

A Clinical and Demographic Profile of Tonsillitis Patients during the COVID-19 Pandemic

Meena Maruti Ohal¹, Sattien Arun Maran²

¹Associate Professor, Department of ENT, Department of ENT, ANIIMS, Port Blair

²Senior Resident, Department of ENT, ANIIMS, Port Blair

Received: 29-12-2022 / Revised: 29-01-2023 / Accepted: 20-02-2023

Corresponding author: Dr Meena Maruti Ohal

Conflict of interest: Nil

Abstract

Background: Tonsillitis is a common public health problem seen by otorhinolaryngology surgeons. It has socio-occupational and economic impact. Most of the tonsillitis is treated by antibiotic but some can lead to life threatening complication if not treated on time and not diagnosed the impending complication.

Aim and Objectives: The objective of this work was to study the epidemiological and complications profile of acute and chronic tonsillitis and their distribution, followed by final outcome of the treatment adopted in a tertiary care Hospital, Portblair, ENT Department.

Materials and Methods: This is a retrospective study over a 12-month period from September 2020 to Aug 2021 including 225 patients who presented with tonsillitis and/or their complications were analysed. Their demography, clinical findings, types of tonsillitis, month wise distribution of types of disease and final outcome after medical treatment was analyzed.

Results: Two hundred and twenty five (225) patients were studied. The mean \pm SD of cases studied was 23.32 ± 12.98 years with minimum – maximum age range was 02 – 60 years. In this study there were 92/225 (40.9%) males and 133/225 (59.1%) females with a male to female ratio of 1:1.44. 76.88% of the patients showed a good outcome, 14.22% showed a moderate outcome, 07.55% showed an average outcome and 00.88% showed poor outcome. 19/ 225 (08.44%) of the patients who showed poor and average response were advised tonsillectomy after the COVID-19 pandemic in this study.

Conclusions: Chronic Tonsillitis was a common throat disorder observed during COVID-19 pandemic. Males were more commonly affected. The increased attendance of patient's throat complaints was high due to awareness and similarity of symptoms of tonsillitis and COVID-19 disease. Low socio economic groups were more affected. The common types of tonsillitis were parenchymatous type, follicular type. Complications due to acute infection frequently observed were peritonsillar abscess, neck abscess. Medical treatment with Amoxycillin and clavulanic acid combination was highly responsive with 76.88% responding well.

Keywords: Tonsillitis, Chronic Inflammatory Diseases, Abscess, Recurrence and Tonsillectomy.

This is an Open Access article that uses a funding model which does not charge readers or their institutions for access and distributed under the terms of the Creative Commons Attribution License (<http://creativecommons.org/licenses/by/4.0>) and the Budapest Open Access Initiative (<http://www.budapestopenaccessinitiative.org/read>), which permit unrestricted use, distribution, and reproduction in any medium, provided original work is properly credited.

Introduction

Chronic Tonsillitis is defined as a long-standing inflammatory disease of the Tonsil

caused by viral, bacterial and fungal infections [1]. When such an inflammatory

disease occurs several times in a specified time, it was called as recurrent tonsillitis [2]. Both chronic and recurrent tonsillitis have a significant impact on a patient's quality of life due to its morbidity [3]. Though it affects all age groups, in children it causes loss of school days resulting in delayed learning capabilities [4]. Chronic and recurrent Tonsillitis are treated empirically with antibiotics, but they provide only a temporary relief and the inflammatory process is triggered once again due to change in normal flora or exposure to extremes of cold oral consumables [5]. Every time the cause of recurrent Tonsillitis cannot be identified because of the nature of these organisms to develop biofilms in the wet and warm folds of the tonsils dodging the true identity [6]. This review discusses different treatment modalities, their advantages and disadvantages, and new treatment options focusing on biofilms. All treatment options should be selected based on evidence and individual need. Children aged below 2 years are seldom affected with chronic tonsillitis especially due to bacterial origin [7]. But children aged between 05 and 15 frequently develop Tonsillitis due to *Streptococcus* bacteria unlike younger children who are affected by viral etiology [8]. The prevalence of Chronic Tonsillitis in school attending children was reported as 17.82% in India [9]. Chronic Tonsillitis is usually classified as Follicular, Membranous and Atrophic varieties similar to its acute form [10]. In Membranous tonsillitis following infection the exudation from the crypts coalesces to form a membrane over the tonsillar surface [11]. The causes could be due to pneumococcal infection or *Corynebacterium diphtheriae* [12]. The common symptoms encountered are sore throat, swelling of the tonsils, odynophagia, headache, tiredness, chills, fever, cough, tender lymph nodes in the neck and otalgia. The less common symptoms observed were nausea, stomach

ache, vomiting, furry tongue, bad breath, and change in voice and difficulty in opening of mouth [13]. Tonsil contains lymphatic tissue follicles in its structure which helps in the production of immunoglobulins and development of both B-cell and T-cell lymphocytes. As the palatine tonsils contain crypts which help in sampling of the antigens from the food and liquids swallowed, also harbours microorganism for antigen sampling. Hence are more prone to any infection of the tonsils as there is involvement of these components [14]. The present study was conducted to study the epidemiological factors and complications profile of tonsillitis and their distribution in a tertiary care Hospital, Portblair, ENT Department.

Type of study: A cross sectional analytical study.

Study period: Aug 2020 to Sep 2021.

Place of study: Study was done in the department of ENT, ANIIMS, Portblair.

Materials

A cross sectional study was conducted and 225 patients with clinical symptoms and signs of Acute and Chronic Tonsillitis, attending the department of ENT, a tertiary care Hospital, Portblair were included with an aim to study the epidemiological and complications profile of tonsillitis and their distribution. An Institutional ethics committee clearance was obtained. The data from OPD and IPD Charts were studied. Demographic details of the all the patients was collected.

