UNIVERSITY OF DONGOLA
Faculty of Medicine & Health Sciences
Department of Community Medicine

RESEARCH PROPOSAL

Prevalence of Tonsillitis and Associated Factors among Students of Abdalla Ebn Abe Al-Sarh Primary School in Dongola City, Sudan, 2026

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1. INTRODUCTION

1.1. Background

Tonsillitis is inflammation of the palatine tonsils, usually as part of an acute pharyngotonsillar infection. It presents with sore throat, painful swallowing, fever, enlarged or erythematous tonsils, tonsillar exudate and tender cervical lymph nodes (1). Most episodes are viral, while group A Streptococcus (GAS) is the main bacterial cause in school-age children (1).

Global Evidence

The Infectious Diseases Society of America reports that GAS accounts for about 20–30% of acute pharyngitis in children (1). Carapetis et al. estimated that GAS causes more than 600 million cases of pharyngitis worldwide each year (2). Untreated GAS infection can lead to acute rheumatic fever and rheumatic heart disease, which caused an estimated 319,400 deaths globally in 2015, mostly in low-income settings (3).

Regional Evidence

In Nigeria, Onyeagwara et al. conducted a 3-month cross-sectional study among 564 boarding school students and reported sore throat in 89.2% of them. Among the 503 students with sore throat, signs of inflammation were found on examination in 76.9% (4).

Evidence from Sudan

In Sudan, Alrayah conducted a hospital-based study at secondary care hospitals in Rabak City among 297 patients with sore throat and reported chronic tonsillitis in 77 patients (25.9%) (5). Ahmed et al. clinically examined 132 students of a Khalwa (Quran boarding school) in Khartoum and found tonsillitis in 16% (6). Mustafa studied 100 children aged 5–15 years with suspected tonsillitis at Khartoum Teaching Hospital and isolated Streptococcus pyogenes from 32% of throat swabs (7). In Gezira State, Mahmoud studied the effect of tonsillitis on pre-school and basic school children and their mothers' knowledge, attitude and practice (8).

1.2. Operational Definitions

Tonsillitis: Sore throat or painful swallowing, either present or within the preceding 7 days (reported by the child or parent), together with tonsillar erythema or swelling, with or without exudate, on examination by the study physician on the day of data collection.

Probable group A streptococcal (GAS) tonsillitis: Tonsillitis with a modified Centor (McIsaac) score of ≥3 (9,10).

Recurrent tonsillitis: At least 7 episodes in one year, 5 episodes per year in two years, or 3 episodes per year in three years, as reported by the parent/guardian (11).

Household crowding: More than 3 persons per sleeping room.

Classroom ventilation: Rated good or poor by the research team using an observation checklist (number of open windows/vents and working fans).

1.3. Problem Statement

Tonsillitis is common among primary school children and can interfere with eating, sleep, school attendance and learning. Inadequately managed bacterial cases may lead to serious complications (1,3). Studies in Sudan were conducted among hospital patients or a boarding school sample (5–7), and a study in Nigeria reported a high frequency of sore throat among boarding students (4). To the best of our knowledge, no previous study has assessed the prevalence of tonsillitis and its associated factors among primary school students in Dongola City. Therefore, the prevalence of tonsillitis and its associated factors in this population remain unknown.

1.4. Justification

To the best of our knowledge, no previous study has assessed tonsillitis and its associated factors among primary school students in Dongola City. Therefore, this study is needed to provide useful local information about this problem and the factors associated with it. The findings may help determine the current situation at the school, support early referral of affected students and school health education, and may serve as a basis for future research in Dongola City.

1.5. Research Questions

1. What is the prevalence of tonsillitis among students of Abdalla Ebn Abe Al-Sarh Primary School, Dongola City?
2. What proportion of the students have a past history of tonsillitis or recurrent tonsillitis?
3. Which demographic, household, school-environment, and hygiene-related factors are associated with tonsillitis?
4. Is there an association between a past history of tonsillitis and current tonsillitis?

1.6. Hypothesis

Null hypothesis (H_0): There is no significant association between demographic, household, school-environment, or hygiene-related factors and tonsillitis among students of Abdalla Ebn Abe Al-Sarh Primary School, Dongola City.

Alternative hypothesis (H_1): There is a significant association between demographic, household, school-environment, or hygiene-related factors and tonsillitis among students of Abdalla Ebn Abe Al-Sarh Primary School, Dongola City.

