Evaluation of Risk Factors for Laryngopharyngeal Reflux among Sikkimese Population

Kesari SP, Chakraborty S, Sharma B

Department of ENT

Sikkim Manipal University, SMIMS,

Gangtok, Sikkim, India.

Corresponding Author

Santosh Prasad Kesari

Department of ENT

Sikkim Manipal University, SMIMS,

Gangtok, Sikkim, India

E-mail: santosh4uma@yahoo.co.in

Citation

Kesari SP, Chakraborty S, Sharma B. Evaluation of Risk Factors for Laryngopharyngeal Reflux among Sikkimese Population. *Kathmandu Univ Med J* 2017;57(1):29-34.

ABSTRACT

Background

Laryngopharyngeal reflux is a global health problem and is associated with a huge economic burden and decreased quality of life. Studies describing the epidemiology of laryngopharyngeal reflux are sparse in India and south east Asia. This study becomes significant as it is being conducted in Sikkimese population who resides in high altitude have a different lifestyle.

Objective

To evaluate the risk factors for laryngopharyngeal reflux among Sikkimese origin.

Method

Patients of Sikkimese origin visiting Ear Nose Throat outpatient department Were administered with validated questionnaire. The patients were further subjected to validate Reflux symptom Index score. Indirect laryngoscopy was performed to calculate reflux finding score. Presence of laryngopharyngeal reflux was identified with patients having reflux symptom index and reflux finding score of greater or equal to 13 or more and 7 or more.

Result

Out of 200 subjects analysed, there were 77(38.5%) male and 123(61.5%) female. Heartburn and regurgitation were the most common symptom among the masses. Hoarseness and frequent throat clearance were the commonest laryngopharyngeal reflux symptoms. Various risk factors were computed as mentioned in the results column.

Conclusion

Study on the above mentioned population differed from rest of the country in terms of dietary habits. Fermented food was found to be one of the important risk factor for the development of laryngopharyngeal reflux in the sikkimise population.

KEY WORDS

Laryngopharyngeal reflux, risk factors, reflux finding score, reflux symptom Index, sikkimese population

INTRODUCTION

Gastroesophageal reflux (GER) is a condition when gastric content passes through the lower oesophageal sphincter into the oesophagus. Gastroesophageal Reflux (GER) which travels proximally and penetrates the upper oesophageal sphincter to enter the laryngopharynx is called as Extra-oesophageal reflux (EER) or laryngopharyngeal reflux (LPR). It is a global health concern and is associated with a huge economic burden and decreased quality of life.[1] Approximately 75 million (15-44%) of all American adults experiences heartburn. Among which 50% of these patients show symptoms of EER.[2] GERD is frequently diagnosed in adults above 40 years of age and has a higher prevalence in western countries.[2] Studies describing the epidemiology of GERD in India and South East Asia are sparse. Traditionally, it has been believed that GERD is uncommon in the developing countries. However in recent years, the progress in the Indian society on both socioeconomic and educational fronts has led to changes in diet and lifestyle. Recent studies indicates that the prevalence of GERD in India ranges from 8-20% which is comparable to that of the west.[3] This figure can not be generalized to the different group of population residing in the different part of India due to the differences in social, cultural and lifestyle habits. There is only one population based study in India at high altitude area of ladakh region.[3,4] This study is important as it is being conducted among Sikkimese population who resides in high altitude region and have a different lifestyle and dietary risk factors.

To evaluate the risk factors of laryngopharyngeal Reflux and its adverse effects. And suggest preventive methods of laryngopharyngeal reflux.

