TONSILLAR ENLARGEMENT IN APPARENTLY HEALTHY ADULTS IN A RURAL COMMUNITY IN NIGERIA

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ABSTRACT

Background: Tonsillar enlargement could worsen airway obstruction thereby causing apnea and hypoventilation. This is rarely investigated especially in developing country, hence this study which was aimed at determining the prevalence of enlarged palatine tonsils and comparing the degree of obstruction with selected anthropometric measurements in healthy adults in a rural community.

Methods: A cross-sectional study of apparently healthy adults (≥ 18 years) in Oyo community, South Western Nigeria. The participants were selected using multistage random sampling technique. Interviewer assisted structured questionnaire was administered to obtain information on age, gender, occupation, history of smoking and snoring. Ear, nose and throat examination was done and Brodsky grading of tonsil documented. The neck circumference (cm), weight (kilogram) and height (meter) were measured and their Body Mass Indices (BMI) calculated. The data was analysed using IBM- Statistical Package for Social Sciences (SPSS) version 20 and text of association between tonsillar grade, and BMI and Neck circumference was performed using Chi Square.

Results: Participants were 408 subjects, consisting 202 (49.5%) males and 206 (50.5%) females, the mean age was 37 ± 15.2 years. One hundred and fifteen (28.2%) participants had enlarged Palatine tonsils of which; 70 (17.2%) had grade 1 enlargement, 33(8.1%) had grade II enlargement, and 12(2.9%) had grade III enlargement. None of the participants had grade IV tonsillar enlargement. The Mean Body Mass Index was 24.32 ± 4.50 kg/m^2 and mean neck circumference was 34.08 ± 2.70cm. Palatine tonsillar enlargement was significantly associated with young age (p = 0.01), female gender (p = 0.02), and neck circumference (p =0.01), but not with high BMI (P = 0.06).

Conclusion: Tonsillar enlargement is prevalent, and it is associated with young age, and female gender, but not with Body Mass Index and neck circumference.

Keywords: Adults, Body mass index, Gender, Neck circumference, Palatine Tonsil

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INTRODUCTION

The palatine tonsils are lymphoid mucosa-associated-lymphoid-tissue located in the oropharynx and they form part of the Waldeyer's ring. They constitute part of the body's first line of defense for the lower airways and gastrointestinal tract. They also contribute to the development of antigenic host cells.[1] Inflammation from allergy or infections causes antigenic stimulation of the lymphoid follicles with resultant hypertrophy and enlargement of the tonsil. After resolution of the inflammation, the tonsil enlargement is expected to resolve but in few cases, the enlargement may persist.[2] The size of the tonsil varies according to the age, individuality, and pathologic status. Tonsils increase rapidly in size between the third to sixth years of life, reaching their maximum size at puberty and thereafter begin to atrophy.[3] This age bracket corresponds to period when these children have not developed immunity against many viruses like rhinoviruses, adenoviruses and respiratory syncytial viruses. They become easily or readily susceptible to repeated pathogenic bacterial infections of the tonsils.[4]

Enlarged palatine tonsils have significant clinical implications ranging from breathing disorders, obstructive sleep apnoea and difficult intubation. It may also lead to respiratory and cardiac complications, such as chronic alveolar hypoventilation,

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pulmonary hypertension, cor-pulmonale and right heart failure.[5] Symptoms suggestive of obstructive tonsillar hypertrophy include noisy respiration, loud snoring, restless sleep, hypersomnolence, night terrors, behavior changes, and poor concentration at school or work. Tonsillar enlargement are categorized based on the extent of oropharyngeal airway they occupy and Brodsky grading scale has been used for precise description of tonsillar size.[6,7] Tonsillar hypertrophy may require tonsillectomy, especially when associated with obstructive sleep-breathing disorder or repeated infection. This study was designed to determine the prevalence of tonsillomegally in the healthy adult population of Oyo, Nigeria.

