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Research Article

Bacteriology of Tonsillitis among Children Attending Ear, Nose and Throat Department of Ekiti State University Teaching Hospital, Nigeria

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ABSTRACT

Background: Tonsillitis is a poorly identified cause of fever in children. This study aimed at determining te sociodemographic features, clinical features and bacteriology of tonsillitis in children in a teaching hospital. **Materials and Methods:** This was an hospital based, descriptive cross-sectional study of children with tonsillitis in our department. Data was collected using pretested interviewers assisted questionnaires and tonsillar swab microscopy, culture and antimicrobial sensitivity tests. Obtained data were collated and analyzed using SPSS version 18.0.

Results: The peak age prevalence was 38.4% at preschool age group. There were 60.7% males with male to female ratio of 1.5:1. Children with family history of tonsillitis were 66.1%. Commonest types of tonsillitis were 57.1% recurrent tonsillitis. Main sources patient referral was 37.5% pediatrician. Majority 83.9% of the patients were seen in ear, nose and throat outpatient clinic. Common clinical presentation among children was fever, catarrh and sore throat in 83.9%, 64.3% and 60.7% respectively. Frequent clinical findings were 82.1% enlarged tonsils and 77.7% exudates on the tonsils. Bacteria growth was isolated from 66.1% patients. Multiple growths were isolated from 17.0%. Common isolated bacteria were 32.1% Staphyloccocus aureus and 25.9% Streptococcus species. Streptococcus species and Staphylococcus aureus showed 100% sensitivity to Cefuroxime, Gentamicin, Azithromycin, Ceftazidine and Amoxicillin. Commonest prehospital medication was analgesics 94.6% and antimalaria 91.1%.

Conclusion: Tonsillitis was prevalent in preschool age with higher family history of tonsillitis. Higher rate of recurrent tonsillitis with inappropriate prehospital medication. Main offending bacteria were Staphylococcus aureus and Streptococcus species sensitivity to Cefuroxime, Gentamicin, Azithromycin, Ceftazidine and Amoxicillin.

INTRODUCTION

Tonsillitis is the inflammation of the palatine tonsils and most often occurs in children [1]. The inflammatory disorder may be reactive or infective. Infection of the tonsils may be secondary to viral, bacterial or fungal [2-4]. The most common causes of tonsillitis are viral infection while second most common causes of tonsillitis is aerobic and anaerobic bacterial infection [1]. Though tuberculous infection of the tonsils is not uncommon in clinical and otorhinolaryngology, head and neck practices. Tonsillitis is usually contagious and spread from person to person via contact with secretion from mouth and throat infected individual [5,6]. The tonsils is strategically located in the oropharynx and prone to foreign body from the nose and mouth descending to lower

aero digestive tract [7,8]. Tonsils are lymphoid tissue form Waldeyal's ring plays an important role in antigen presentation and processing [9,10]. They are inductive sites for humoral as well as cell-mediated immune responses. They also produce antibodies and B cells which help in the immune system to protect the body from infections that may enter the mouth or nose.

Tonsillitis is common infective diseases usually present to family physician or emergency room doctor. Presentation occurs throughout the year but peak during cold weather. Viral tonsillitis is more common in younger children [11]. Bacteria tonsillitis commonly occurs in children aged 5-15 years [11]. Bacterial tonsillitis are of pathologic significance due to associated complication like rheumatic fever, rheumatic heart disease and glomerulonephritis from group A hemolytic Streptococcus (GABHS) infection. Bacterial tonsillitis is 15% to 30% among children with sore throat while it is 5% to 15% of adults with sore throat [12].

