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Prevalence, Risk Factors, Management Practices, and Academic Impact of Recurrent Pharyngitis among Nigerian University Students: A Cross-Sectional Multi-Centre Study

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ABSTRACT

Background: Recurrent pharyngitis is a common upper respiratory tract condition among young adults and contributes significantly to morbidity and academic disruption among students with limited studies in Nigeria. Study determined the prevalence, risk factors, management practices, and academic impact of recurrent pharyngitis among undergraduate students in Nigerian universities.

Methods: A cross-sectional multi-centre study involving 1,230 undergraduate students from 10 Nigerian universities was conducted. The structured questionnaire assessed environmental and behavioural risk factors, management practices (self-medication, use of over-the-counter medications, home remedies, and healthcare consultations), and academic outcomes. Descriptive statistics, chi-square tests, and binary logistic regression analyses were performed, with statistical significance set at $p < 0.05$.

Results: The prevalence of recurrent pharyngitis was 62.6% (769/1,230). Significant associations were observed with dust exposure ($\chi^2 = 18.42$, $p < 0.001$), frequent shouting ($\chi^2 = 22.15$, $p < 0.001$), use of air conditioning or electric fans ($\chi^2 = 10.63$, $p = 0.001$), and second-hand smoke exposure ($\chi^2 = 6.78$, $p = 0.009$). Logistic regression identified shouting (OR = 2.14, 95% CI: 1.63–2.81), dust exposure (OR = 1.89, 95% CI: 1.45–2.46), and second-hand smoke exposure (OR = 1.52, 95% CI: 1.12–2.05) as independent factors. Self-medication was common (42%), while formal healthcare utilisation was relatively low. Academic impacts included lecture absenteeism (50%), reduced concentration (29%), and academic decline (21%).

Conclusion: Recurrent pharyngitis is highly prevalent among Nigerian university students and is associated with environmental and behavioural factors, self-medication practices, and substantial academic disruption. Targeted preventive and health-promotion interventions are warranted

Keywords: Recurrent pharyngitis; university students; risk factors; self-medication; academic performance; Nigeria.



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INTRODUCTION

Pharyngitis remains one of the most frequently encountered upper respiratory tract conditions globally, affecting millions of individuals annually^{1,2}. It is characterized by inflammation of the pharynx and presents clinically with sore throat, fever, and dysphagia³⁻⁵. Although predominantly viral in origin, bacterial pathogens such as Group A Streptococcus contribute significantly due to their association with complications such as acute rheumatic fever and rheumatic heart disease⁶⁻⁸.

In developing countries, including Nigeria, the burden of pharyngitis is amplified by environmental and socioeconomic factors, notably overcrowding, poor sanitation, and limited access to healthcare⁹⁻¹². University students are particularly vulnerable due to shared living environments, increased social interactions, and exposure to environmental irritants¹³⁻¹⁵.

Behavioural factors, including smoking, shouting, poor hydration, and self-medication, further increase susceptibility¹⁶⁻¹⁸. Seasonal variations, particularly during the harmattan period characterized by dry and dusty conditions, have also been implicated¹⁹.

Recurrent pharyngitis has important academic implications. Students experiencing repeated illness episodes often report absenteeism, reduced concentration, and impaired academic performance²⁰⁻²².

Despite these impacts, there is limited large-scale data in Nigeria examining the combined burden of prevalence, risk factors, management practices, and academic outcomes.

MATERIALS AND METHODS

Study Design: This study employed a descriptive cross-sectional design using an online survey approach to assess the prevalence, risk factors, and academic impact of recurrent pharyngitis among undergraduate students in Nigerian tertiary institutions. A structured, self-administered questionnaire was developed using Google Forms and distributed electronically to eligible participants. The cross-sectional design was considered appropriate as it allows for the simultaneous assessment of exposure and outcome variables within a defined population at a single point in time.