METHODS

This study is a case control type of study, conducted at Central Referral Hospital (CRH), Sikkim Manipal Institute of Medical Sciences (SMIMS), Tadong, Gangtok, Sikkim for a period of 2 months from 1st April 2015 to 31st May 2015. Due to time constrain a total of 200 Individuals from different part of Sikkim formed a part of study population. We divided 200 individuals into 100 as case and 100 as control for easy comparability. All the persons presenting in various departments of Central Referral Hospital with features of laryngopharyngeal reflux (LPR) were thoroughly interviewed, examined and investigated after obtaining informed written consent. In case of minors the informed written consent of guardian was taken. The definition of case in our study is a person with feature of laryngopharyngeal reflux (LPR) such as Hoarseness, vocal fatigue, Chronic Cough, Dysphagia, Frequent throat clearing or globus sensation, respiratory symptoms, ear pain and ear blockage sensation with or without some or all of the feature of GERD such as heartburn epigastric pain, regurgitation, nausea, vomiting, difficulty in swallowing, burping, chest pain, abdomen pain. The individual without these features served as control. All the patients were subjected to Reflux Symptom Index (RSI) which is a self administered nine item questionnarie which assess LPR. Each item was alloted a score of 0-5, with a minimum score of 0 (no symptoms) and a maximum score of 45 (all possible features).Individual with score of 13 or more were considered to have a features of LPR,[5,6] and thus form a part of a case group and the others were included in the control, All these persons were subjected to indirect laryngoscopy to examine the hypopharynx and the larynx for the features of LPR. The finding of the examination were scored in another scale called as Reflux Finding Score (RFS) which is again an eight item clinical severity scale based on finding of fibreoptic laryngoscopy.[7] The result of RFS could range from 0 (no abnormality) to a maximum of 26 (worse score possible), based on this analysis, one can be 95% certain that a patient with a Reflux Finding Score (RFS) of seven or more will have LPR.[5,6]

The individuals who do not fulfill the criteria to be included in case group were included in control group. Age and sex matching was done to compare the case with its corresponding control group. All individuals above 10 years who could read, write and comprehend and gave informed written consent were included in the study. In case of minors consent was taken from legal guardian. Individuals below 10 years who couldn't give consent and couldn't read write and comprehend were excluded from the study.

After obtaining the permission from the Dean, Sikkim Manipal Institute of Medical Sciences and Medical Superintendent, Central Referral Hospital the cases were obtained from various departments of Central Referral Hospital and the corresponding control obtained from the community. Institute Ethical Committee (IEC) clearance was taken prior to the start of the study.

The collected data was tabulated and analyzed by using the SPSS (Statistical Package of Social Sciences) version 16.0 for windows. Finding are expressed in terms of proportion and depicted in form of Tables

RESULTS

Table no 1 shows the baseline information of the study population. In our study population 77(38.3%) were male, 123(61.2%) female of which majority belong to age group below 40 years which comprises of 119(59.2%). In our study 130(64.7%) were Hindu among which majority belong to Nepali Community 148(73.6%). Of the total study population 124(61.7%) belong to East district of Sikkim of which majority were resident of Urban area 81(40.3%).

Table 1. Baseline characteristics of the population studied

Variables	n=200	%
GENDER		
Male	77	38.5
Female	123	61.5
AGE GROUP (yrs)		
10- 20	46	22.9
21- 30	41	20.4
31- 40	32	15.9
41- 50	38	18.9
>50	43	21.4
RELIGION		
Hindu	130	64.7
Christian	15	7.5
Buddhist	55	27.4
others	-	-
COMMUNITY		
Nepali	148	73.6
Bhutia	19	9.5
Lepcha	21	10.4
Others	12	6.0
ADDRESS		
East sikkim	124	61.7
West sikkim	36	17.4
South sikkim	34	16.9
North sikkim	7	3.5
RESIDENCE		
Urban	81	40.3
Semi urban	50	24.9
Rural	69	34.3

Table 2 shows Socio Demographic correlates associated with Laryngopharyngeal reflux diseases. from the table we see that the symptoms of GERD/LPR was significantly more in individual who smoke and have history of passive smoking. The symptoms of reflux was also significantly higher among alcoholics who consume alcohol regularly, people drinking frequent tea/coffee and aerated drinks. when we compared the symptoms with dietary habits we show that the features were common in people with non vegetarian food habits, with frequency of meal being moderate to heavy for more than three meals per day. the reflux was more in those who consumed fermented food with higher spice content. it was also seen that the symptoms were more in people with higher frequency of junk food intake and in those who consume milk at bed time. The significant finding in our study was that the feature of reflux was common in people who go to bed immediately after dinner. Religion and residence of the subject was also associated with significant increase in reflux symptoms.

