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Research Paper

Laryngopharyngeal reflux disease, prevalence and clinical characteristics in ENT department of a tertiary hospital Tanzania

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KEYWORDS
Laryngopharyngeal reflux disease;
Reflux scoring index;
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Tertiary hospital

Abstract *Background:* Laryngopharyngeal reflux disease (LPRD) is a condition with nonspecific symptoms and most of times patients present late with advanced disease which may predispose to malignancy. The magnitude and clinical characteristics of this condition are not well known among patients attending Otorhinolaryngology services in Tanzania.
Materials and methods: This was a hospital based descriptive cross sectional study, conducted in the wards and clinics of Otorhinolaryngology department of Muhimbili National Hospital. Patients with symptoms of Laryngopharyngeal reflux disease were included in the study. Data was collected using questionnaires and clinical examination forms, were processed and analysed by using SPSS. Results presented in frequency tables, cross tabulations and figures.
Results: This study recruited 256 participants among them males were 131(51.2%).The mean age was (41.38 $\pm$ 13.94) years. Prevalence of Laryngopharyngeal reflux disease was 18.4% without gender predilection. The commonest symptoms were globus sensation, hoarseness of voice and excessive urge to clear the throat with 95.7%, 88.1% and 83.0% respectively while

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the most observed signs were thick endolaryngeal mucus, Vocal cord oedema and partial ventricular obliteration with 90.9%, 88.6% and 72.7% respectively. Lying down less than two hours after meal and spices foods consumption were the leading risk factors. Hypertension and Diabetes Mellitus type 2 were the most prevalent co morbid conditions associated with Laryngopharyngeal reflux disease.

Conclusion: The prevalence of Laryngopharyngeal reflux disease is high among patients attending Otorhinolaryngology services at Muhimbili national hospital. All patients with Laryngopharyngeal reflux disease related symptoms should get thorough evaluation for early diagnosis and treatment.

Background

Laryngopharyngeal reflux disease (LPRD) is among under diagnosed diseases with significant public health importance due owing to its morbidity and mortality. It affects the quality of life (QoL) impair working ability and increase financial losses.[1,2] It's known to play role in pathogenesis of laryngeal squamous cell carcinoma of the arytenoids and adenocarcinoma of the distal esophagus.[3,4]

Laryngopharyngeal reflux disease is a backward flow of stomach contents into the larynx and pharynx and its posture independent, whereas Gastroesophagial reflux disease stomach content reach the level of esophagus causing heartburn and posture dependent.[5] LPRD has long been misdiagnosed and undertreated.[6,7]

Several studies have pointed out association between LPRD and host laryngeal conditions ranging from functional including muscle tension and dysphonia,[8] structural abnormalities like spasm and stenosis[9,10] and malignant transformation.[11,12]

Increased consumption of tobacco and table salt are associated with many diseases including hypertension, renal disease as well as increased risk for LPRD but physical exercises and dietary fibers decreases the risk.[13]

Methods

A hospital based descriptive cross-sectional study was conducted at Muhimbili National hospital ORL clinics and wards; all adult aged 18 years and above with voice changes and or globus sensation were included while Patient with known (diagnosed) Laryngopharyngeal and or esophageal malignancy were excluded. A total of 256 patients were interviewed.

Data collection procedures

Data collected using standardized Swahili structured questionnaire, Reflux Scoring Index and Reflux Finding score. The Swahili translated RSI table was given to the patient to read and respond to the questions; those who could not read the research assistant read to them the questions and asked to provide answers to fill the RSI table by circling the number corresponding to patients score on specific questions answering the reflux scoring index and the cut-off point of RSI $\geq$13 was regarded as diagnostic.

All Patients with RSI $\geq$13 then underwent laryngoscopic examination to establish their RFS. The laryngoscopic evaluations were done using a Karl Storz rigid laryngoscope (Zero degree scope) for those patients who could not be evaluated with rigid laryngoscope, a flexible nasopharyngoscope was done by the principle investigator to reduce biases; a total RFS of $\geq$7 was regarded as diagnostic of LPRD. Laryngoscopy also evaluated vocal lesions and other complications of the reflux disease. Patients who didn't meet diagnostic point were treated according to their illness.