Inclusion criteria: Patients aged between 02 and 60 years were included. Patients with symptoms and signs of acute and chronic tonsillitis were included. Patients of both genders were included. Patients with all types of acute and chronic tonsillitis were included. Patients willing to undergo treatment as per the Hospital protocol were included.

Exclusion criteria: Patients below 02 years and above 60 years were excluded. Patients not willing to participate and not accepting the treatment protocol of the Hospital were excluded. Patients with dysphagia other than due to tonsillitis and neck abscess due to dental caries, trauma were excluded. Patients Clinical symptoms and signs were noted such as sore throat, swelling of the tonsils, odynophagia, headache, tiredness, chills, fever, cough, tender lymph nodes in the neck and otalgia. The less common symptoms observed were nausea, stomach ache, vomiting, furry tongue, bad breath, and change in voice and difficulty in opening of mouth. Signs noted were, peritonsoillitis, Positive squeeze test for pus or cheesy material oozing out of the crypts of the tonsil, tender jugulo-digastrics lymph nodes. The incidences of different types of tonsillitis and complications of tonsillitis were noted month.

Treatment Patients were treated with empirical antibiotics to start with followed by specific antibiotics based on the culture sensitivity reports of the throat swabs. Oral Amoxicillin with clavulanic acid 650 mgs was used in adults and proportionate doses in the other age groups in combination with non-steroidal anti-inflammatory drugs (NSAIDS) to control pain and fever and all patient were advised betadine gargling. The clinical response was note and graded as Good: more than 80% recovery from symptoms and signs. Moderate response: 50% to 80% recovery. Average: 30% to 50% recovery of the symptoms and signs. Poor: less than 30% or no response. Patients suffering with more than 5 attacks of acute

over chronic tonsillitis, positive squeeze test, enlarged tender jugulo-digastric lymph nodes, were advised Tonsillectomy under General Anesthesia after the COVID-19 pandemic. All the patients were assessed for persistence of symptoms and signs 3 months after the treatment protocol followed in the Hospital.

Statistical Data Analysis

The data on categorical variables is shown as n (% of cases) and the data on continuous variables is presented as Mean and Standard deviation (SD). The inter-group statistical comparison of distribution of categorical variables is done using Chi-Square test or Fisher's exact probability test if more than 20% cells have expected frequency less than 5. In the entire study, the p-values less than 0.05 are considered to be statistically significant. All the hypotheses were formulated using two tailed alternatives against each null hypothesis (hypothesis of no difference). The entire data is statistically analyzed using Statistical Package for Social Sciences (SPSS version 24.0, IBM Corporation, USA) for MS Windows.

Results

Out of 225 cases studied, majority of cases had their age between 18 – 29 years (77 cases, 34.2%), 46 cases (20.4%) had age between 2 – 10 years, 37 cases (16.4%) had age between 11 – 17 years, 39 cases (17.3%) had age between 30 – 39 years, 16 cases (7.1%) had age between 40 – 49 years and only 10 cases (4.4%) had age between 50 – 60 years. The mean \pm SD of cases studied was 23.32 \pm 12.98 years with minimum – maximum age range was 02 – 60 years. (Table 1 and Fig 1)

Table 1: Shows the incidence of age among the subjects (n-225).

Age group (years)	No. of cases	% of cases
2 – 10	46	20.4
11 – 17	37	16.4
18 – 29	77	34.2
30 – 39	39	17.3

40 – 49	16	7.1
50 – 60	10	4.4
Total	225	100.0

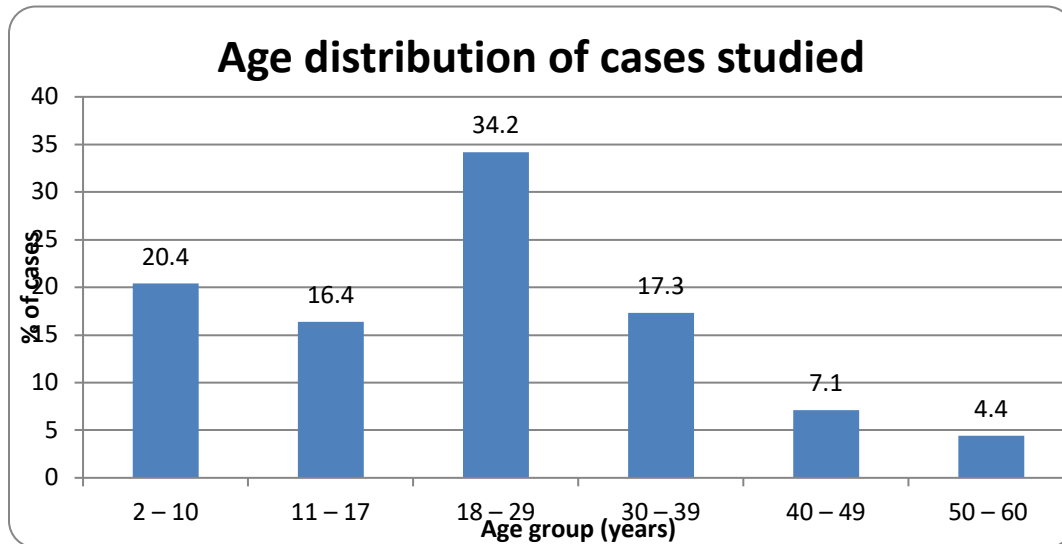


Figure 1: Shows the incidence of age among the subjects (n-225).