Study Settings: The study was conducted across multiple Nigerian tertiary institutions using digital platforms to facilitate wide participation. Respondents were drawn from universities, polytechnics, and colleges

of education across different geopolitical zones of the country. The use of an online data collection method enhanced accessibility, minimised geographical limitations, and improved the diversity and representativeness of the sample.

Study Population: A total of 1,230 undergraduate students across 10 Nigerian universities participated in the study. The study population comprised undergraduate students enrolled in accredited Nigerian tertiary institutions who had access to internet-enabled devices and were capable of completing an online questionnaire.

Eligibility Criteria: Inclusion Criteria: Participants were eligible for inclusion if they were undergraduate students currently enrolled in a Nigerian tertiary institution, aged 16 years and above, able to read and understand English, had access to an internet-enabled device, and provided informed consent.

Exclusion Criteria: Postgraduate students, individuals not currently enrolled in a tertiary institution, respondents with incomplete questionnaire submissions, and those unwilling to provide consent were excluded from the study.

Sample Size Determination: The minimum sample size was determined using Cochran's formula for cross-sectional studies:

$$n_0 = Z^2 \times p(1 - p) / e^2$$

Where Z represents the standard normal deviate at a 95% confidence level (1.96), p is the estimated prevalence of recurrent pharyngitis (0.5, due to lack of prior data), and e is the margin of error (0.05). This calculation yielded a minimum sample size of 384 respondents. To enhance representativeness and account for potential non-response and incomplete entries, additional responses were included, resulting in a total sample size of 1230 students participants across 10 Nigerian universities used for analysis.

Sampling Technique: A modified multistage approach with elements of convenience sampling was employed to enhance the representativeness of the study population.

In the first stage, Nigerian tertiary institutions were stratified based on geopolitical zones. Institutions were then selected across these strata to ensure regional representation.

In the second stage, students within selected institutions were stratified by level of study and faculty. Proportionate sampling was applied to ensure that

participants reflected the distribution of students across different academic levels.

In the final stage, participants were recruited using systematic and voluntary online participation through institutional platforms and student networks.

Although elements of convenience sampling were involved due to the online nature of data collection, efforts were made to ensure diversity and broad representation across institutions and demographic groups.

Participants were recruited through various online platforms, including student social media groups such as WhatsApp, Telegram, and Facebook, as well as institutional email networks. The survey link was widely distributed across undergraduate communities to ensure diversity in institutional representation and academic levels.

Instrument for Data Collection: Data were collected using a pre-tested structured questionnaire designed in Google Forms. The instrument comprised five sections:

Section A: Sociodemographic characteristics (age, gender, institution, level of study, residence type)

Section B: History and prevalence of recurrent pharyngitis (frequency, duration, prior diagnosis)

Section C: Risk factors (e.g., smoking, dust exposure, crowded living conditions, hygiene practices, allergies, recurrent infections)

Section D: Academic impact (attendance, concentration, performance, examination outcomes)

Section E: Health-seeking behaviour and treatment practices

The questionnaire included both closed-ended and Likert-scale questions to capture quantitative and perception-based responses.

A pilot study was conducted among a small group of undergraduate students to evaluate the clarity, reliability, and validity of the instrument. Necessary modifications were made before final deployment.

Data Collection Procedure: The Google Forms link was distributed electronically through student networks and social media platforms. The introductory page of the survey included the study objectives, relevant information about participation, and an informed consent statement. Participation was voluntary and anonymous, and no personally identifiable information was collected. Data collection was conducted over several weeks, with periodic reminders sent to enhance response rates.

Data Management and Analysis: Completed responses were automatically recorded in Google Forms and exported into Microsoft Excel for data cleaning, coding, and preliminary organisation. The cleaned dataset was subsequently analysed using IBM SPSS Statistics for Windows, Version 29.0 (IBM Corp., Armonk, NY, USA).