Clinical features of tonsillitis includes sore throat, odynophagia, fever, tender enlarged neck lymph node, headache, tiredness, chills,malaise, red swollen tonsils, white pus -filled spots on the tonsils [13,14]. Other presentation includes halitosis, trismus, nausea, vomiting, stomach ache, coughing, hoarseness, anorexia, fatigue and anxiety/fear of choking [15,16]. There is paucity of literature on bacteriology of tonsillitis in Ekiti, South western, Nigeria. Despite tonsillitis causes significant morbidity and absenteeism from school or work. Early treatment of tonsillitis will prevent complication such as rheumatic fever [17]. It is therefore important to evaluate the pattern of bacterial tonsillitis in any community and their susceptibility to various antibiotics therapy. This will facilitate formulation of empirical antibiotic therapy in low income countries clinical setting which are associated with poor microbiological investigation facilities and late patient presentation to the hospital. This study will also greatly assist in development of evidence based management of tonsillitis in low income countries. This study aimed at determining the sociodemographic features, clinical features and bacteriology of tonsillitis in children in our tertiary center.

MATERIALS AND METHODS

This was a hospital based, descriptive cross-sectional study of children aged less than18 years with diagnosis of tonsillitis seen and treated in ear nose and throat department of Ekiti state university teaching hospital. The study was carried out over a period of one year (between October 2018 and September 2019. Inclusion criteria: All children that were seen, diagnosed, treated and consented to participate in the study. Exclusion criteria: All children who rejected participation in the study. All adult with tonsillitis. All consecutive consented children were enrolled into the study. Data was collected from the patient, parent or guardian using pretested interviewers assisted questionnaires. All children with tonsillitis had palatine tonsillar swab aseptically taken with sterile cotton wool swab stick. The specimen was immediately sent to microbiology laboratory for culture, microscopy and antimicrobial sensitivity/resistant tests in the center. This is to determine offending bacterial type and antimicrobial susceptibility. Specimens were cultured on different culture media, mainly MacConkey agar, blood agar and nutrient agar. Where there were growth, the bacterial were identified by the unique colonial morphology, haemolysis on blood agar, changes in physical appearance of the different culture media, their enzyme activities and Gram staining observation.

Subsequently, antimicrobial tests were performed on the colonies to characterize the antimicrobial susceptibility pattern of offending isolated bacterial. This was done by Disk Diffusion method where a small portion of the test bacteria was streaked on Mueller-Hinton agar plate using a sterile wire loop. Obtained data were collated and analyzed using SPSS version 18.0. Analyzed data were expressed using descriptive statistic inform of frequency table, percentage, bar chart and pie chart. Ethical clearance for study was sought for and obtained from ethical committee of the hospital. Informed consent was obtained from patient, parent or guardian.

RESULTS

All the studied children age group were represented with peak age value of 43 (38.4%) at preschool age (1-5)years group and least age value of 12 (10.7%) at extreme age group of 16-18 years as in (Table 1). On gender, there were 68 (60.7%) males and 44 (39.3%) females with male to female ratio of 1.5:1. Rural dwellers in 63 (56.3%) was commoner than urban dwellers in 49 (43.8%). Christian faith accounted for 101 (90.2%) while Muslim faith accounted for 11 (9.8%). Commonest parents education level was 41 (36.6%) secondary

followed by 29 (25.9%) primary and 28 (25.0%) post secondary. On parent occupation status, majority 31 (27.7%) were students/apprentice followed by 23 (20.5%) artisan and 22 (19.6%) business. Children with family history of tonsillitis were commoner than family without tonsillitis in 74 (66.1%) and 38 (33.9%) respectively in (Table 2).

Table 1: Age group distribution of the patients.

Age (years)	Number	Percentage (%)
1-5	43	38.4
6-10	36	32.1
11-15	21	18.8
16-18	12	10.7
	112	100.0

Table 2: Sociodemographic features of the patients.