In this study there were 92/225 (40.9%) males and 133/225 (59.1%) females with a male to female ratio of 1:1.44. (Table 2 and Fig 2)

Table 2: Showing the gender incidence of the study (n-225).

Sex	No. of cases	% of cases
Male	92	40.9
Female	133	59.1
Total	225	100.0

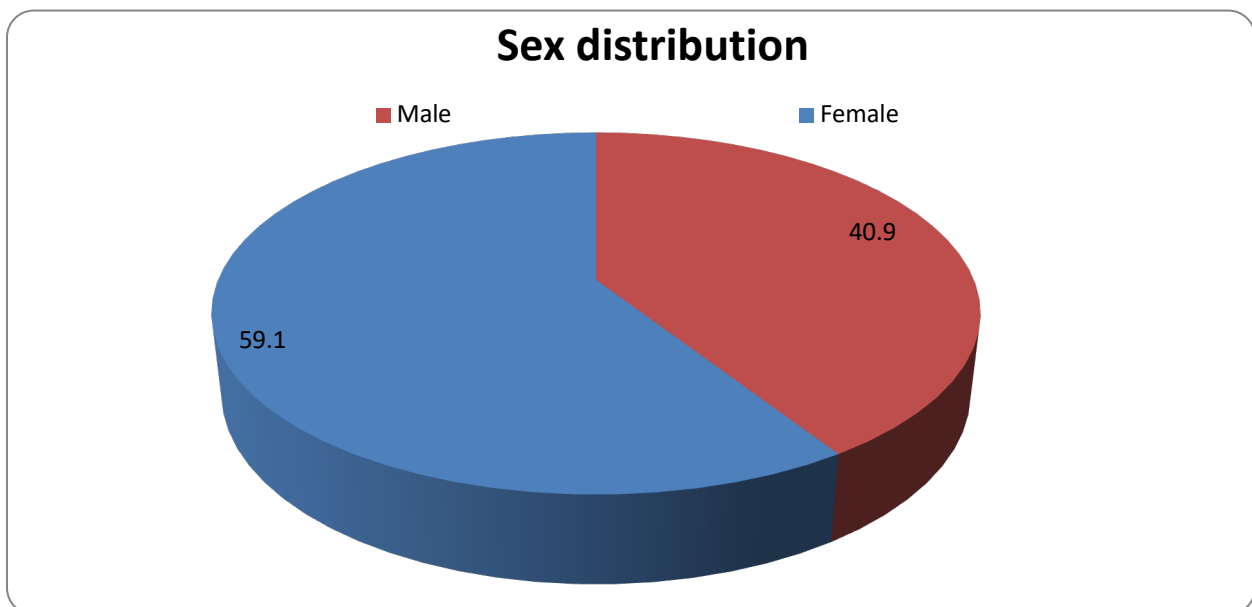


Figure 2: Shows the gender incidence in the study (n-225).

In this study 157 (69.77%) patients belonged to low socio-economic group, 41 (18.22%) belonged to middle income group and the remaining 27 (12%) belonged to high income group (Fig 3).

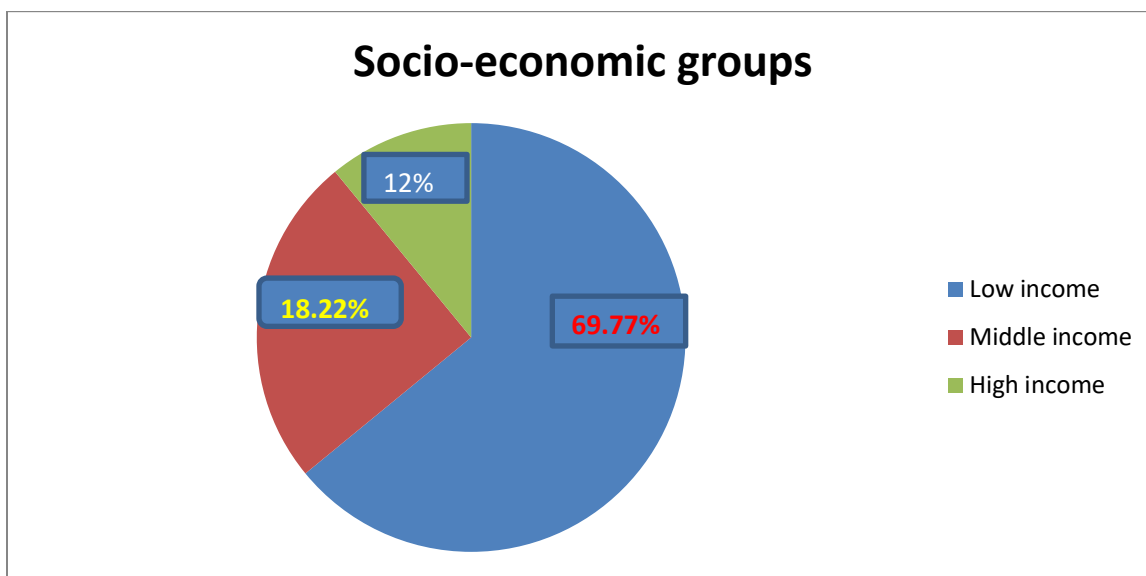


Figure 3: Showing the pie chart of socio economic groups of the study subjects (n-225).

A month wise number of patients with Chronic Tonsillitis registered in the department of ENT were tabulated in the Table 3. Number of patients were in the order of decreasing incidence were noted in August 2021 as 31/225 (13.8%), November 2020 as 30/225 (13.3%), December 2020 as 30/225 (13.3%) and March 2021 as 23/225 (10.2%). In the other months also the incidence was noted in the Table 3.