1.7. Objectives

1.7.1. General Objective

To determine the prevalence of tonsillitis and its associated factors among students of Abdalla Ebn Abe Al-Sarh Primary School, Dongola City.

1.7.2. Specific Objectives

1. To estimate the prevalence of tonsillitis among students of Abdalla Ebn Abe Al-Sarh Primary School, Dongola City.
2. To determine the proportion of students with a past history of tonsillitis and with recurrent tonsillitis.
3. To determine the demographic, household, school-environment, and hygiene-related factors associated with tonsillitis among the students.
4. To determine the association between a past history of tonsillitis and current tonsillitis.

2. LITERATURE REVIEW

2.1. Global Evidence

The Infectious Diseases Society of America guideline states that most acute pharyngitis in children is viral, that GAS accounts for about 20–30% of cases in children, and that clinical findings alone cannot reliably distinguish viral from GAS infection (1). Carapetis et al. estimated more than 600 million cases of GAS pharyngitis worldwide each year, and noted a large burden of severe GAS disease (2). Watkins et al. reported that rheumatic heart disease, a late complication of untreated GAS infection, caused an estimated 319,400 deaths in 2015, with the highest burden in low-income countries (3).

Centor et al. described four clinical criteria (tonsillar exudate, tender anterior cervical lymph nodes, fever, and absence of cough) to estimate the probability of GAS pharyngitis (9). McIsaac et al. modified the score by adding age, which made it applicable to children (10).

2.2. Regional Evidence

Onyeagwara et al. studied 564 boarding school students in Benin City, Nigeria, and reported sore throat in 89.2%. Odynophagia (92.8%), cough (50.5%), and fever (36.4%) were the commonly reported symptoms among those with sore throat, and signs of inflammation were found in 76.9% of them on examination (4).

2.3. Sudan

Alrayah studied 297 patients with sore throat attending ENT clinics in Rabak City and reported chronic tonsillitis in 25.9%. The majority were male (67.5%), and the most affected age group was 11–20 years. The study was hospital-based and did not use culture or rapid antigen testing (5).

Ahmed et al. clinically examined 132 students of a Khalwa in Khartoum and found tonsillitis in 16%, with enlarged cervical lymph nodes in 8.3% (6).

Mustafa studied 100 children aged 5–15 years with suspected tonsillitis at Khartoum Teaching Hospital and isolated Streptococcus pyogenes from 32% of throat swabs (7).

Mahmoud studied the effect of tonsillitis on pre-school and basic school children and their mothers' knowledge, attitude and practice in Gezira State (8).

3. METHODOLOGY

3.1. Study Design

A school-based analytical cross-sectional study. The report will follow the STROBE statement for cross-sectional studies (12).

3.2. Study Setting

The study will be conducted at Abdalla Ebn Abe Al-Sarh Primary School, Dongola City, Northern State, Sudan.

3.3. Study Period

The study will be conducted over approximately six months (October 2026 to April 2027). Data collection will take about four weeks, and its exact dates and season will be recorded.

3.4. Study Population

The study population will consist of students enrolled at Abdalla Ebn Abe Al-Sarh Primary School during the study period.

Inclusion criteria:

- Students enrolled at the school during the study period.
- Students whose parents/guardians give written informed consent and who give assent.

Exclusion criteria:

- Students who are acutely ill with a severe condition requiring immediate medical care (they will be referred).
- Students who refuse to participate.

Students absent on the day of examination will not be excluded. They will be revisited up to two times, and the reason for absence will be recorded.

3.5. Sample Size Calculation

The sample size will be calculated using the following formula for a single population proportion with a finite population:

$$n = N \times Z^2 \times p \times q / [d^2 \times (N - 1) + Z^2 \times p \times q]$$

Where:

- n = required sample size
- N = total number of students enrolled in the school (from the school register)
- Z = 1.96 at 95% confidence level
- p = 0.16, the prevalence of tonsillitis among students in a Sudanese study (6)
- q = 1 − p = 0.84

- d = 0.05 margin of error

A 10% non-response rate will be added: Adjusted n = n / (1 – 0.10). The final sample size will be calculated once the exact enrolment (N) is obtained from the school administration. If the adjusted sample is more than about half of the enrolment, all students will be included.

3.6. Sampling Technique

Stratified random sampling will be used. A sampling frame will be prepared from the class registers, students will be stratified by grade, and the sample will be allocated to each grade in proportion to its number of students. Students within each grade will be selected by systematic random sampling.