Table 2. Socio Demographic Correlates Associated with Laryngopharyngeal Reflux

Socio Demographic Correlates	Cases N1=100	Controls N2=100	χ^2, df, p
Body Mass Index			
Underweight	6	10	
Normal weight	49	66	χ^2= 10.782, df=3, p= 0.13
Overweight	35	21	
Obese (I,II,III)	10	3	
Gastro esophageal reflux symptoms			
None	17	37	
Regurgitation	20	16	
Heartburn	37	7	χ^2= 33.676, df=5, p= 0.000*
Globus Sensation	7	10	
Burping	7	18	
Epigastric Pain	12	12	
Symptoms of LPR			
Hoarseness	29	25	
Globus sensation	12	6	
Frequent throat clearing	15	13	
Chronic cough	8	5	χ^2= 10.625, df=7, p= 0.153
Dysphagia	8	7	
Respiratory problem	8	7	
Ear problem(otitismedia, EustationTube Dysfunction)	9	9	
None	11	28	
Smoking habit			
Smoker	49	15	
Nonsmoker	40	75	χ^2= 28.762, df=2, p= 0.000*
Exsmoker	11	10	
H/O Passive Smoking			
None	9	7	
<1 hour/day	23	87	χ^2= 89.432, df=2, p= 0.000*
>1 hour/day	68	6	
Intake*			
Non alcoholic	61	78	
Occasional drinker(once a month)	16	17	χ^2= 8.741, df=2, p= 0.013*
Regular drinker(2-3 times a week)	23	5	
Dietary Habit			
Vegetarian	20	49	χ^2= 18.608, df=1, p= 0.000*
Non vegetarian	80	51	
Quantity of Food per meal**			
Light	6	32	
Moderate	60	42	χ^2= 22.033, df=2, p= 0.000*
Heavy	34	26	
Frequency of Meal			
<3 meal/day	11	14	
3 meal/day	82	79	x2= 0.416, df=2, p= 0.812
>3 meal/day	7	7	

Type of Cereal			
Rice	79	32	χ^2= 44.825, df=2, p= 0.000*
Wheat	9	26	
Mixed	12	42	
Fermented food			
Yes	84	66	χ^2= 8.640, df=1, p= 0.003*
No	16	34	
Spicy food			
Frequent	59	29	χ^2=21.904, df=2, p= 0.000*
Infrequent	27	33	
Never	14	38	
Tea/coffee			
None	15	71	χ^2=65.953, df=2, p= 0.000*
<3 cups	75	22	
>3 cups	10	7	
Aerated Drinks			
Frequent	21	56	χ^2=25.869, df=2, p= 0.000*
Infrequent	45	25	
None	34	19	
Dinner amount**			
Light	14	74	χ^2=74.730, df=2, p= 0.000*
Moderate	66	16	
Heavy	20	10	
Fast Food			
Frequent	36	20	χ^2=39.192, df=2, p= 0.000*
Infrequent	46	19	
None	18	61	
Milk at Bedtime			
Yes	18	5	χ^2= 8.030, df=1, p= 0.004*
No	82	95	
Sleeping habit post dinner			
Immediate	64	19	χ^2=42.567, df=2, p= 0.000*
1-2 hours later	24	46	
>2hours later	12	35	
Religion			
Hindu	70	60	χ^2=6.527, df=2, p= 0.038*
Christian	10	5	
Buddist	20	35	
Community			
Nepali	79	69	χ^2=3.252 df=3, p= 0.354
Bhutia	9	10	
Lepcha	8	13	
Others	4	8	
Residence			
Urban	49	32	χ^2=11.698, df=2, p= 0.003*
Semi Urban	15	35	
Rural	36	33	

*p value <0.05 is considered as significant

Note : * : alcohal intake classification-
non drinker -is a person who never drink
occasional drinker- is a person who drinks minimum of once a month (male -90ml, female-60 ml)
regular drinker- who consume alcohal 2-3 times a week (male 60-90 ml, female 60-90 ml)

** : meal quantity
light - fat and spicy content is less then25%
moderate - fat and spicy content is upto 50%
heavy - fat and spicy content is more than 50%.

DISCUSSION

The socio demographic correlates, associated with GERD and LPR have shown the following significant correlation. The laryngopharyngeal reflux was significantly higher in Hindu in test group which account for 70% of the case group followed by 20% Buddhist and 10 percent Christian. Thus there is significant correlation with the Religion and Reflux symptom in the study (p=0.038). The reason for this high prevalence in Hindu population could be because of their dietary habits which favour reflux symptoms.

