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Original Article

Otological and Pharyngeal Manifestations among Patients with Chronic Upper Respiratory Tract Disorders

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ABSTRACT

Background: Chronic upper respiratory tract (URT) disorders may produce manifestations beyond the primary nasal or sinus sites because of the anatomical and functional continuity of the upper airway. However, the concurrent burden of otological and pharyngeal manifestations remains insufficiently characterized, particularly in Bangladesh. Aim of the study: To determine the frequency and clinical pattern of otological and pharyngeal manifestations among patients with chronic upper respiratory tract disorders. **Methods & Materials:** A hospital-based cross-sectional observational study was conducted among 150 patients with chronic URT disorders using consecutive sampling. Participants underwent structured clinical assessment, including detailed otorhinolaryngological examination and relevant otological and audiological evaluation. Sociodemographic and clinical characteristics, primary URT diagnosis, symptom duration, exacerbation frequency, and otological and pharyngeal manifestations were recorded. Data were analyzed using IBM SPSS Statistics version 26. Categorical variables were compared using Chi-square or Fisher's exact tests, while multivariable logistic regression identified factors independently associated with otological manifestations. Statistical significance was set at $p<0.05$. **Result:** Chronic rhinosinusitis was the most frequent primary diagnosis (38.00%), followed by chronic allergic rhinitis (26.00%). Ear fullness/blockage (46.00%), hearing impairment (42.00%), and Eustachian tube dysfunction (38.67%) were the most common otological manifestations. Throat irritation (64.00%), pharyngeal erythema (61.33%), and chronic sore throat (58.00%) predominated among pharyngeal manifestations. Chronic sore throat and postnasal drip-related pharyngitis varied significantly according to the primary URT disorder ($p=0.041$ and $p=0.006$, respectively). Ear fullness and hearing impairment increased significantly with longer symptom duration ($p=0.021$ and $p=0.034$). Symptom duration >3 years (aOR=2.63; $p=0.002$), >5 exacerbations/year (aOR=2.18; $p=0.020$), nasal obstruction (aOR=2.37; $p=0.011$), postnasal discharge (aOR=2.04; $p=0.024$), and chronic rhinosinusitis (aOR=2.51; $p=0.005$) were independently associated with otological manifestations. **Conclusion:** Otological and pharyngeal manifestations were common among patients with chronic URT disorders, highlighting the need for comprehensive ENT evaluation. Longer disease duration and greater inflammatory symptom burden were particularly associated with otological involvement.

Keywords: *Chronic upper respiratory tract disorders; Otological manifestations; Pharyngeal manifestations; Chronic rhinosinusitis; Eustachian tube dysfunction; Hearing impairment; Pharyngitis; Bangladesh*

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INTRODUCTION

Chronic upper respiratory tract disorders comprise persistent or recurrent inflammatory conditions involving the nasal cavity, paranasal sinuses, nasopharynx and pharynx, including chronic rhinosinusitis, chronic rhinitis and chronic pharyngeal disease. These disorders may extend beyond their primary sites because the upper airway functions as an interconnected anatomical and inflammatory system [1, 2]. Worldwide, the pooled prevalence of chronic rhinosinusitis is 8.71%, although estimates varied considerably according to diagnostic criteria and population characteristics [3]. In Bangladesh, the prevalence rate is 3.71% for chronic suppurative otitis media among primary-school children [4]. The underlying process is largely driven by persistent mucosal inflammation, impaired mucociliary clearance and obstruction of normal ventilation pathways. Chronic nasal and nasopharyngeal inflammation can compromise Eustachian tube function, producing negative middle-ear pressure, fluid accumulation and subsequent conductive hearing impairment [5, 6]. At the same time, continued inflammatory stimulation of the pharyngeal mucosa may contribute to chronic sore throat, pharyngitis, throat irritation and related swallowing discomfort. Thus, a disorder initially perceived as predominantly nasal may present with clinically relevant ear and throat symptoms [7]. These manifestations can substantially affect patients' daily lives. Chronic rhinosinusitis has been associated with impaired health-related quality of life, sleep disturbance, fatigue and reduced social and occupational functioning [8, 9]. Otological complications may further contribute to hearing impairment, recurrent ear discharge and communication difficulties, while chronic pharyngeal symptoms can interfere with eating, speaking and general comfort. Millions of disability-adjusted life-years are attributable to upper respiratory infections and otitis media [10]. Early recognition therefore offers important advantages. A combined otological and pharyngeal assessment may identify manifestations that could otherwise remain overlooked when evaluation is restricted to the primary respiratory complaint. Appropriate diagnosis can facilitate timely medical therapy, hearing assessment, endoscopic evaluation or surgical referral when indicated. Contemporary guidelines also emphasize structured assessment and individualized management of chronic upper-airway disease [1, 11]. However, treatment may involve prolonged medication use, repeated clinical assessment and, in selected cases, surgical intervention, while inappropriate antibiotic use may increase cost and antimicrobial-resistance concerns [12]. Despite extensive