Table 3: Shows the Month wise frequency of cases studied (n-225).

Month	No. of cases	% of cases
September 2020	11	04.9
October 2020	12	05.3
November 2020	30	13.3
December 2020	30	13.3
January 2021	15	06.7
February 2021	21	09.3
March 2021	27	12.0
April 2021	23	10.2
May 2021	7	03.1
June 2021	7	03.1
July 2021	11	04.9
August 2021	31	13.8
Total	225	100.0

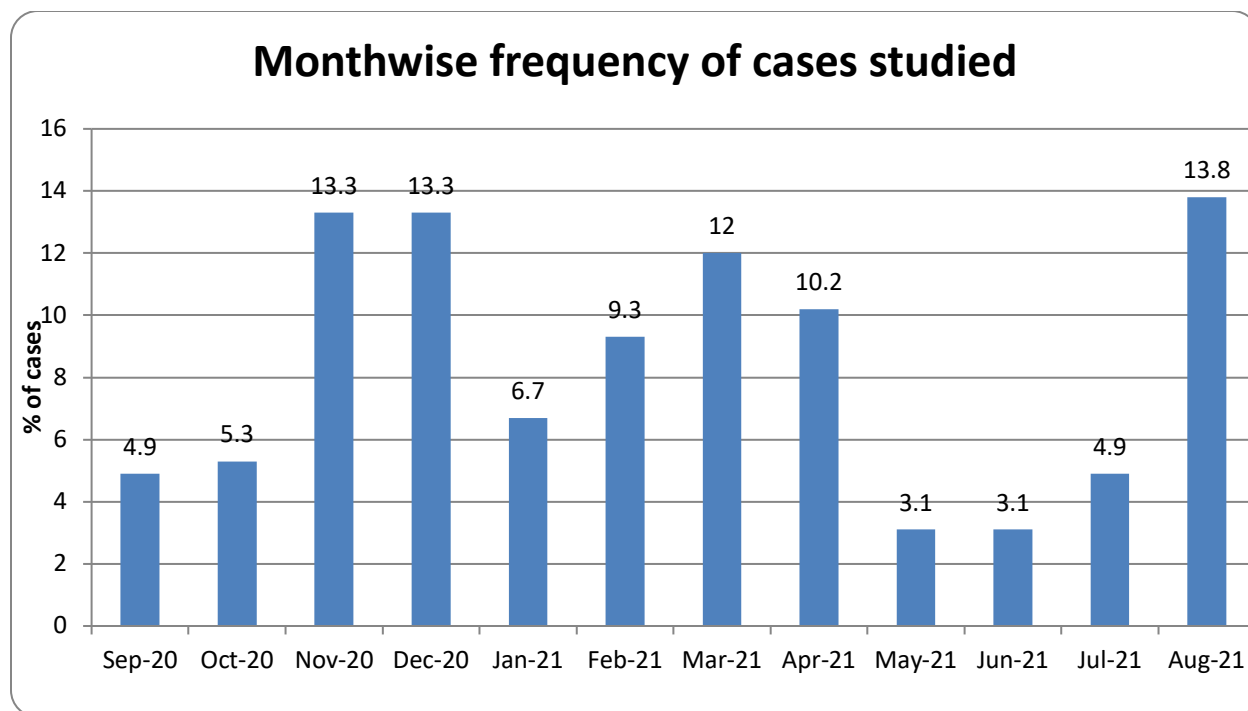


Figure 3: Shows the Month wise frequency of cases studied (n-225).

Table 4 and figure 4 show the diagnosis among the cases studied. Of 225 cases studied, majority of cases i.e. 113 cases (50.2%) had chronic tonsillitis, 91 cases (40.4%) had acute tonsillitis, 12 cases (05.3%) had Peritonsillitis, 05 cases (02.2%) had Para pharyngeal abscess, 03 cases (1.3%) had neck abscess and 01 case (0.4%) had retro pharyngeal abscess in the study group. (Table 4, Fig 4).

Table 4: Showing the types of chronic tonsillitis observed in the study (n-225).

Diagnosis	No. of cases	% of cases
Chronic tonsillitis	113	50.2
Acute tonsillitis	91	40.4
Peritonsillitis	12	05.3
Para pharyngeal abscess	05	02.2
Neck abscess	03	01.3
Retropharyngeal abscess	01	0.4
Total	225	100.0