Sociodemographic features	Number	Percentage (%)
Sex		
Male	68	60.7
Female	44	39.3
Dwelling		
Rural	63	56.3
Urban	49	43.8
Religion		
Christian	101	90.2
Muslim	11	9.8
Parent Education level		
Nil formal	14	12.5
Primary	29	25.9
Secondary	41	36.6
Post secondary	28	25.0
Parent Occupation		
Students/apprentice	31	27.7
Business	22	19.6
Artisan	23	20.5
Civil servant	21	18.8
Farming	15	13.4
Family history of tonsillitis		
Present	74	66.1
Absent	38	33.9

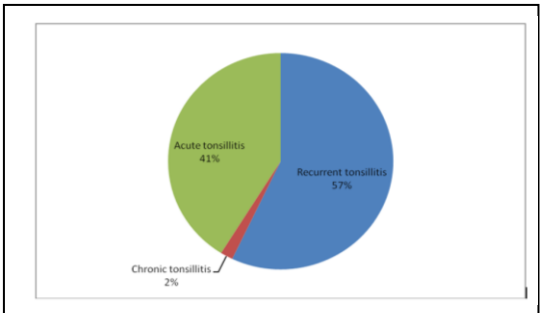

Figure 1: Types of tonsillitis among patients.

Commonest types of tonsillitis in this study were 64 (57.1%) recurrent tonsillitis. Others were 46 (41.1%) acute tonsillitis and2 (1.8%) chronic tonsillitis in (Figure 1). Main sources of patient referral were from 42 (37.5%) paediatrician, 34 (30.4%) family physician and 23 (20.5%) casualty officer in (Figure 2). In this study, emergency presentation of tonsillitis were less common. Majority 94 (83.9%) of the patients were seen in ear, nose and throat outpatient clinic. Patient seen in emergency ward and hospital ward accounted for 17 (15.2%) and 1 (0.9%) respectively in (Figure 3).

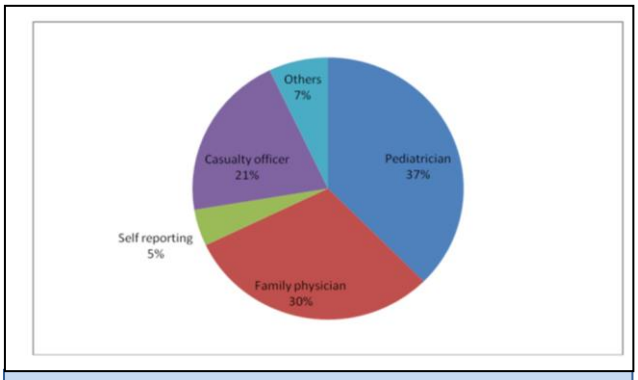

Figure 2: Sources of referral among patients.

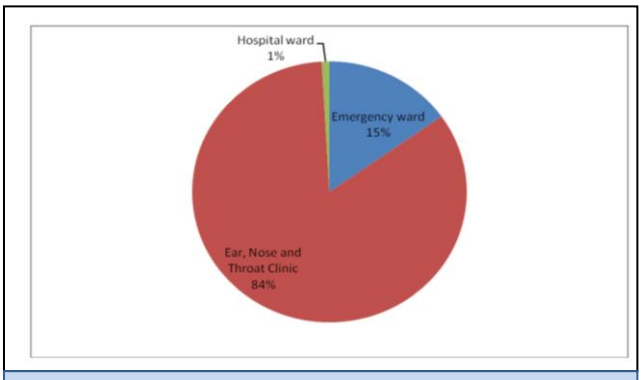

Figure 3: Pattern of presentation among patients.

Common clinical presentation among children with tonsillitis were fever, catarrh, sore throat and odynophagia in 94 (83.9%), 72 (64.3%), 68 (60.7%) and 47 (42.0%) respectively. Frequent clinical findings on examination were 92 (82.1%) enlarged tonsils, 87 (77.7%) exudate on the tonsils and 86 (76.8%) neck pain/cervical lymphadenopathy in (Table 3). Tonsils swab was taken from all patients. No bacteria growth was isolated from 38 (33.9%) tonsils swab while bacteria growth was isolated from 74 (66.1%) patients. Multiple growth was isolated from 19 (17.0%). The isolates were from 43 (38.4%) males and 31 (27.7%) females with male to female ratio of 1.4:1. Common isolated bacteria were 36 (32.1%) Staphyloccocusaureus, 29 (25.9%) Streptococcus