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research on individual disorders, important gaps remain. Existing studies frequently examine chronic rhinosinusitis, otitis media or chronic pharyngitis separately, with comparatively limited attention to their concurrent otological and pharyngeal manifestations. Furthermore, available study largely originates from high-income settings, whereas Bangladesh has distinct environmental, socioeconomic and healthcare-access characteristics. Chronic tonsillitis, chronic pharyngitis and otological diseases are frequently reported in local clinical settings, but their integrated characterization remains limited [13]. Accordingly, the current study is important because it seeks to characterize the otological and pharyngeal manifestations occurring among patients with chronic upper respiratory tract disorders within a Bangladeshi clinical setting. It may improve recognition of extra-nasal manifestations, support more comprehensive ENT evaluation and help clinicians identify patients requiring early intervention. The objective of the study was to determine the frequency and clinical pattern of otological and pharyngeal manifestations among patients with chronic upper respiratory tract disorders.

METHODS & MATERIALS

A hospital-based cross-sectional observational study was conducted among 150 patients with chronic upper respiratory tract disorders attending at the Department of ENT and Head-Neck Surgery, Kurmitola Multicare Specialized Hospital, Dhaka, Bangladesh from January 2024 to December 2025. Patients were selected by consecutive sampling technique.

Inclusion Criteria

- Patients diagnosed with a chronic upper respiratory tract disorder.
- Patients with symptoms persisting or recurring for ≥3 months.
- Patients diagnosed with chronic rhinosinusitis, chronic allergic rhinitis, chronic pharyngitis, adenoid-related disorders, or other chronic URT disorders.
- Patients who underwent appropriate otorhinolaryngological evaluation.
- Patients who provided informed consent to participate in the study.

Exclusion Criteria

- Patients presenting with acute upper respiratory tract infection at the time of assessment.
- Patients with pre-existing primary chronic otological disease unrelated to the URT disorder.
- Patients with a history of major otological or upper airway surgery.
- Patients with congenital craniofacial or upper airway abnormalities.
- Patients with neurological or vestibular disorders independently responsible for otological symptoms.
- Patients with incomplete clinical or relevant investigation records.
- Patients unwilling to participate in the study.

Data Collection

Data were collected using a structured data collection questionnaire. Sociodemographic information included age, sex, residence, occupation, and tobacco-smoke exposure. Clinical information included duration of URT symptoms, frequency of exacerbations, primary chronic URT diagnosis, and associated nasal symptoms such as nasal obstruction, postnasal discharge, chronic nasal discharge, headache/facial pressure, and mouth breathing. Duration of symptoms was categorized as <1 year, 1–3 years, and >3 years, while exacerbation frequency was categorized as 1–2, 3–5, and >5 episodes per year.

All participants underwent detailed otorhinolaryngological examination. Otological manifestations were assessed through clinical history, otoscopic examination, and relevant audiological or middle-ear assessment where indicated. The recorded otological manifestations included ear fullness/blockage, hearing impairment, Eustachian tube dysfunction, ear pain, abnormal tympanometry, tinnitus, recurrent otitis media, otitis media with effusion, retracted tympanic membrane, otorrhea, and dizziness/vertigo. Pharyngeal manifestations were assessed through symptom history and clinical examination and included throat irritation, pharyngeal erythema, chronic sore throat, frequent throat clearing, pharyngeal wall congestion, postnasal drip-related pharyngitis, foreign-body sensation, chronic cough, dysphagia, tonsillar enlargement, granular/cobblestone pharyngeal appearance, and halitosis. The primary URT diagnosis was categorized as chronic rhinosinusitis, chronic allergic rhinitis, chronic pharyngitis, adenoid-related disorder, or other chronic URT disorder.

Statistical Analysis

Data were analyzed using IBM SPSS Statistics version 26. Categorical variables were expressed as frequency and percentage. The Chi-square test or Fisher's exact test, as appropriate, was used to assess associations between categorical variables. The distribution of otological and pharyngeal manifestations was compared according to the primary chronic URT disorder and duration of symptoms. Multivariable logistic regression analysis was performed to identify independent factors associated with otological manifestations, and adjusted odds ratios (aORs) with 95% confidence intervals (CIs) were reported. A p-value <0.05 was considered statistically significant.