Quality control

Research assistants were training on RSI and RFS prior to commencing the research to minimize bias Laryngoscopy was done by the principal investigator.

Data management

Data was checked for accuracy and completeness then coded and entered into (Statistical Package for the Social Sciences) version 20 for analysis. The results presented in frequency tables, cross tabulations and figures. Relationship between the independent variables and the dependent variable was established using Chi-square test of association, a variable with P-value of equal or less than 0.05 was considered to be statistically significant.

Results

Out of 256 participants, males were 51.2%. Majority of participants belong to the age group 28—37 years 24.2%. And the least belongs to the age group between 68 and 77 years 4.7%. The median age with inter quintile range in years was 40 (18—73) years (Table 1).

The overall prevalence of LPRD was 18.4%, with male and female prevalence being 19.1% and 17.6% respectively ($P = 0.759$, Table 2).

The most common symptoms were Globus sensation 95.7%, followed by hoarseness of voice 88.1% while the least common was difficult swallowing 14.9%.The association between LPRD and hoarseness of voice was statistically significant ($P = 0.030$, Table 3).

Table 1 Social demographic characteristics ($n = 256$).

Age groups	n (%)
18–27 years	48 (18.8)
28–37 years	62 (24.2)
38–47 years	58 (22.6)
48–57 years	50 (19.5)
58–67 years	26 (10.2)
68–77 years	12 (4.7)
Patients category	
Out patient	192 (75.0)
Patients occupation	
Blue color job	146 (57.1)

Table 2 Prevalence of LPRD by sex (n, %).

Sex	LPRD positive	LPRD negative	Total
Male	25 (19.1)	106 (80.9)	131 (51.2)
Female	22 (17.6)	209 (82.4)	125 (48.8)
Total	47 (18.4)	209 (81.6)	256 (100)

LPRD: laryngopharyngeal reflux disease.

The most observed sign was thick endolaryngeal mucus 90.9%, while the least observed signs were granuloma formation and posterior commissure hypertrophy with 11.4% each. The findings were statistically significant with $P < 0.001$ except for posterior commissure $P = 0.007$ (Table 4).

Among the known risk factors going to sleep less than two hours after meal and eating spice or fat foods were mostly reported 87.2% and 72.3% respectively, however obesity was strongly associated with LPRD and the association was statistically significant ($P = 0.012$, Fig. 1).

Among the known associated co morbid conditions of LPRD, this study found that diabetes mellitus type 2 and hypertension were most prevalent by 42.6% and 34.0% respectively; while the least associated was chronic infectious lung disease 12.8%. Findings were statistically significant for diabetes, asthma, chronic lung disease, bowel and ear diseases ($P < 0.05$, Table 5).

Table 3 Symptoms among patient with LPRD (n, %).

Symptoms	LPRD positive
Hoarseness	40 (88.1)
Sensation of a lump in the throat	45 (95.7)
Excessive urge to clear throat	39 (83.0)
Sensation of mucus sticking in the throat or postnasal drip	33 (70.2)
Chronic cough	15 (31.9)
Difficulty swallowing	7 (14.9)
Sore throat	11 (23.4)
Heartburn	18 (38.3)
Bitter saliva	25 (53.2)

LPRD: laryngopharyngeal reflux disease.

Table 4 Endoscopic findings among patients with laryngopharyngeal reflux disease ($n = 44$).