Variable Measurement: The primary outcome variable, prevalence of recurrent pharyngitis, was defined as the proportion of respondents reporting repeated episodes of sore throat within the past 12 months. Risk factors were categorised into behavioural (e.g., smoking, shouting), environmental (e.g., dust exposure, ventilation), and medical factors (e.g., history of allergies). Academic impact was assessed using self-reported indicators such as absenteeism, reduced concentration, and perceived decline in academic performance.

Statistical Analysis: Descriptive statistics, including frequencies, percentages, means, and standard deviations, were used to summarise the data. Inferential analysis was performed to assess relationships between variables. The chi-square (χ^2) test was used to determine associations between recurrent pharyngitis and categorical variables such as gender, residence type, and exposure factors. Variables found to be statistically significant were further included in a binary logistic regression model to identify independent factors associated with recurrent pharyngitis and its academic impact. To ensure statistical validity, missing data were evaluated for patterns and addressed using complete-case analysis, as the proportion of missing values was minimal ($<5\%$) and assumed to be missing completely at random (MCAR). To control for potential confounding variables (such as age, gender, and socio-economic status), multivariate logistic regression was employed, adjusting for these covariates to isolate the independent associations of environmental and behavioural risk factors. Furthermore, to account for the multi-centre sampling design and ensure representativeness across the participating universities, sample weights were calculated and applied based on the relative student population sizes of each institution. Before logistic regression analysis, multicollinearity among independent variables was assessed using the Variance Inflation Factor (VIF). All VIF values were below 2.0, indicating no significant multicollinearity. Model fitness was evaluated using the Hosmer–Lemeshow goodness-of-fit test, which demonstrated

adequate model fit ($p > 0.05$). The assumptions of binary logistic regression, including independence of observations and absence of highly correlated predictors, were verified before model estimation. Results were presented in tables and graphical formats. Statistical significance was set at $p < 0.05$.

Ethical Considerations: Ethical approval for the study was obtained from Afe-Babalola University Research and Ethics Committee with protocol number: AMSH/REC/25/089. Participation was entirely voluntary, and informed consent was obtained electronically before data collection. Confidentiality and anonymity of respondents were strictly maintained throughout the study. Participants were informed of their right to withdraw at any stage without any consequences. Data were collected anonymously, and no personally identifiable information was obtained from participants. Survey responses were stored in password-protected electronic files accessible only to members of the research team. Data handling complied with institutional ethical requirements for confidentiality and secure storage.

Participants aged 16–17 years were considered mature minors within the educational setting and provided informed assent/consent electronically before participation, in accordance with the ethical approval granted by the Research Ethics Committee.

RESULTS

Table 1: Sociodemographic Profile ($n = 1230$)

Variable	Category	n (%)
Age	22–25 years	564 (45.9)
	18–21 years	410 (33.3)
	26 – 30 years	256 (20.8)
Gender	Male	615 (50.0)
	Female	615 (50.0)
Residence	Hostel	615 (50.0)
	Off-campus	564 (45.9)
	Other/Unspecified	51 (4.1)

Table 2: Risk Factors and Association with Pharyngitis

Variable	Yes (%)	χ^2	p-value
Dust exposure	45.9	18.42	<0.001
Use of air conditioning or electric fans	50.0	10.63	0.001
Shouting	58.4	22.15	<0.001
Secondhand smoke	25.1	6.78	0.009

χ^2 = Chi-square statistic; p -values < 0.05 are statistically significant.

Table 3: Factors Associated with Recurrent Pharyngitis (Logistic Regression)

Variable	OR	95% CI	p-value
Shouting	2.14	1.63–2.81	<0.001
Dust exposure	1.89	1.45–2.46	<0.001
Secondhand smoke	1.52	1.12–2.05	0.006
Use of air conditioning or electric fans	1.34	1.05–1.72	0.019

OR = Odds Ratio; CI = Confidence Interval; p -values < 0.05 are statistically significant.