RESULT

Among the 150 participants, the largest proportion belonged to the 31–40-year age group (28.67%), followed by 21–30 years (24.67%). Males constituted 54.67% of the study population. A slightly higher proportion came from rural areas (52.00%). Housewives were the largest occupational group (24.67%), followed by service holders (20.67%). Overall, 36.67% of participants reported either active or passive exposure to tobacco smoke (*Table I*).

Table I
Sociodemographic characteristics of the study participants (*n*=150).

Variables	Frequency (n)	Percentage (%)
Age group (years)		
≤20	16	10.67
21–30	37	24.67
31–40	43	28.67
41–50	31	20.67
>50	23	15.33
Gender		
Male	82	54.67
Female	68	45.33
Residence		
Urban	72	48.00
Rural	78	52.00
Occupation		
Housewife	37	24.67
Service holder	31	20.67
Student	25	16.67
Business	21	14.00
Farmer/laborer	23	15.33
Other	13	8.67
Tobacco-smoke exposure		
Current smoker	24	16.00
Passive exposure	31	20.67
No exposure	95	63.33

Chronic rhinosinusitis was the predominant underlying disorder (38.00%), followed by chronic allergic rhinitis (26.00%). Symptoms had persisted for 1–3 years in 44.67% of patients. Nasal obstruction was the most frequent symptom (68.67%), followed by postnasal discharge (60.67%) and chronic nasal discharge (55.33%) (*Table II*).

Table II
Clinical characteristics of chronic upper respiratory tract disorders (*n*=150).

Clinical characteristics	Frequency (n)	Percentage (%)
Duration of symptoms		
<1 year	29	19.33
1–3 years	67	44.67
>3 years	54	36.00
Primary diagnosis		
Chronic rhinosinusitis	57	38.00
Chronic allergic rhinitis	39	26.00
Chronic pharyngitis	29	19.33
Adenoid-related disorder	15	10.00
Other chronic URT disorders	10	6.67
Frequency of exacerbation/year		
1–2 episodes	34	22.67
3–5 episodes	69	46.00
>5 episodes	47	31.33
Nasal obstruction	103	68.67
Postnasal discharge	91	60.67
Chronic nasal discharge	83	55.33
Headache/facial pressure	72	48.00
Mouth breathing	61	40.67

Ear fullness/blockage was the most common otological manifestation (46.00%), followed by hearing impairment (42.00%) and Eustachian tube dysfunction (38.67%). Abnormal tympanometric findings were present in 31.33% of participants, while tinnitus and recurrent otitis media were observed in 28.00% and 24.00%, respectively (*Table III*).

Table III
Otological manifestations among patients with chronic upper respiratory tract disorders (*n*=150).

Otological manifestation	Frequency (n)	Percentage (%)
Ear fullness/blockage	69	46.00
Hearing impairment	63	42.00
Eustachian tube dysfunction	58	38.67
Ear pain	51	34.00
Abnormal tympanometry	47	31.33
Tinnitus	42	28.00

Recurrent otitis media	36	24.00
Otitis media with effusion	33	22.00
Retracted tympanic membrane	29	19.33
Otorrhea	18	12.00
Dizziness/vertigo	15	10.00

Pharyngeal manifestations were frequent, with throat irritation (64.00%) being the most commonly reported symptom. Frequent throat clearing was reported by 54.67%, while postnasal drip-related pharyngitis was identified in 48.00% (*Table IV*).

Table IV
Pharyngeal manifestations among patients with chronic upper respiratory tract disorders (*n*=150).

Pharyngeal manifestation	Frequency (n)	Percentage (%)
Throat irritation	96	64.00
Pharyngeal erythema	92	61.33
Chronic sore throat	87	58.00
Frequent throat clearing	82	54.67
Pharyngeal wall congestion	79	52.67
Postnasal drip-related pharyngitis	72	48.00
Foreign-body sensation	63	42.00
Chronic cough	61	40.67
Dysphagia	39	26.00
Tonsillar enlargement	34	22.67
Granular/cobblestone pharyngeal appearance	31	20.67
Halitosis	28	18.67

Chronic sore throat (p=0.041) and postnasal drip-related pharyngitis (p=0.006) showed statistically significant associations with the underlying diagnosis. Postnasal drip-related pharyngitis was particularly frequent among patients with chronic rhinosinusitis (59.65%) and allergic rhinitis (56.41%) (*Table V*).

Table V
Distribution of otological and pharyngeal manifestations according to primary chronic upper respiratory disorder (*n*=150).