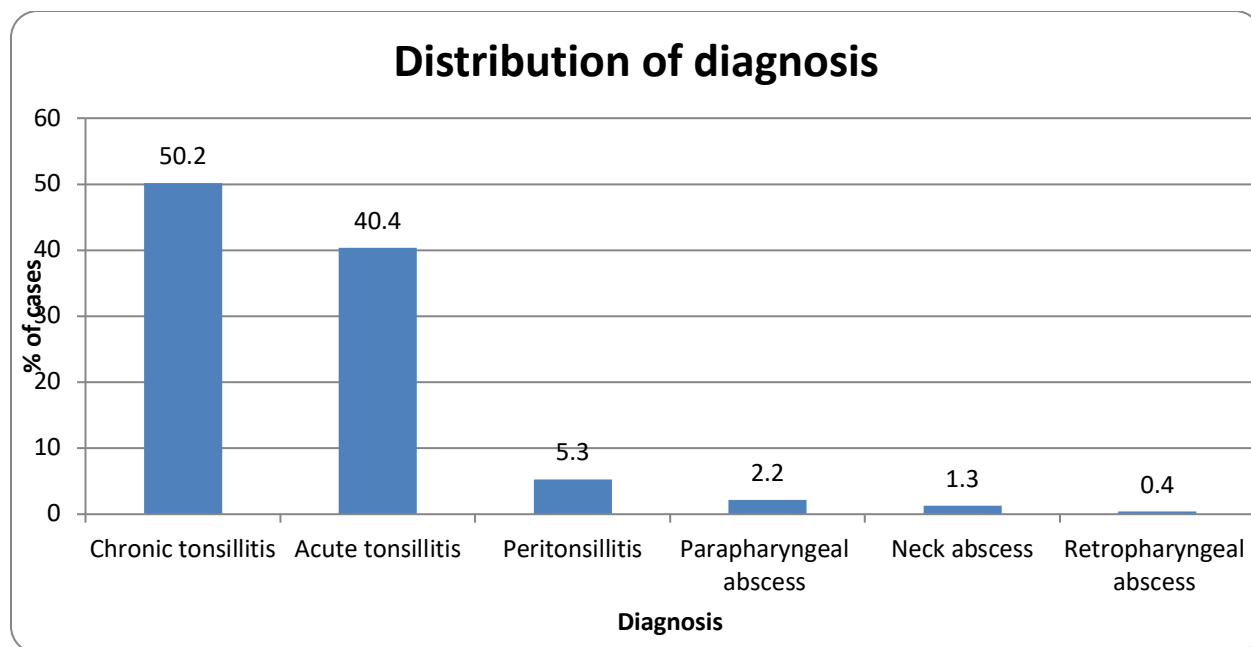


Figure 4: Shows the Distribution of types of Chronic Tonsillitis among the cases studied (n-225).

Out of 11 cases studied in September 2020, the most common diagnosis was Acute tonsillitis which was present in 09 cases (81.3%), 02 cases (18.2%) had chronic tonsillitis. Out of 12 cases studied in October 2020, the most common diagnosis was Chronic tonsillitis which was present in 06 cases (50.0%), 03 cases each (25.0% each) had acute tonsillitis and Peritonsillitis respectively. Out of 30 cases studied in November 2020, the most common diagnosis was Acute tonsillitis which was present in 18 cases (60.0%), 11 cases (36.7%) had chronic tonsillitis and 01 case (03.3%) had Peritonsillitis. Out of 30 cases studied in December 2020, the most common diagnosis was Chronic tonsillitis which was present in 20 cases (66.7%), 07 cases (23.3%) had acute tonsillitis and 03 cases (10.0%) had Para pharyngeal abscess. Out of 15 cases studied in January 2021, the most common diagnosis was Chronic tonsillitis which was present in 11 cases (73.3%), 03 cases (20.0%) had acute tonsillitis and 01 case (06.7%) had Para pharyngeal abscess.

Out of 21 cases studied in February 2021, the most common diagnosis was Acute tonsillitis which was present in 13 cases (61.9%), 06 cases (28.6%) had chronic tonsillitis and 02 cases (09.5%) had Peritonsillitis. Out of 27 cases studied in March 2021, the most common diagnosis was Chronic tonsillitis which was present in 12 cases (44.4%), 11 cases (40.7%) had acute tonsillitis and 03 cases (11.1%) had Peritonsillitis and 01 case (03.7%) had neck abscess. Out of 23 cases studied in April 2021, the most common diagnosis was Chronic tonsillitis which was present in 13 cases (56.5%), 09 cases (39.1%) had acute tonsillitis and 01 case (4.3%) had Peritonsillitis.

Out of 07 cases studied in May 2021, the most common diagnosis was chronic tonsillitis which was present in 04 cases (57.1%), 01 case each (14.3% each) had acute tonsillitis, Para pharyngeal abscess and Neck abscess. Out of 07 cases studied in June 2021, 3 cases each (42.9% each) had Chronic tonsillitis and acute tonsillitis respectively and 1 case (14.3%) had Retropharyngeal abscess. Out of 11 cases studied in July 2021, the most common diagnosis was Chronic

tonsillitis which was present in 08 cases (72.7%), 02 cases (18.2%) had acute tonsillitis and 01 case (09.1%) had neck abscess. Out of 31 cases studied in August 2021, the most common diagnosis was Chronic tonsillitis which was present in 17 cases (54.8%), 12 cases (38.7%) had acute tonsillitis and 02 cases (06.5%) had

Peritonsillitis. Distribution of type of diagnosis differs significantly across various months in the study group (P-value<0.05). Seasonality component seems to be statistically significantly evident in the presentation of various types of diagnosis among the cases studied. (Table 5 and Fig 5)

Table 5: Distribution of types of diagnosis across the various months of the study group (n=225)

Month	Type of Diagnosis												Total	P-value	
	Chronic tonsillitis		Acute tonsillitis		Peritonsillitis		Para pharyngeal abscess		Neck abscess		Retro-pharyngeal abscess				
	n	%	n	%	n	%	n	%	n	%	n	%	n	%	
Sept 2020	02	18.2	09	81.8	0	0.0	0	0.0	0	0.0	0	0.0	11	100	0.001**
Oct 2020	06	50.0	03	25.0	03	25.0	0	0.0	0	0.0	0	0.0	12	100	
Nov 2020	11	36.7	18	60.0	01	3.3	0	0.0	0	0.0	0	0.0	30	100	
Dec 2020	20	66.7	07	23.3	0	0.0	3	10.0	0	0.0	0	0.0	30	100	
Jan 2021	11	73.3	03	20.0	0	0.0	1	6.7	0	0.0	0	0.0	15	100	
Feb 2021	06	28.6	13	61.9	02	9.5	0	0.0	0	0.0	0	0.0	21	100	
Mar 2021	12	44.4	11	40.7	03	11.1	0	0.0	1	3.7	0	0.0	27	100	
Apr 2021	13	56.5	09	39.1	01	4.3	0	0.0	0	0.0	0	0.0	23	100	
May 2021	04	57.1	01	14.3	0	0.0	1	14.3	1	14.3	0	0.0	07	100	
June 2021	03	42.9	03	42.9	0	0.0	0	0.0	0	0.0	1	14.3	07	100	
July 2021	08	72.7	02	18.2	0	0.0	0	0.0	1	9.1	0	0.0	11	100	
Aug 2021	17	54.8	12	38.7	02	6.5	0	0.0	0	0.0	0	0.0	31	100	
Total	113	50.2	91	40.4	12	5.3	5	2.2	3	1.3	1	0.4	225	100	

P-value by Chi-Square test. P-value<0.05 was considered to be statistically significant. ***P-value<0.001.