Diagnostic evaluation of the logistic regression model showed no evidence of problematic multicollinearity among predictor variables (all VIF values < 2.0). The Hosmer–Lemeshow goodness-of-fit test indicated satisfactory model fit ($p > 0.05$), supporting the reliability of the model estimates.

Table 4: Academic Outcomes

Outcome	n (%)
Missed lectures	615 (50.0)
Reduced concentration	357 (29.0)
Academic decline	258 (21.0)

A total of 1,230 undergraduate students participated in this multi-centre study. The majority of respondents were aged 22–25 years (45.9%), followed by those aged 18–21 years (33.3%), with an equal gender distribution (50% male and 50% female). Approximately half of the participants resided in hostels (50.0%), while 45.9% lived off-campus and 4.1% in other accommodation types, as shown in Table 1.

The overall prevalence of recurrent pharyngitis within the past 12 months was 62.6% (769/1,230). Among affected students, 55% reported at least one episode per year, though recurrent cases had ≥ 2 episodes annually; 29.2% had 2–3 episodes, and a smaller proportion reported four or more episodes. Most episodes were mild to moderate in severity, with 50% lasting less than two days and 45% resolving within 3–5 days. Seasonal variation was observed, with symptoms most frequently reported during the harmattan period (34.8%).

The distribution of clinical symptoms is illustrated in Figure 1, which shows that throat pain was the most commonly reported symptom, followed by difficulty swallowing (dysphagia) and hoarseness. This pattern is consistent with typical presentations of pharyngeal inflammation.

Several environmental and behavioural risk factors were identified and analysed for association with recurrent pharyngitis. As presented in Table 2, frequent shouting was reported by 58.4% of respondents and showed a strong association with pharyngitis ($\chi^2 = 22.15$, $p < 0.001$). Similarly, exposure to dusty environments (45.9%) was significantly associated with the condition ($\chi^2 = 18.42$, $p < 0.001$). The use of air conditioning or fans (50.0%) also demonstrated a statistically significant relationship ($\chi^2 = 10.63$, $p = 0.001$). Exposure to second-hand smoke, reported by 25.1% of participants, was moderately associated with recurrent pharyngitis ($\chi^2 = 6.78$, $p = 0.009$).

Further analysis using binary logistic regression identified independent predictors of recurrent pharyngitis. As shown in Table 3, frequent shouting was the strongest predictor (OR = 2.14, 95% CI: 1.63–2.81, $p < 0.001$), followed by dust exposure (OR = 1.89, 95% CI: 1.45–2.46, $p < 0.001$). Exposure to second-hand smoke (OR = 1.52, 95% CI: 1.12–2.05, $p = 0.006$) and use of air conditioning or fans (OR = 1.34, 95% CI: 1.05–1.72, $p = 0.019$) were also identified as significant predictors.

Management practices among respondents revealed a high reliance on self-medication, with 42% reporting the use of over-the-counter drugs and home remedies. Hospital visits and specialist consultations were relatively low, indicating limited formal healthcare utilisation.

The academic impact of recurrent pharyngitis was substantial. As summarised in Table 4, 50% of students reported missing lectures due to illness, while 29% experienced reduced concentration and productivity. Additional effects included fatigue and increased stress levels. The distribution of these academic outcomes is depicted in Figure 2, where absenteeism represents the largest proportion of reported impacts.

Overall, the findings demonstrate a high prevalence of recurrent pharyngitis among Nigerian university students, with significant associations between environmental exposures, behavioural factors, and adverse academic outcomes.