There was a higher prevalence of Laryngopharyngeal reflux in a resident of urban area compared to those who resided in the rural area. The p value for this association was 0.003, which is statistically significant. This association is probably due to western lifestyle adopted in the urban area with consumption of diet rich in fatty food, low physical activity and stressful activity.

Gastroesophegeal reflux and laryngopharyngeal reflux or extra esophegeal reflux were considered the problem of the affluent western society is now seen in increasing trend among the population of Sikkimese origin. In a study conducted by Kumar et al. a prevalence of 23% was reported among rural population of Ladakh region adopting a cut off point of symptom score.[4] A recent study from Delhi conducted by Sharma et al. which also used a cut off score based on symptoms for a year to define a case, reported a prevalence of 16.2% among hospital employees.[8] Studies in Chennai and Jaipur reported prevalence rates of 24% and 22% respectively. In a study conducted by Gaddam et al. and Kumar et al. lower prevalence (7.6%) was reported in a health facility based study by the taskforce of Indian Society of Gastroenterology (ISG) following the same case definition.[1,3]

The present study done in Sikkimese population showed no association of Body Mass Index (BMI) with the occurrence of laryngopharyngeal reflux contrary to the results of some other studies(p= 0.13). A study conducted by Nilsson et al. shows considerable association between BMI and reflux.[9] Weak association between increasing BMI and reflux symptom was found among moderately obese men (BMI 30-35) with 40% increase in risk of reflux symptom compared to men of normal weight (BMI<25). In women

the association was stronger with significant increase in the risk of reflux symptom in all three category of overweight and obesity compared to those with BMI<25. In our study we found heartburn (37%) as the most common symptom of GERD followed by regurgitation (20%) among the cases included in the study. This finding goes in hand with other study that shows positive association between heartburn and regurgitation and GERD. Heartburn was present in 100% of the cases in a study done in Bangladesh and 98% in the study conducted by Kumar et al.[3] In a study conducted by Sharma et al. heartburn was present in 3.6% of population on daily basis, 5.9% on weekly basis, and 17.7% on an occasional basis.[8] Similarly prevalence for regurgitation was 3.3%, 5%, and 14.8%, respectively among the employees of large hospitals of northern India.[8]

Smoking was shown to be positively associated with GERD and LPR that is both the passive and the active smoking. Among the 100 cases of the study group, 68 had the record of passive smoking for more than an hour a day and 49 among the hundred cases were active smoker and 11 were ex smoker. This association was statistically significant (p= 0.000). A recent study in Bihar conducted by Kumar et al. showed that tobacco intake 4-6 times a day was associated with 37% of the cases and a study on hospital employees has revealed an association of GERD with current smoking.[3] Study done among the employee of large hospital of northern India by Sharma et al. shows that current smoking of cigarettes was associated with the presence of reflux symptoms.[8] However, a Spanish study of 2500 subjects did not find that smoking predisposes to reflux symptoms.[8]

The present study shows a strong association between alcohol consumption and gastroesophegeal reflux and laryngopharyngeal reflux in contrary to many other studies. Study conducted by Sharma et al. did not find any association of alcohol consumption with presence of reflux symptoms.[8] Study conducted by Murray et al. showed inverse relationship between alcohol consumption and reflux disease.[10] Low to moderate consumption upto 20 units per week appeared inversely related to the frequency and severity of the symptoms.[10]

The type of the meal whether vegetarian or non vegetarian consumed by a study population shows a positive association between the incidence of GERD and LPR. Of the hundred cases of the study population eighty consumed non vegetarian meal (p= 0.000). Other studies also show positive association between the type of meal and gastroesophegeal reflux and laryngopharyngeal reflux. The fatty and spicy nature of the fried non- vegetarian food items may be responsible for symptom says Kumar et al.[3]

Number of meal consumed per day doesn't show any positive correlation with the incidence of gastroesophegeal reflux and laryngopharyngeal reflux (p=0.812) in our study but the amount of meal consumed definitely shows a positive correlation with the occurrence of gastroesophegeal reflux and laryngopharyngeal reflux in the study population (p=0.000). Of the 100 cases only 6 consumed light meal whereas the rest consumed either moderate or heavy amount of meal. In another study conducted in the school children in Veleru, India showed that heavy meals were taken by 9(2.4%) of the children only.[11] The type of cereal consumed by the population has shown significant association with gastroesophegeal reflux and laryngopharyngeal reflux in our study. Seventy nine of the 100 cases consumed rice as a staple diet whereas only 21 of the cases consumed wheat and mixed diet. Seventy nine percent of the case population consumed rice making it a very significant factor to cause GERD and LPR.