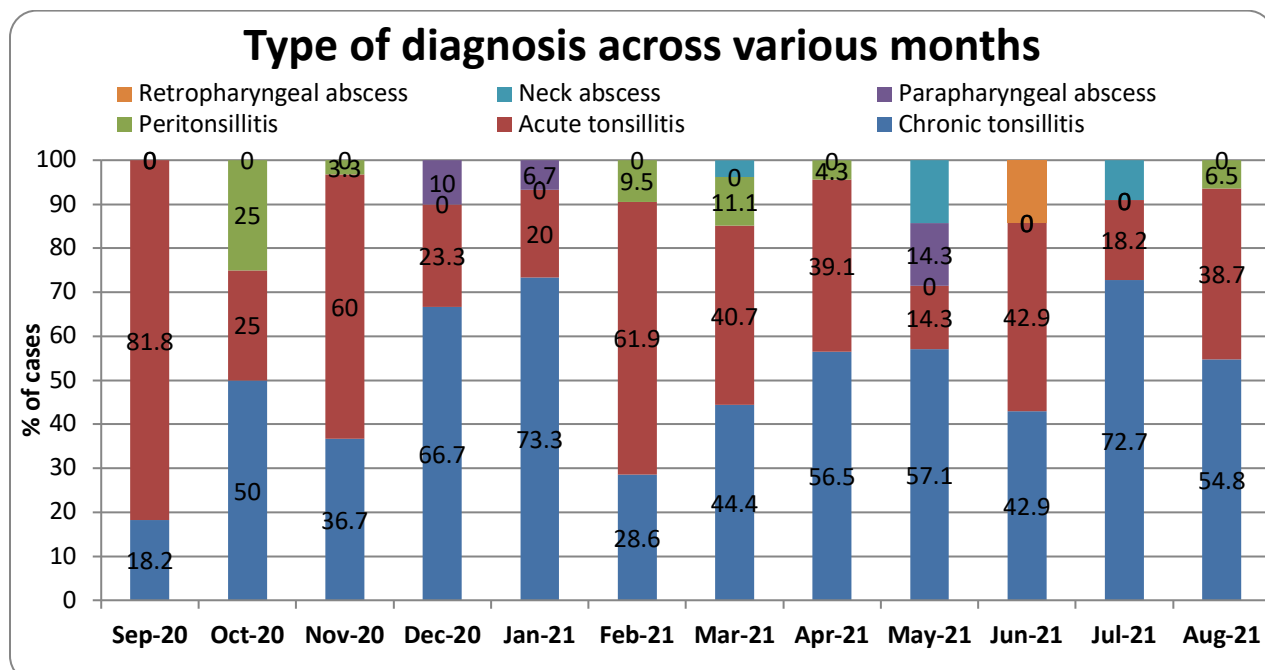


Figure 5: Distribution of type of diagnosis across various months in the study group (n-225)

In this study the most common symptom was sore throat observed in 189 (84%), followed by odynophagia in 171 (76%), otalgia in 155 (68.88%), fever in 137 (60.88%), tiredness in 88 (39.11%), chills in 67 (29.77%) and cough in 103 (45.77%) of the cases. (Table 6) Among the signs the most common was swelling of both the tonsils was observed in 174 (77.33%) of the patients, squeeze test positive in 166 (73.77%), enlarged and tender JD nodes in 182 (80.88%), peritonsillitis in 138 (61.33%) and pharyngitis in 161 (71.55%). (Table 6)

Table 6: Shows the symptomatology in the study (n-225)

Symptoms and signs	Number	Percentage
Symptoms		
Sore throat	189	84
Odynophagia	171	76
Otalgia	155	68.88
Fever	137	60.88
Cough	103	45.77
Tiredness	88	39.11
Chills	67	29.77
Tender lymph nodes	84	37.33
Headache	64	28.44
Signs		
Swelling of the Tonsils	174	77.33
Squeeze test positive	166	73.77
Enlarged and tender JD glands	182	80.88
Peritonsillitis	138	61.33
Pharyngitis	161	71.55

Out of 225 cases, 17 cases (07.65%) had complications. Out of 225 cases most of them had conservative management (98.7%), only 3 cases (1.3%) needed the surgery under local anesthesia which subsequently needed the hospitalization for further surgical management. Out of 225 cases studied, only 01 case (0.4%) had growth of micro-organism isolated on throat swab, and 1 patient (0.4%) also required CT scan. Out of 225 cases, total 3 cases (1.3%) had incidence of morbidity and 1 case (0.4%) had death. (Table 7)

Table 7: Showing the Distribution of incidence of complications, type of intervention, type of investigation, morbidity, and mortality among the cases studied (n-225).