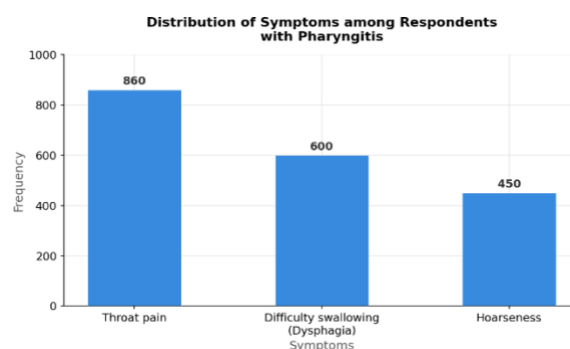


Figure 1: Throat pain is the dominant symptom at 860 cases, followed by dysphagia (600) and hoarseness (450).

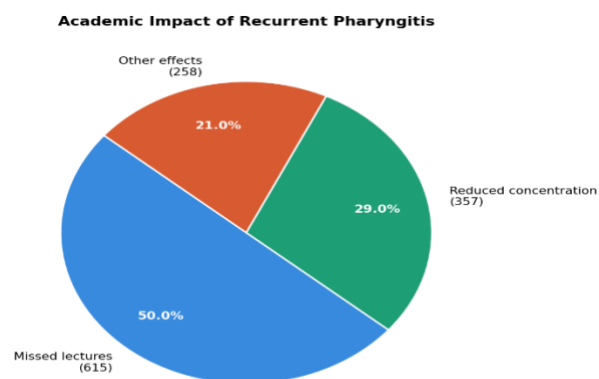


Figure 2: Missed lectures account for just over half of the academic impact (615 students), with reduced concentration at 357 and other effects like fatigue/stress at 258.

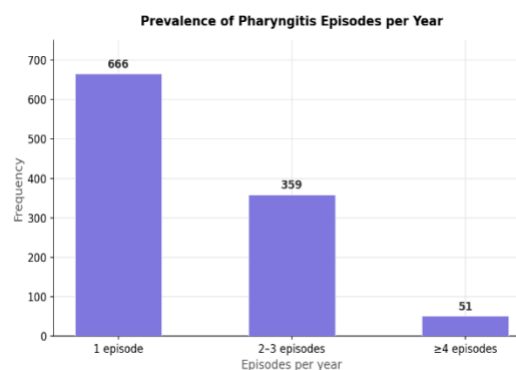


Figure 3: The majority of students experienced 1 episode per year ($n=666$), with 359 having 2–3 episodes, and only 205 reporting ≥ 4 episodes.

DISCUSSION

The prevalence of recurrent pharyngitis observed in this study (62.6%) indicates a substantial burden among Nigerian university students. This prevalence is higher than figures reported in several international studies of young adults and university populations, where prevalence estimates range between 30% and 50%, but remains within the broader range reported for upper respiratory tract infections among individuals living in communal settings. The finding highlights the considerable burden of recurrent pharyngeal symptoms among students in Nigeria.

Overcrowding, shared facilities, and limited ventilation in such settings are well-documented facilitators of respiratory pathogen transmission^{12,13,15}.

The clinical presentation, characterised predominantly by throat pain, dysphagia, and hoarseness (Figure 1), is consistent with established clinical patterns^{1,2}. While viral pathogens account for most cases, bacterial infections—particularly Group A Streptococcus—remain clinically significant due to potential complications like acute rheumatic fever and rheumatic heart disease 6–8. Seasonal variation was also evident, with a higher occurrence of symptoms during the dry, dusty harmattan period, which can irritate the mucosal lining of the upper respiratory tract and increase susceptibility to infection¹⁹.

The analysis of risk factors revealed several significant associations. Frequent shouting, reported by 58.4% of participants, emerged as the strongest predictor of recurrent pharyngitis (OR = 2.14, $p < 0.001$). This finding is biologically plausible, as excessive vocal strain can lead to microtrauma of the pharyngeal mucosa, increasing susceptibility to inflammation and infection. Previous studies have similarly identified vocal overuse as a contributing factor to throat irritation and related conditions¹⁴. The high prevalence of this behaviour among students may be linked to social activities, academic demands, and cultural communication patterns.