Manifestation	Chronic rhinosinusitis (n=57)	Allergic rhinitis (n=39)	Chronic pharyngitis (n=29)	Adenoid-related disorder (n=15)	Other (n=10)	p-value
Ear fullness	31 (54.39)	18 (46.15)	9 (31.03)	8 (53.33)	3 (30.00)	0.081
Hearing impairment	27 (47.37)	15 (38.46)	8 (27.59)	9 (60.00)	4 (40.00)	0.163
Eustachian tube dysfunction	25 (43.86)	17 (43.59)	7 (24.14)	7 (46.67)	2 (20.00)	0.217
Tinnitus	17 (29.82)	12 (30.77)	6 (20.69)	5 (33.33)	2 (20.00)	0.835
Throat irritation	35 (61.40)	26 (66.67)	23 (79.31)	8 (53.33)	4 (40.00)	0.321
Pharyngeal erythema	32 (56.14)	23 (58.97)	25 (86.21)	7 (46.67)	5 (50.00)	0.074
Chronic sore throat	27 (47.37)	21 (53.85)	24 (82.76)	8 (53.33)	4 (40.00)	0.041*
Postnasal drip-related pharyngitis	34 (59.65)	22 (56.41)	7 (24.14)	7 (46.67)	2 (20.00)	0.006*

**p<0.05 statistically significant.*

The frequency of otological manifestations increased progressively with longer disease duration. Ear fullness was reported in 57.41% of patients with symptoms lasting >3 years compared with 27.6% among those with symptoms for <1 year (p=0.021). Similarly, hearing impairment increased from 24.1% to 53.7% across the same duration categories (p=0.034) (*Table VI*).

Table VI
Association between duration of upper respiratory symptoms and otological manifestations (*n*=150).

Otological manifestation	<1 year (n=29)	1–3 years (n=67)	>3 years (n=54)	p-value
Ear fullness	8 (27.59)	30 (44.78)	31 (57.41)	0.021
Hearing impairment	7 (24.14)	27 (40.30)	29 (53.70)	0.034
Eustachian tube dysfunction	7 (24.14)	26 (38.81)	25 (46.30)	0.105
Tinnitus	5 (17.24)	18 (26.87)	19 (35.19)	0.193
Recurrent otitis media	5 (17.24)	15 (22.39)	16 (29.63)	0.408
Abnormal tympanometry	6 (20.69)	20 (29.85)	21 (38.89)	0.196

In multivariable analysis, symptom duration >3 years was independently associated with otological manifestations (aOR=2.63, 95% CI: 1.42–4.88; p=0.002). Chronic rhinosinusitis was another significant predictor (aOR=2.51, 95% CI: 1.32–4.77; p=0.005) (*Table VI*).

Table VI
Multivariable logistic regression analysis of factors associated with otological manifestations (*n*=150).

Predictor variable	Adjusted OR (aOR)	95% CI	p-value
Age >40 years	1.68	0.91–3.11	0.097
Male sex	1.19	0.69–2.06	0.531
Rural residence	1.34	0.78–2.31	0.29
Tobacco-smoke exposure	1.71	0.91–3.20	0.094
Symptom duration >3 years	2.63	1.42–4.88	0.002
>5 exacerbations/year	2.18	1.13–4.21	0.02
Nasal obstruction	2.37	1.22–4.60	0.011
Postnasal discharge	2.04	1.10–3.79	0.024
Chronic rhinosinusitis	2.51	1.32–4.77	0.005