			No. of cases	% of cases
Complications		Yes	17	7.6
		No	208	92.4
Type of intervention	Conservative	Yes	222	98.7
		No	03	01.3
	Surgical	Yes	03	01.3
		No	222	98.7
	Anesthesia given	Yes	03	01.3
		No	222	98.7
Admission required		Yes	03	01.3
		No	222	98.7
Type of investigation	Throat swab (Growth)	Yes	1	0.4
		No	224	99.6
	CT scan	Yes	1	0.4
		No	224	99.6
Morbidity		Yes	3	1.3
		No	222	98.7
Mortality		Yes	1	0.4
		No	224	99.6

The final outcome of the treatment adopted in the study was compared with the grading method used and mentioned in the materials. It was observed that 76.88% of the patients showed a good outcome, 14.22% showed a moderate outcome, 07.55% showed an average outcome and 00.88% showed poor outcome. 19/ 225 (08.44%) of the patients who showed poor and average response were advised tonsillectomy after the COVID-19 pandemic in this study. Tonsillectomy surgeries were not undertaken during the pandemic period to prevent its spread among the health personnel. P-value by Chi-Square test was 0.001 which was considered to be statistically significant. (p value significant at <0.05), (Table 8)

Table 8: Shows the final outcome after treatment of the subjects in the study (n-225)

Medical Treatment	Number	Percentage	P value
Good	173	76.88	0.001
Moderate	032	14.22	
Average	017	07.55	
Poor	002	00.88	

Discussion

This study was conducted to understand the demography, clinical features and types of chronic inflammatory conditions of Tonsillitis followed by final outcome of the treatment adopted in the department of ENT, in the ANIIMS Portblair. In this cross sectional study totally 225 patients were included according to the inclusion and exclusion criteria. The mean \pm SD of the cases studied was 23.32 ± 12.98 years with minimum and maximum age range was 02 to 60 years. The prevalence of acute tonsillitis concerning population distribution was found to vary differently. Among the subjects maximum tonsillitis cases were observed in the age group of 11 to 17 years which was also observed in a similar study by Middleton *et al* [15]. In this study there were 92/225 (40.9%) males and 133/225 (59.1%) females with a male to female ratio of 1:1.44. Middleton *et al.* also observed similar findings with male patients (55%) compared to female patients (45%) reporting with acute on chronic tonsillitis. probably because some patients admitted were more than female patients. In this study 157 (69.77%) patients belonged to low socio-economic group, 41 (18.22%) belonged to middle income group and the remaining 27 (12%) belonged to high income group (Fig 3). In a study by Hidaya Qarqani Bukhari *et al* (16), they observed low socio economy in 61% of cases followed by 35% in middle-income group and 04% in high economy group. The reason for such high incidence among the low socio economy group was due to low immunity in these patients, cross infection occurring in overcrowded housing areas with poor ventilation. The most common symptom was sore throat observed in 189 (84%), followed by odynophagia in 171 (76%), otalgia in 155 (68.88%), fever in 137 (60.88%), tiredness in 88 (39.11%), chills in 67 (29.77%) and cough in 103 (45.77%) of the cases. (Table 6) In the study by Hidaya Qarqani Bukhari *et al* [16].

the occurrence of symptoms were sore throat in all the patients, fever in 73%, and odynophagia in 36% and constitutional symptoms in 45% of the patients. Evans and Dick [17] also supported these observations for a sore throat and fever. In this study there were 113 (50.2%) patients with Chronic tonsillitis, 91 (40.4%) with Acute on chronic tonsillitis, 12 (05.3%) with peritonsillitis, 05 (02.2%), neck abscess in 03 (01.3%) and retro pharyngeal abscess in 01 (0.4%) of the patients (Table 4, Fig 4).

In the study by Hidaya Qarqani Bukhari *et al* [16]. 59% of the patients exhibited acute parenchymatous tonsillitis signs, 40% acute follicular signs and only one per cent of the patients had acute membranous tonsillitis. Among the signs the most common was swelling of both the tonsils was observed in 174 (77.33%) of the patients, squeeze test positive in 166 (73.77%), enlarged and tender JD nodes in 182 (80.88%), peritonsillitis in 138 (61.33%) and pharyngitis in 161 (71.55%). (Table 6) In their study Hidaya Qarqani Bukhari *et al* [16] observed palpable tender JD lymph node was observed in 70% of the cases. Veltri *et al* [18] observed similar findings. Majority of the patients responded for the following antibiotics as per the Hospital protocol during the COVID-19 protocol that is penicillin, erythromycin, ampicillin, gentamycin, chloramphenicol, ciprofloxacin, cephalixin, cefotaxime, cefotaxime and amikacin. In their study Krober *et al* [19]. also observed similar reports. 76.88% of the patients showed a good outcome, 14.22% showed a moderate outcome, 07.55% showed an average outcome and 00.88% showed poor outcome. 19/ 225 (08.44%) of the patients who showed poor and average response were advised tonsillectomy after the COVID-19 pandemic in this study. Emergency surgery was done for drainage of peritonsillar abscess and neck abscess, retropharyngeal abscess.

Tonsillectomy surgeries were not undertaken during the pandemic period to prevent its spread among the health personnel. P-value by Chi-Square test was 0.001 which was considered to be statistically significant. (p value significant at <0.05), (Table 8) In their study by Hidaya Qarqani Bukhari *et al* [16]. showed that their patients showed recurrence in symptoms in 70.3% of the cases and not recurred in 27.6% of the patients. In this study one patient developed very severe infection of the tonsils which progressed to Neck abscess and incision and drainage was done but succumbed to death. (Table 7) In their study Hidaya Qarqani Bukhari *et al* [16] encountered 04.21% of the patients with peritonsillar abscess, and they were treated with incision and drainage antibiotics. Stafford *et al* [20] observed recurrence of chronic tonsillitis.