species, 11 (9.8%) Klebsiella species and 7 (6.3%) Proteus species in (Table 4). In this study, Streptococcus species and Staphylococcus aureus from the different tonsils swabs showed 100% sensitivity to Cefuroxime, Gentamicin, Azithromycin, Ceftazidine and Amoxicillin while Staphylococcus aureus further had 100% sensitivity to Streptomycin. Both showed some sensitivity to Ampicillin Cephalexin, Floxapen, and Co-trimoxazole with detailed in (Table 5). In this study, commonest prehospital medication was analgesics in 106 (94.6%). Other medication was 102 (91.1%) antimalaria and 88 (78.6%) herbs in (Figure 4).

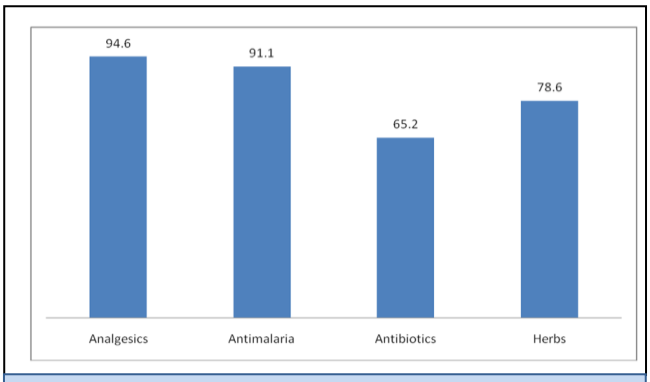

Figure 4: Pre-hospital medication among patients.

Table 3: Clinical features among patients.

Clinical features	Number	Percentage (%)
Sore throat	68	60.7
Otalgia	32	28.6
Neck pain/cervical lymphadenopathy	86	76.8
Trismus	6	5.4
Odynophagia	47	42.0
Dysphagia/Loss of appetite	34	30.4
Difficulty breathing	13	11.6
Catarrh	72	64.3
Enlarged tonsils	92	82.1
Halitosis	12	10.7
Fever	94	83.9
Exudate	87	77.7

Table 4: Microscopic of cultured organisms among patients.

Microscopic, culture and sensitivity	Number	Percentage (%)
Streptococcus species	29	25.9
Staphylococcus Species	36	32.1
Klebsiella species	11	9.8
Proteus species	7	6.3
Escherichia coli	4	3.6
Pseudomonas aeroginosa	6	5.4
No growth	38	33.9

Table 5: Antibiotic sensitivity among the patients.

Sensitivity	Strept. species n (%)	Staphyl. aureus n (%)	Klebsiella species n (%)	Proteus species n (%)	Escherichia coli n (%)	Pseud. aeroginosa n (%)
Cefuroxime Gentamicin	29(100) 29(100)	36(100) 36(100)	11(100) 9(81.8)	7(100) 7(100)	3(75.0) 4(100)	6(100) 6(100)
Azithromycin Ceftazidine	29(100) 29(100)	36(100) 36(100)	11(100) 10(90.9)	6(85.7) 4(57.1)	0(0) 0(0)	6100) 6(100)
Amoxicillin Streptomycin	29(100) 21(72.4)	36(100) 36(100)	7(63.6) 4(36.4)	5(71.4) 5(71.4	2(50.0) 4(100)	0(0) 4(66.7)
Ampicillin Cephalexin	21(72.4) 21(72.4)	31(86.1) 31(86.1)	6(50.0) 6(54.5)	3(42.9) 4(57.1)	0(0) 0(0)	4(66.7) 3(50.0)
Floxapen Cotrimoxazole	18(62.1) 3(10.3)	29(80.5) 15(41.7)	11(100) 0(0)	3(42.9) 4(57.1)	0(0) 0(0)	3(50.0) 0(0)