The population chosen for study in this case differs from the population of the rest of the country in its dietary habit, when the rest of the country consumes wheat as the staple diet the population of Sikkim eat rice along with fermented food which are known to cause reflux symptoms. The consumption of fermented food has shown positive association with the occurrence of gastroesophegeal reflux and laryngopharyngeal reflux. Of the 100 cases 84 consumed fermented food regularly and only 16 did not. It shows that almost 84% of the study's case population consumed fermented food showing a positive relationship with occurrence of GERD and LPR (p=0.003).

Consumption of spicy food is associated with the increased incidence of gastroesophegeal reflux and laryngopharyngeal reflux as per our study(p=0.000), which is believed as a result of increased gastric juice secretion, relaxation of lower esophageal sphincter and delayed gastric emptying.[11,12] Various other studies also agree to spicy food being the cause of gastroesophegeal reflux and laryngopharyngeal reflux disease. A study conducted by Kumar et al. in the rural population of north Bihar says that "symptoms were associated with fried spicy food in 95% of cases".[4] Moderately spicy food was associated with 87% of GERD in a recent study.[3] A study on an urban population in Pakistan has associated fried spicy food with 71% of GERD. A study conducted by Jahnavi et al. in the school children of veleru India shows that spicy food was consumed by 46(12.1%) of the children having the symptoms.[11] Consumption of tea/coffee has shown implication with gastroesophegeal reflux and laryngopharyngeal reflux in our study. Of the hundred cases 85 consumed tea/coffee and only 15 did not. This result comes in accordance with other studies which also show association between tea/ coffee consumption and incidence of gastroesophegeal reflux and laryngopharyngeal reflux. The school children were asked about their coffee/tea intake per day, 193 children (50.8%) were consuming 1-3 cups/day says Jahnavi et al.[11] Most of the cases (85%) ingested 1-3 cups of tea a day says Kumar et al. in their study "prevalence, perceptions and profile of gastroesophageal reflux disease in a rural population of north Bihar".[3] The consumption of aerated drink has also shown positive association with the incidence of gastroesophegeal reflux and laryngopharyngeal reflux in our study. More than half of the children were

consuming aerated drinks out of which 60 (15.8%) children were taking frequently says Jahnavi et al. in "A study of the symptoms of gastro-esophageal reflux disease and associated risk factors among the rural school children of Veleru India".[11] Of the hundred cases 66 consumed aerated drink of which 21 consumed frequently and 45 consumed infrequently. More than 50% of the case population gave the history of consumption of aerated drink showing its positive association with gastroesophegeal reflux and laryngopharyngeal reflux in the study population.

The amount of dinner consumption has association with occurrence of gastroesophegeal and laryngopharyngeal reflux in this study like various other studies. A full stomach before going to bed is said to be a risk factor for occurrence of gastroesophegeal reflux and laryngopharyngeal reflux as per "the study of the symptoms of gastroesophageal reflux disease and associated risk factors among the rural school children of Veleru India" by Jahnavi et al.[11]

Consumption of junk food is one of the proved etiological factor for development of gastroesophegeal reflux and laryngopharyngeal reflux and this study adheres to that as eighty two percent of the case population consumes junk food of which thirty six percent consumes frequently and forty six percent consumes infrequently. Consumption of fast food is a risk factor for development of gastroesophegeal reflux and laryngopharyngeal reflux as per other studies conducted worlwide.