A critical finding is the widespread reliance on self-medication (42%), which is consistent with other low- and middle-income settings where barriers to healthcare access drive self-treatment²³⁻²⁵. This practice has serious implications, particularly regarding the misuse of antibiotics, which contributes to the development of antimicrobial resistance—a growing global health threat^{26,28}.

The academic impact of recurrent pharyngitis was substantial, with half of the respondents reporting missing lectures and 29% experiencing reduced concentration and productivity (Table 4, Figure 2). This aligns with research demonstrating a strong association between student health and academic performance^{29,30}. Illness-related absenteeism disrupts learning continuity, while symptoms such as pain and fatigue impair cognitive function and reduce academic engagement, potentially compounded by psychological stress and reduced quality of life³¹.

While the large sample size and multi-centre design enhance generalizability, several limitations must be acknowledged. The cross-sectional design precludes causal inferences, and reliance on self-reported data introduces potential recall and selection biases. The absence of laboratory confirmation limits the ability to distinguish between viral and bacterial etiologies.

In addition, the online nature of the survey may have resulted in selection bias, as participation was limited to students with internet access and willingness to respond. Potential non-response bias cannot be excluded, as students who declined participation may have differed systematically from respondents.

Despite these limitations, the findings have important public health and policy implications. To enhance practical relevance and impact, specific policy recommendations and implementation strategies are proposed:

1. Institutional Health Policies: University administrations should establish mandatory health guidelines that mandate regular maintenance of hostel ventilation systems and dust-control measures, particularly during the harmattan season.
2. Campus-Based Health Campaigns: Student affairs and health services should launch targeted peer-led education campaigns focusing on vocal hygiene (to address shouting), the risks of secondhand smoke, and the dangers of antibiotic self-medication.
3. Strengthened Campus Healthcare Access: Universities should implement 'express clinics' or mobile health booths during peak seasons (harmattan) to provide rapid, low-cost diagnostic screening (such as RADTs) and professional consultations, reducing the reliance on self-medication.
4. Academic Support Systems: Academic departments should develop flexible attendance and lecture-capture policies for students with documented recurrent illnesses to mitigate the academic impact of absenteeism.

CONCLUSION

In conclusion, recurrent pharyngitis is highly prevalent and is significantly associated with adverse academic outcomes among Nigerian university students. Due to the cross-sectional nature of this study, these findings indicate strong associations rather than direct causal relationships. The results highlight the significant link between environmental, behavioral, and healthcare-related factors and the occurrence of recurrent pharyngitis. Interventions aimed at improving awareness, promoting healthy behaviors, and enhancing access to appropriate healthcare services are critical for addressing the burden associated with this condition and supporting student well-being and academic outcomes.

RECOMMENDATIONS

There is a need for comprehensive health education programs within Nigerian universities to increase awareness about the causes, prevention, and proper management of recurrent pharyngitis among students. Such programs should emphasize the importance of personal hygiene, avoidance of environmental risk factors, and responsible health-seeking behavior. Additionally, improving hostel ventilation is essential to reduce overcrowding and minimize exposure to airborne irritants such as dust, which significantly contribute to the occurrence of pharyngitis. University authorities should also collaborate with health authorities to promote rational antibiotic use and curb the growing problem of antimicrobial resistance associated with self-medication. Furthermore, students should be encouraged to seek early medical consultation when symptoms arise, rather than relying solely on over-the-counter medications. Early diagnosis and appropriate treatment can help prevent complications, reduce recurrence, and minimize the negative impact on academic performance.

Declarations

Authors' contribution: SKA is the sole author and takes full responsibility for this work. He conceived and designed the study, developed the instruments, and led data collection in Malete, Moro LGA. He performed the statistical analyses, including chi-square and odds ratio calculations, and interpreted the findings. He drafted the manuscript, contributed clinical expertise, and critically revised it for important intellectual content. He

approved the final version and is accountable for the accuracy and integrity of the entire work.

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