Sign	n (%)
Subglottic edema	15 (34.1)
Ventricular obliteration	32 (72.7)
Erythema/Hyperemia	39 (88.6)
Voco cord edema	35 (79.5)
Diffuse laryngeal edema	33 (75.0)
Posterior commissure hypertrophy	39 (88.6)
Granuloma	5 (11.4)
Thick endolaryngeal mucus/others	40 (90.9)

When multivariate analysis was done for the co morbid conditions with P-value less than 0.05 the risk of suffering from LPRD is 2.3 times higher in diabetic patient as compared to a non-diabetic one, while for Asthmatic candidates the risk is approximately 4 times higher and for those with chronic ear diseases it was found to be 3.4times higher than in their counterparts (Table 6).

Discussion

The study constituted 256 clients; Gender was well balanced with males 51.2% *vs.* females 48.8% with no statistical difference in LPRD between the two sexes, this was similarly with the findings from other studies.[14,15] Few other studies have found LPRD prevalence to be higher in female.[16] The differences may be due to different diagnostic tool and methodology used by different investigators. The median age with inter quintile range in years was 40 (18–73) years this is similar to findings by other studies.[15,17–19]

The prevalence of LPRD differs among countries or regions of the same countries.[20] The prevalence at MNH was found to be 18.4% this was analogous to 18.8% in Greece, but higher than 15% in Latvia and lower than 23.9% in China and 34.4% in United Kingdom.[21–23] The prevalence of LPRD in this study may not represent the actual picture of the condition in the society as majority of patients with this condition are treated in the peripheral hospitals and those with severe symptoms or associated complications present to Otorhinolaryngologists (ORL surgeon). A better picture of the magnitude of LPRD in this region requires comprehensive data collection including both hospital and community-based study.

From this study, most reported symptoms by clients diagnosed with LPRD were Globus sensation followed by hoarseness of voice and excessive urge to clear throat with 95.7%, 88.1% and 83.0% respectively; this was similar to other studies.[15,17,24] while the least reported ones were chronic cough, sore throat and difficult in swallowing with 31.9%, 23.4% and 14.9% respectively. The association between LPRD and hoarseness of voice was statistically significant; $P = 0.030$.

The most observed clinical signs among LPRD patient were thick endolaryngeal mucus followed by Vocal cord edema and partial ventricular obliteration with 90.9%, 88.6% and 72.7% respectively. These findings are similar to

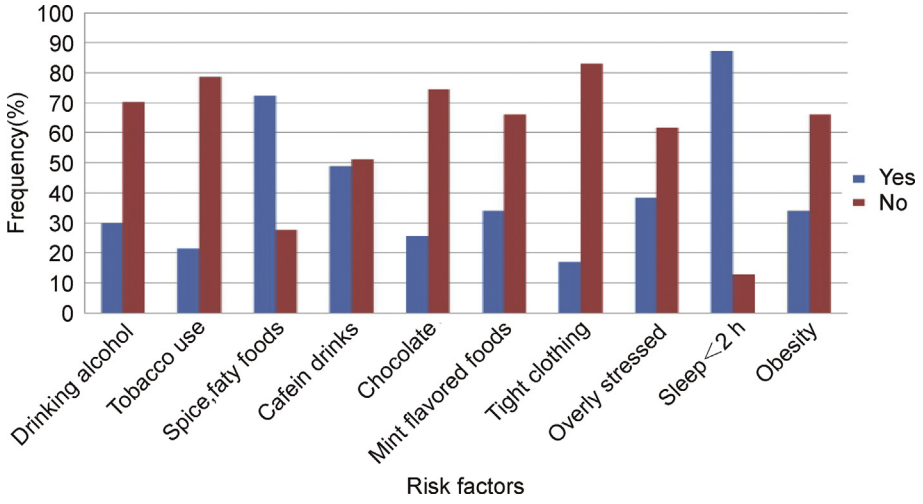

Figure 1 Risk factors of Laryngopharyngeal reflux disease.

Table 5 Co morbid disease conditions and LPRD.