METHODOLOGY

This is a cross sectional study of adults in a rural community in Oyo carried out from August 2012 and June 2013. Ethical approval was obtained from Oyo State Ministry of Health Ethics Review Board (Ref no. AD/13/475/255) and permission was obtained from the community leaders. The participants, who were healthy (have no specific symptoms) adults aged 18 years or older, were selected using multistage random sampling technique. Oyo community, where the study was conducted has 30 electoral districts[7] and ten of them were selected using simple random technique. The houses with even primary health care numbers were selected and all the adults that met the inclusion criteria in each of the houses were recruited into the study. Exclusion criteria were past history of throat surgery and gross craniofacial anomaly. Structured questionnaire was administered to obtain socio-demographic and relevant clinical data of the participants. Thereafter, the participants had oral and oropharyngeal examination done. The size of the tonsils was categorized based on the percentage of oropharyngeal airway which they occupy using Brodsky grading scale.[8,9] Grade 0 means tonsils are within the tonsillar fossa; Grade I means tonsils occupied ≤25% of the oropharyngeal width; Grade II means tonsils occupied 26% - 50% of the oropharyngeal width; Grade III means tonsils occupied 51%-75% of the oropharyngeal width; and Grade IV means tonsils occupied >75% of the oropharyngeal width. Two investigators performed the oropharyngeal examination independently and compared their findings to agree on the tonsil grade.

The weight (kg), height (m), and neck circumference (cm) of the participants were measured. Body Mass Index (BMI) was calculated for each participant as weight (kg)/ height^2 (m^2). BMI value of 18 - 25 kg/m^2 is normal, overweight is BMI ≥25 kg/m2 and <30 kg/m^2, and obesity is BMI ≥30 kg/m^2.The neck circumference of the participants was measured and graded.[10]

Statistical analysis

All the data were collated inputted and analyzed using IBM-SPSS version 20. The results were then expressed as means ± standard deviation for continuous data and n-percent for categorical data. Test of association between dependent and independent variables was with Chi Square. Level of significance was considered at $p < 0.05$ at 95% Confidence Interval.

RESULT

Out of 420 participants that were recruited, only 408 participants completed the study due to interference from the family members. The participants were 202 (49.5%) males and 206 (50.5%) females. Their age ranged from 18 to 82 years with mean of 37 ± 15.2 years.

The mean neck circumference was 34.08 ± 2.70cm for all the participants but the mean for male was 34.59 ± 2.92cm and female was 33.58 ± 2.37cm. The mean BMI for all the participants was 24.32 ± 4.50 kg/m^2. The males have the mean BMI of 23.79± 3.93 kg/m^2 and the females have the mean BMI of 24.86 ± 4.90 kg/m^2.

Two hundred and ninety three (71.8%) participants have no palatine tonsillar enlargement while 115(28.2%) adults had palatine tonsil enlargement comprising 70 (17.2%)grade I, 33(8.1%) grade II, and 12(2.9%) grade III (Table I). Grade IV palatine tonsillar enlargement was not encountered among the participants in this study. Grade II and grade III palatine tonsillar enlargements were only observed among participants that were age 40 years or less. There were more females 71 (17.4%) than males 44 (10.8%) with tonsillar enlargement (p = 0.02). (See table II). There was no association between neck circumference and palatine tonsillar enlargement (p = 0.98) and between BMI and palatine tonsillar enlargement (p = 0.06) (Table III).

Table 1: Palatine tonsillar enlargement and the age distribution

Tonsillar grading	Age (Years)							Total
	18-29	30-39	40-49	50-59	60-69	70-79	80-89	
Grade O	126(30.9%)	53(13.0%)	35(8.6%)	33(8.1%)	33(8.1%)	6(1.5%)	7(1.7%)	293(71.8%)
Grade I	19(4.7%)	23(5.6%)	18(4.4%)	3(0.7%)	5(1.2%)	0(0.0%)	2(0.5%)	70(17.2%)
Grade II	13(3.2%)	13(3.2%)	7(1.7%)	0(0.0%)	0(0.0%)	0(0.0%)	0(0.0%)	33(8.1%)
Grade III	3(0.7%)	6(1.5%)	3(0.7%)	0(0.0%)	0(0.0%)	0(0.0%)	0(0.0%)	12(2.9%)
Total	161(39.5%)	95(23.3%)	63(15.4%)	36(8.8%)	38(9.3%)	6(1.5%)	9(2.2%)	408(100.0%)

p < 0.01 (Smaller Tonsillar size were seen with increasing age of participants)