3.7. Data Collection

Data will be collected using two paper-based tools. First, a structured questionnaire will be administered to each student through a face-to-face interview by the research team. It covers socio-demographic characteristics, past history of tonsillitis, household factors (household size, number of persons sharing the sleeping room, contact with persons with sore throat, indoor smoke exposure), and hygiene practices (handwashing, sharing cups/utensils, cough etiquette). Second, a standardized examination form will be completed by a qualified physician at the school, recording temperature, tonsillar findings, cervical lymph nodes, and the modified Centor (McIsaac) score. Classroom crowding and ventilation will be recorded once per class using an observation checklist. Examinations will be done in a private room with a teacher present. The questionnaire will be prepared in Arabic and pretested on a small number of students outside the study sample. Data collectors will be trained, and completed forms will be checked for completeness every day.

3.8. Data Management and Statistical Analysis

Data from the completed forms will be coded and entered into Microsoft Excel, with a random 10% of forms re-entered to check for errors, and then imported into SPSS version 26 for data cleaning and statistical analysis. Frequencies and percentages will be used for categorical variables, while means ± standard deviation or medians with interquartile ranges will be used for continuous variables, as appropriate. The prevalence of tonsillitis will be calculated with its 95% confidence interval. The Chi-square test will be used to assess associations between the independent variables and tonsillitis, and Fisher's exact test will be used when the assumptions of the Chi-square test are not met. Variables with a p-value <0.25 in the bivariate analysis will be entered into a multivariable logistic regression model, and adjusted odds ratios (AOR) with 95% confidence intervals will be reported. A p-value <0.05 will be considered statistically significant.

3.9. Ethical Considerations

Ethical approval will be obtained from the Department of Community Medicine, Faculty of Medicine & Health Sciences, University of Dongola, and permission will be obtained

from the Northern State Ministry of Health, the relevant education authority, and the administration of Abdalla Ebn Abe Al-Sarh Primary School. The study will follow international ethical guidelines for research involving children (13). Written informed consent will be obtained from parents/guardians after explaining the purpose, procedures, risks, and benefits of the study, and verbal assent will be obtained from each student. Participation will be entirely voluntary, and students may withdraw at any time without any effect on their schooling. Confidentiality will be strictly maintained: paper forms will be kept in a locked place and electronic data in password-protected files, using unique identification codes instead of student names. Students with concerning findings will be referred to a health facility, and no treatment will be given by the research team.

3.10. Study Limitations

The study is limited to one school, so the findings cannot be generalized to all primary schools in Dongola City. Point prevalence may vary with the season of data collection. Clinical diagnosis cannot distinguish viral from bacterial tonsillitis, and parent-reported history may be affected by recall bias. The cross-sectional design cannot establish causality.

3.11. Research Plan

The study will proceed through the following stages: (1) finalization and departmental approval of the proposal; (2) securing ethical clearance and administrative permission from the Northern State authorities and the school; (3) preparing the questionnaire and examination form and pretesting them on a small number of students outside the study sample, with tool refinement as needed; (4) training of data collectors; (5) recruitment of students, collection of informed consent, and data collection through parent interviews and physician examination; (6) data cleaning, coding, and entry verification; (7) statistical analysis in SPSS; (8) writing of results, discussion, and the final report; and (9) presentation of findings at the departmental research seminar and defense.

4. TIMELINE

Activity	Oct 26	Nov 26	Dec 26	Jan 27	Feb 27	Mar 27	Apr 27
Literature review & proposal finalization							
Ethical & administrative approvals							
Tool preparation & pretesting							
Data collection							
Data entry & cleaning							
Data analysis							
Writing results & final report							
Submission to the Department							
Research defense							

RESEARCH PROJECT BUDGET

#	Item Description	Quantity	Unit Cost (SDG)	Total Cost (SDG)
1	Printing and photocopying (consent forms, questionnaires, examination forms)	1,500 pages	50	75,000
2	Transportation (Field visits to the school)	20 trips	5,000	100,000
3	Stationery	Lump sum	—	30,000
4	Clinical consumables (tongue depressors, gloves, masks, thermometer)	Lump sum	—	120,000
5	Data Analysis (SPSS processing & export)	Lump sum	—	300,000
6	Miscellaneous / Contingency (10%)	Lump sum	—	62,500
	Total Estimated Budget			687,500 SDG

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