DISCUSSION

Based on the sociodemographic features, preschool predominate over other age group. This may be due to low and immature immunity in this age group. Further to this, most of these children are in nursing home with contact with other children with upper respiratory tract infection. Most of the children in this study has comorbid rhinitis. This concur with studies done elsewhere with high predominant tonsillitis in children particularly under 5 years [18,19]. Tonsillitis in male predominate tonsillitis in female in this study. This may be because male children are more active and busy exploring their environment leading to higher risk of injuries and infection. Similar findings was reported in previous studies [3,20]. Tonsillitis was reported to be commoner in female than male in studies done in other center [21,22]. Majority of our children with tonsillitis were urban dweller. This is because of location of the center in the state capital, accessibility, affordability and sociocultural practices [23]. Tonsillitis is commoner in family of children with tonsillitis in this study. This affects the siblings much more than the parents also higher mother affectation than father. This is more likely be due to level of family tie and proximity. Sharing of household such as utensils is important in disease contact. Research work done in other centers concur with this result [24,25]. Pattern and findings of tonsillitis on parent education and parent occupation also depends level of parental education and socioeconomic status.

In this study majority of the patients were diagnosed with recurrent tonsillitis. Recurrent disorder because of self medication, wrong management and believe that sore throat is

a self limiting diseases. Acute tonsillitis presentation when occurred it is because of severe first episode with sudden drooling of saliva and affectation appetite/feeding. Failure to self effort and non specialist care were leading cause of patient to referral in this study. Some patients are usually commenced on some treatment to stabilize acute toxic state. These patients are either discharge home or referred to ear, nose and throat outpatient clinic. Only few emergency cases with complicated tonsillitis are referred for emergency otorhinolaryngologist intervention in this study.

Main clinical presentation in this study was fever and sore throat/refusal of food. Unfortunately children do not complain of sore throat. Many of the patients were initially wrong diagnosed and treated as a case of either Malaria or Typhoid fever with antimalaria and antibiotics due to Malaria endemic zone. Unfortunately, majority of the primary health care officer do not consider tonsillitis as one of their differential in their diagnosis of fever. Clinical examination of the oropharynx revealed enlarged inflammation tonsils which are often omitted. This finding is contrary to report from other studies [25,26].

In this study, the most common bacterial isolates were Staphylococcus aureus and Streptococcus species. These are followed by Klebsiella species, Proteus species, Pseudomonas aureginosa and E.Coli. This findings is similar to report from previous studies [22,27]. There was no isolated bacteria in few cases and this may be as a result of self medication and wrong diagnosis with inappropriate prehospital treatment with antibiotics. Similar report was documented in studies elsewhere [22,27]. These main isolated bacteria, staphylococcus aureus and streptococcus species were fully sensitive to Cefuroxime, Gentamicin, Azithromycin, Ceftazidine and Amoxicillin while Staphylococcus aureus further had full sensitivity to Streptomycin. These findings concur with study in another center [1]. All the bacteria isolate were resistant to Ampicillin, Cephalexin, Floxapen and Cotrimoxazole. This resistance may be secondary to indiscriminate and abuse of these antibiotics. Similar report was recorded by study done elsewhere [1].

Most of the children were given some treatment prior to presentation for specialist care in this study without cure. This is most likely due to wrong diagnosis as malaria with unavoidably inappropriate antimalaria therapy. Some other treatment included herbs, antibiotics and analgesics. The antibiotics may be in suboptimal dose with resultant common antibiotics resistance that was recorded in this study.

CONCLUSION

Tonsillitis is a childhood diseases, prevalent in preschool age with higher family history of tonsillitis.There is high rate of recurrent tonsillitis with inappropriate prehospital medication. Main offending bacteria were Staphylococcus aureus and Streptococcus species sensitivity to Cefuroxime, Gentamicin, Azithromycin, Ceftazidine and Amoxicillin. High resistance to common antibiotics occurred from antibiotics abuse. Tonsillitis should be a differential of fever and throat must be examined in patient.

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COMPETING INTERESTS

All the authors declare that there was no competing interests.

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