Co morbid disease conditions		LPRD positive	*P* value
Hypertension	Yes	16 (34.0)	0.199
	No	31 (66.0)	
Diabetes mellitus type 2	Yes	20 (42.6)	0.003
	No	27 (57.4)	
Asthma	Yes	10 (21.3)	0.005
	No	37 (78.7)	
Chronic infectious lung disease	Yes	6 (12.8)	0.026
	No	41 (87.2)	
Chronic inflammatory bowel disease	Yes	9 (19.1)	0.034
	No	38 (80.9)	
Chronic ear disease	Yes	12 (25.5)	0.001
	No	35 (74.5)	

LPRD: laryngopharyngeal reflux disease.

those reported by other authors[15,25,26]; the least observed signs were granuloma formation and posterior commissure hypertrophy with 11.4%. similar to the findings by other studies[16,25] but contrary to Belafsk and Koufman in their study on validity and reliability of RFS who found posterior pharyngeal hypertrophy to be the most common observed laryngoscopic sign.[14]

The current study found that among the known risk factors; going to sleep less than two hours after meal and eating spice or fat foods were mostly correlated with LPRD while drinking caffeine, smoking cigarettes and alcohol consumption were moderately correlated, partly my findings coincides with other studies where other authors found consumption of alcohol, tobacco caffeine increases risk for LPRD.[27] The differences in pattern of risk factors may be attributed by different cultures, geographical locations and social behaviours of the study populations however high BMI was strongly associated with LPRD and statistically significant ($P = 0.012$) this was similar to the findings in other studies.[15,28]

It has been evidenced from various studies that as high as 41.8% of patients with LPRD are suffering from other conditions like Cardiovascular, gastrointestinal, musculoskeletal, respiratory and endocrine diseases.[29] This study found strong correlation between LPRD and diabetes mellitus type 2 and hypertension this finding is similar to other studies.[30,31] The association between LPRD and chronic ear disease, chronic inflammatory bowel disease, chronic lung disease and DM type 2 were statistically significant with *P* value less than 0.005. These findings were similar to other studies.[15,22,29,32,33]

Conclusion

Laryngopharyngeal reflux disease is highly prevalent among patients attending ORL services at Muhimbili national hospital. Globus sensation and hoarseness of voice were the most common symptoms while thick endolaryngeal mucus and Vocal cord oedema were the most common signs among LPRD patients. Early sleeping after meal and high spices consumptions are the common risk factors. Diabetes mellitus type 2, chronic ear disease and hypertension were the common co morbid diseases associated with LPRD.

Table 6 Adjusted *P* value for co morbid disease conditions of laryngopharyngeal reflux disease.

Co morbid disease conditions	Laryngopharyngeal reflux disease		Adjusted *P*-value	
	Negative	Positive	*P*- value	*OR* (95%*CI*)
Diabetes mellitus type 2	45 (21.5)	20 (42.6)	0.032	2.3 (1.07—5.030)
Asthma	16 (7.7)	10 (21.3)	0.005	3.9 (1.51—10.57)
Chronic ear disease	18 (8.6)	12 (25.5)	0.002	3.4 (1.38—8.46)

Ethics approval

The study protocol was reviewed and approved by the Institutional Review Board of the Muhimbili University of Health and Allied Sciences and permission to conduct the study was obtained from Muhimbili National Hospital administration. All patients enrolled provided written consent.

Consent to publish

Not applicable.

Availability of data and materials

The datasets used and/or analyzed during the current study are available from the corresponding author on request.

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Author's contributions

WAM contributed to conceptualization, data collection, formal analysis, funding acquisition, methodology, project administration, validation, writing original draft and writing review and editing. ERM was involved in conceptualization, data collection, formal analysis, methodology and supervision as well as revision of the manuscript and writing review and editing.KMB contributed design, formal analysis, and supervision, writing review and editing as well as review of manuscript. ZAS, AN contributed design, formal analysis, supervision, writing review and editing as well as review of manuscript, AAK, NM, DN contributed to conceptualization, analysis, as well as review of manuscript, ABP contributed to conceptualization, formal analysis, methodology, supervision, validation and critical review of the manuscript. All authors read and approved the final manuscript.

Declaration of Competing Interest

The author declare no conflicts of interest.

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