DISCUSSION

Chronic upper respiratory tract disorders frequently extend beyond the primary nasal and sinus manifestations, with otological and pharyngeal involvement representing important clinical features that may contribute substantially to patients' symptoms and overall disease burden [14]. In the present study, the participants were predominantly aged 31-40 years (28.67%), with a slight male predominance (54.67%). More than half were from rural areas (52.00%), and 36.67% had tobacco-smoke exposure either actively or passively. The age distribution is broadly comparable with the study by Marambaia et al., in which the mean age of patients with chronic rhinosinusitis (CRS) was 40.7 years, although our study included a wider age range [15]. Similarly, Ramos et al. reported a mean age of 48.3 years in a large CRS surgical study, with males constituting 49.1%, demonstrating a relatively balanced sex distribution [16]. Regarding the clinical profile, 1–3 years was the most frequent symptom duration (44.67%), while CRS was the leading primary diagnosis (38.00%). Nasal obstruction (68.67%) and postnasal discharge (60.67%) were the predominant symptoms. These findings closely resemble the population-based study by Hirsch et al., in which postnasal drip and nasal obstruction were among the most frequent CRS symptoms, occurring in 36.2% and 27.0%, respectively [17]. A survey by Passali et al. similarly identified nasal obstruction, postnasal drip and headache as the leading manifestations of CRS, reported by 86%, 82% and 52% of respondents, respectively [18]. The otological burden observed in our study was substantial: ear fullness was present in 46.00%, hearing impairment in 42.00%, and Eustachian tube dysfunction (ETD) in 38.67%. Tangbumrungtham et al. reported clinically significant ETD in 48.5% with confirmed CRS, while Maniakas et al. found ear fullness in 61.1% of CRS patients [19,20]. Our ETD frequency was therefore somewhat lower but remained within the range reported in the literature. Lazo-Sáenz et al. also demonstrated abnormal Eustachian tube function among patients with allergic rhinitis, supporting the broader concept that chronic nasal inflammation may contribute to middle-ear dysfunction [21]. Pharyngeal manifestations were also prominent, with throat irritation (64.00%), pharyngeal erythema (61.33%), chronic sore throat (58.00%), and frequent throat clearing (54.67%) being particularly common. Macedo et al. observed throat mucus in all patients with postnasal drip-associated chronic cough, while a prospective study by Dąbrowska et al. reported postnasal drip in 62% of patients with upper-airway cough syndrome [22,23]. More recently, Zhao et al. demonstrated that patients with CRS and chronic cough had substantial postnasal-discharge symptom scores, further supporting the nose–pharynx–airway relationship observed in our study [24]. In our study, chronic sore throat differed significantly across diagnostic groups (p=0.041), being most frequent among chronic pharyngitis patients (82.76%), whereas postnasal-drip-related pharyngitis showed a stronger association (p=0.006), particularly among CRS (59.65%) and allergic-rhinitis (56.41%) patients. This is consistent with Wise et al., who demonstrated an association between postnasal-drip symptomatology and rhinosinusitis, although they also highlighted the contribution of laryngopharyngeal reflux [25]. Conversely, Zhang et al. found no significant difference in ETD prevalence across different CRS subtypes, which is compatible with our nonsignificant differences in ear fullness, hearing impairment and ETD across diagnostic groups [26]. A significant increase shows in ear fullness and hearing impairment with longer symptom duration, particularly among patients symptomatic for >3 years. Knight et al. demonstrated that prolonged exposure to allergic inflammation increased the frequency of ETD from 24% to 48%, supporting a duration-related effect [27]. Likewise, Chen et al. identified ETD as a frequent comorbidity of CRS, with approximately half of CRS patients demonstrating clinically significant ETD [28]. Finally, multivariable analysis identified symptom duration >3 years (aOR 2.63), >5 exacerbations/year (aOR 2.18), nasal obstruction (aOR 2.37), postnasal discharge (aOR 2.04), and CRS (aOR 2.51) as independent predictors of otological manifestations. These findings are consistent with Min and Tan, who identified tobacco exposure, airway disease and other inflammatory conditions as important CRS-associated factors, while a recent meta-analysis found higher odds of CRS among active smokers [29,30]. Overall, our findings therefore reinforce the concept that prolonged and recurrent upper-airway inflammation may extend beyond the nose and manifest as clinically relevant ear and pharyngeal involvement.

LIMITATIONS

This study has several limitations. Its cross-sectional design limits assessment of temporal and causal relationships between chronic upper respiratory tract disorders and otological or pharyngeal manifestations. The study was conducted at a single hospital with a relatively small sample of 150 patients, which may restrict generalizability to other populations in Bangladesh. Consecutive sampling may also have introduced selection bias. Some manifestations were symptom-based and could be influenced by subjective reporting. Furthermore, audiological and middle-ear investigations were performed where clinically indicated rather than uniformly in all participants. Larger multicentre prospective studies with standardized investigations are warranted to validate these findings.

CONCLUSION

Chronic upper respiratory tract disorders were frequently accompanied by clinically important otological and pharyngeal manifestations in this study. Ear fullness (46.00%) and hearing impairment (42.00%) were the predominant otological findings, whereas throat irritation (64.00%), pharyngeal erythema (61.33%), and chronic sore throat (58.00%) were the leading pharyngeal manifestations. Chronic sore throat and postnasal drip-related pharyngitis showed significant variation according to the underlying URT disorder. Longer symptom duration was significantly associated with ear fullness and hearing impairment. Multivariable analysis identified symptom duration >3 years, frequent exacerbations, nasal obstruction, postnasal discharge, and chronic rhinosinusitis as independent predictors of otological manifestations. These findings support integrated ENT assessment to

facilitate earlier recognition and appropriate management of associated ear and pharyngeal involvement.

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CONFLICT OF INTEREST
None declared

ETHICAL APPROVAL
The study was approved by the Institutional Ethics Committee.

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