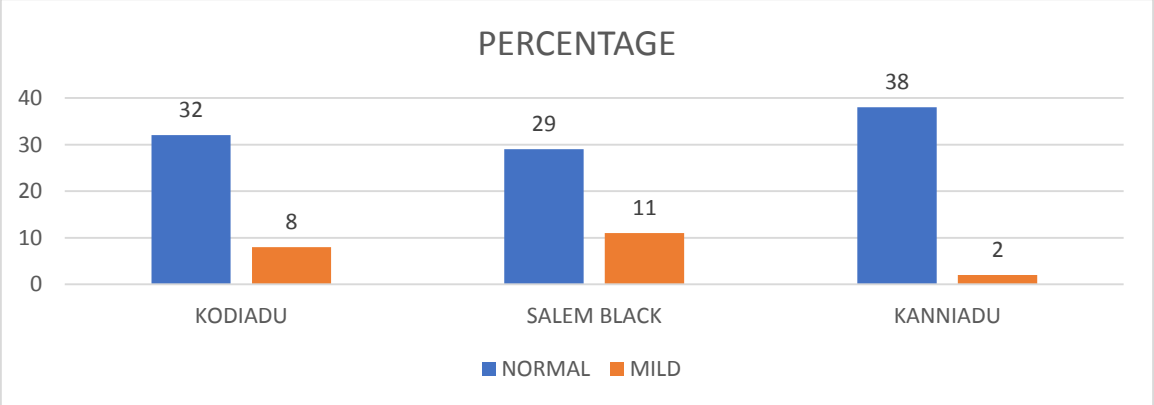
ISSN (Online): 2455-3662
EPRA International Journal of Multidisciplinary Research (IJMR) - Peer Reviewed Journal
Volume: 8| Issue: 7| July 2022|| Journal DOI: 10.36713/epra2013 || SJIF Impact Factor 2022: 8.205 || ISI Value: 1.188

GRAPH 1: Percentage wise distribution of various goat breeds included in the study



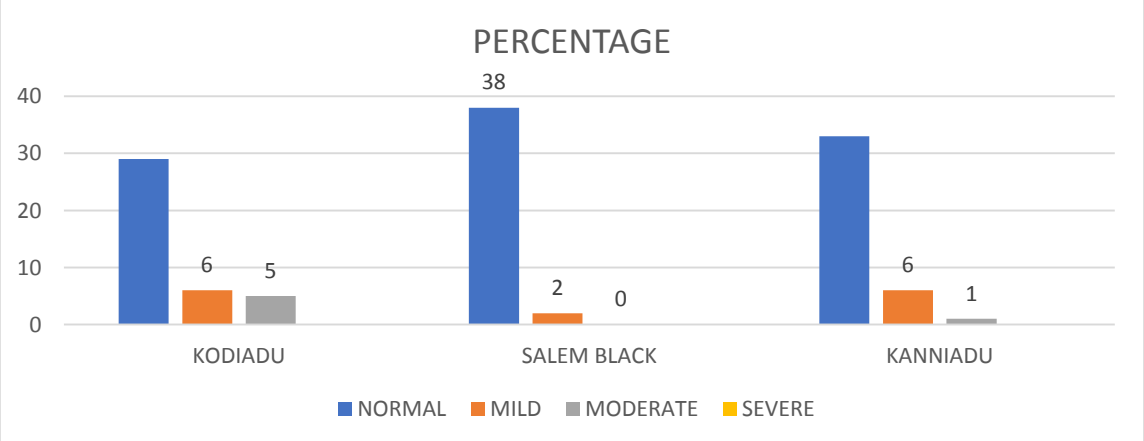
Graph 1 depicts the distribution and percentage of various goat breeds involved in this study

GRAPH 2: Association between various breeds of goat and trauma



Graph 2 depicts the prevalence between various breeds of goat and trauma involved in this study

Graph 3: Association between various breeds of goat and attrition



Graph 3 depicts prevalence between various breeds of goat and attrition involved in this study