In this study milk is seen to be a significant risk factor for occurrence of laryngopharyngeal reflux and the gastroesophegeal reflux disease. Many other studies also claim milk to become a significant risk factor for development of GERD and LPR especially if consumed before sleeping. In this study of the 100 cases 18 consumed milk before going to bed and of 100 controls only five consumed milk before going to bed. A few studies which implicated food items that may precipitate the symptom of reflux include dietary fat.[11]

Immediate sleep post dinner in this study qualifies as a risk factor for development of reflux related issue be it gastroesophegeal or laryngopharyngeal reflux. Many other studies also claim the posture after meal to be a risk factor for development of gastroesophegeal and laryngopharyngeal reflux disease. Recumbent posture after meals was perceived as a precipitating factor by 42% of the cases and postprandial occurrence of symptom was seen in 80% of the cases as per "prevalence, perceptions and profile of gastroesophageal reflux disease in a rural population of north Bihar.[3]

The study was conducted in a small population due to limited resource and time, so more such study should be carried out in this region to add on to the present state of knowlege.

CONCLUSION

In our study, risk factors have been worked out, which most probably are responsible for triggering or attributing to the development of GERD` which subsequent leads to development of Laryngopharyngeal reflux of varied nature in the hill population. This causes various type of upper aerodigestive tract symptoms with which the patients present to ENT and Medicine out patients department.

Since the study was carried out in the population which differs from the rest of the country in its dietary habits, fermented food was found to be one among the important risk factor for the development of laryngopharyngeal reflux in the study population.

The participants of the study were advised to bring improvement to their dietary habits by decreasing the consumption of food rich in fat, spices, fermented food and also decreasing the consumption of tea and coffee and involving in daily exercises like brisk walking, aerobic exercises etc.

REFERENCES

1. Gaddam S, Sharma P. Shedding light on the epidemiology of gastroesophageal reflux diseases in India- a big step forward. *Indian J Gastroenterol.* May-June 2011; 30(3): 105-7.
2. Sudhoff H, Garten D, Schreiber S. In: Moffet D, Keir J, Sudhoff H. Recent advances in otolaryngology. Reflux and otitis media with effusion. 8th Ed. London: The royal society of medicine press ltd; 2008.
3. Kumar S, Shivalli S. Prevalence, Perceptions and profile of gastroesophageal reflux disase in a rural population of north Bihar. *National Journal of Community Medicine.* Apr-June 2014; 5(2): 214-8.
4. Kumar S, Sharma S, Norboo T, Dolma D, Norboo A, Stobdan T et al. Population based study to assess prevelence and risk factors of gastroesophageal reflux disease in a high altitude area. *Indian J Gastroenterol.* May-June 2011; 30(3):135-43.
5. Ford CN. Evaluation and management of laryngopharyngeal reflux. *JAMA.* September 2005; 294(12): 1534-1540 (doi:10.1001/*jama.*294.12.1534).
6. Belafsky PC, Postma GN, Koufman JA. Validity and reliability of the reflux sumptom index (RSI). *Journal of Voice.* 2002; 16(2): 274-7.
7. Belafsky PC, Postma GN, Koufman JA. The validity and reliability of the reflux finding score (RFS). *The Laryngoscope.* August 2001; 111: 1313-7.
8. Sharma KP, Ahuja V, Madan K, Gupta S, Raizada A, Sharma PM. Prevelence, Severity and risk factors of symptomatic gastroesophageal reflux disease among employees of a large hospital in Northern India. *Indian J Gastroenterol.* May-June 2011; 30(3):128-34.
9. Nilsson M, Johnsen R, Ye K, Hveem K, Langergren J. Obesity and Estrogen as Risk Factors for Gastroesophageal Reflux Symptoms. *Journal of American Medical Association.* July 2003;290(1): 66-72.
10. Murray L, Johnston B, Lane A, Harvey I, Donovan J, Nair P et al. Relationship between body mass and gastro-oesophageal reflux symptoms: The Bristol Helicobacter Project. *International Journal of Epidemiology* 2003;32:645-50.
11. Jahnavi G, Patra RS, Singh ES. A study of the symptoms of gastro-esophageal reflux disease and associated risk factors among the rural school children of Veleru India. *International Journal of Medicine and Public Health.* Oct-Dec 2013;3(4):321-4.
12. Platel K, Srinivasan K. Digestive stimulant action of spices: A myth or reality? *Indian J Med Res.* May 2004; 119:167-79.