Conclusions

Tonsillitis was common throat disorders observed during COVID-19 pandemic. Males were more commonly affected. The increased attendance of patient's throat complaints was high due to awareness and similarity of symptoms of tonsillitis and COVID-19 disease. Low socio economic groups were more affected. The common types of tonsillitis were parenchymatous type, follicular type. Complications observed were, Peritonsillar abscess, pharyngeal abscess and neck abscess in acute infection in spite of starting empirical treatment and admission in two to three days as covid infection may be in situ even negative test. Medical treatment with Amoxycillin and clavulinic acid combination was highly responsive with 76.88% responding well. There was mortality due to rapid progression to retropharyngeal and neck abscess as sore throat and acute infection presentation were same and reporting to hospital was delayed. Month wise distribution showed a uniform occurrence of the tonsillitis in the community

irrespective of the seasons and COVID-19 pandemic.

References

1. Beatrix B., Roman K. and Christian-Adrien R. Pharyngeal Infections. The Amplifon Monographs, Paris, 2014; No. 56.
2. Timbo S.K., Keita M.A., Togola F.K., Traore L. and Mohamed A. Epidemiological Aspects of Angina in Bamako. Mali Med, 2006; TXXI N 4.
3. Barry B., Gehanno P. and Tran Bay P. Infectious and Inflammatory Pa- A. W. Haidara *et al*. Int. J. Otolaryngology and Head & Neck Surgery theology of the Adult. Editions Ellipses, Paris, 1999; 448.
4. Nash D.R., *et al*. Antibiotic Prescribing by Primary Care Physicians for Children with Upper Respiratory Tract Infections. Archives of Pediatrics and Adolescent Medicine, 2002; 156: 1114-1119.
5. Bisno A.L. and Kaplan E.L. Strep Throat Over and Over: How Frequent? How Real? Mayo Clinic Proceedings, 2006; 81: 1153-1154.
6. Chole RA, Faddis BT. Anatomical evidence of microbial biofilms in tonsillar tissues: a possible mechanism to explain chronicity. *Arch Otolaryngol Head Neck Surg*. 2003;129(6):634-636.
7. Dagnelie, C.F., Touw-Otten, F., Kuyvenhoven, M.M., *et al*. Bacterial Flora in Patients Presenting with Sore Throat in Dutch General Practice. *Family Practice*, 1993; 10: 371-377.
8. Hayes K. Chronic and recurrent tonsillitis: what to know. 2017. Available from: <https://www.verywell.com/chronic-and-recurrent-tonsillitis-1191984>. Accessed January 6, 2018.
9. Shah UK. Tonsillitis and peritonsillar abscess. *Drugs & Diseases. Otolaryngology and Facial Plastic Surgery. Medscape*. Available; from: <https://emedicine.medscape.com/article/>

- 871977-overview#a6. Accessed January 6, 2018.
10. Chobli, M., Yehouessi-Vignikin, B., Zoumenou, E., *et al.* (2012) Support for Children's Tonsillitis in ENT at CNHU Cotonou. R.A.M.U.R, Volume 17 n° 1.
 11. Reddy DS, Babu AS, Rathod JBS, Kumar CS, Rajesh S. Study of ulceromembranous lesions of tonsil in an Indian scenario. *Indian J Otolaryngol Head Neck Surg.* 2016; 69(1):16–19.
 12. Vijayashree M, Viswanatha B, Sambamurthy B. Clinical and bacteriological study of acute tonsillitis. *IOSR J Dental Med Sci.* 2014; 13(1):37–43.
 13. Chan CC, Chan YY, Tanweer F. Systematic review and meta-analysis of the use of tranexamic acid in tonsillectomy. *Eur Arch Otorhinolaryngol.* 2013 Feb;270(2):735–748.
 14. Chiappini E, Principi N, Mansi N, Serra A, De Masi S, Camaioni A, Esposito S, Felisati G, Galli L, Landi M, Speciale AM, Bonsignori F, Marchisio P, de Martino M Italian Panel on the Management of Pharyngitis in Children. Management of acute pharyngitis in children: summary of the Italian National Institute of Health guidelines. *Clin Ther.* 2012 Jun;34(6):1442–1458.
 15. Middleton DB, D'Amico F, Merenstein JH. Standardized symptomatic treatment vs penicillin as initial therapy Streptococcal pharyngitis. *J. Pediatrics.* 1988; 113(6): 1089-1094.
 16. Hidayat Qarqani Bukhari, Majed Hameed Madloul, Bayan Ibrahim Alorinan, Nora Khalid Albarrak, Waad Habib Alotaibi and Saber A.M. El-Sayed. Prevalence study of acute tonsillitis among paediatrics age groups, / *International Journal of Medical Reviews and Case Reports*; Article in Press.
 17. Evans AS, Dick EC. Acute pharyngitis and tonsillitis in University of Wisconsin students. *JAMA* 1964; 190 (8): 699- 708.
 18. Veltry, RW, Sprinkle, PM, Mc Clugg JE. Epstein- Barr Virus associated with episodes of recurrent tonsillitis. *Arch. Otolaryngol* 1975; 101(9): 552-556.
 19. Krober MS, Bass JW, Michels GN. Streptococcal pharyngitis placebo-controlled double-blind evaluation of clinical response to penicillin therapy. *JAMA.*1985; 253(9): 1271-1274.
 20. Stafford N, Von Haacke N, Sene A, Croft C. 1986: The treatment of recurrent tonsillitis in adults. *J. Laryngol. Otol* 1986; 100 (2): 175-177.