Table 2: Gender distribution and the graded palatine tonsil

Tonsillar grading	**Gender**		**Total**
	Male	**Female**	
Grade 0	158(38.7%)	135(33.1%)	293(71.8%)
Grade I	24(5.9%)	46(11.3%)	70(17.2%)
Grade II	15(3.7%)	18(4.4%)	33(8.1%)
Grade III	5(1.2%)	7(1.7%)	12(2.9%)
Total	**202(49.5%)**	**206(50.5%)**	**408(100.0%)**

p = 0.02 (Females has more tonsillar enlargement)

Table 3: BMI and palatine tonsillar enlargement

Tonsillar grading	**Under weight**	**Healthy weight**	**overweight**	**obese**	**Total**
Grade O	3(0.7%)	200(49.0%)	52(12.7%)	38(9.2%)	293(71.8%)
Grade I	0(0.0%)	39(9.4%)	22(5.3%)	11(2.6%)	70(17.3%)
Grade II	0(0.0%)	20(4.9%)	11(2.6%)	2(0.5%)	33(8.0%)
Grade III	0(0.0%)	5(1.2%)	7(1.7%)	0(0.0%)	12(2.9%)
Total	**3(0.7%)**	**264(64.7%)**	**92(22.5%)**	**49(12.1%)**	**408(100.0%)**

p = 0.06 (BMI is not associated with tonsillar enlargement)

DISCUSSION

Enlarged tonsils contribute to narrowness of the oropharyngeal airway causing snoring and Obstructive Sleep Apnea (OSA), particularly in recumbent position and accounting for the high proportion of snorers among people with enlarged tonsils. Surgical removal of these enlarged tonsils abates these conditions with improved sleeping pattern and quality of life of the affected individual. This present study is a community based study that examined the prevalence of enlarged tonsils among apparently healthy adults, contrast to previous studies that were hospital based.[11,12] In this study, there were more young adults(<40 years) with tonsillar enlargement than in older adult age group. The normal progressive atrophy of the tonsil with aging process might have contributed to this observation.

In this study of healthy adults, the prevalence of tonsillar enlargement was 28.2%. An European study has documented that only 20% of adults with tonsillar enlargement will present to otorhinolaryngologists for surgical management.[13] This supports the fact that most people with tonsillar enlargement are asymptomatic or have adjusted to the symptoms as a way of life hence does not need any therapy or treatment.

The proportion of females with tonsillar enlargement is significantly higher than males. This present study cannot provide explanation for this but a previous study has reported that females are more prone to tonsillar infections which may be responsible for the tonsillar enlargement[11], and another study have reported higher proportions of tonsillectomy among the females.[14]

Although Brodsky tonsillar grading system is subjective and observer dependent, at least two investigators examined and compared their findings in this study. The different grades of tonsillar enlargement among adults found in this present study are similar to what had been reported in the literatures.[15,16] These studies did not report significant cases of adults with grade IV tonsillar enlargement. This may be due to the fact that there is atrophy of the tonsil with advancing age, also individuals with symptomatic grade IV tonsillar enlargements might have presented earlier to the hospital for surgical care due to obstructive symptoms, and thus the prevalence of grade IV tonsillar enlargement in the community is low. The degree of obstruction caused by tonsillar enlargement can better be determined objectively by sleep study which is beyond the scope of this study.

The grade of the palatine tonsils may be overestimated from the real size, because of factors such as lateral pharyngeal fat pads, muscle thickening and skeletal anomaly that may displace the palatine tonsils towards the pharyngeal lumen.[19-20] This might also increase the neck circumference of the participants with significant compromise of the airway and snoring.[21] However, Cahali et al[16] has reported that the clinical palatine tonsil grading is a simple, reliable and independent predictor of actual palatine tonsillar size. The increase in neck circumference in both males and females in this study was not related to tonsillar grading, probably because they were within normal limit, and possibly the fat disposition in the neck has no effect on the tonsillar grading, however this is beyond the scope of this study.

This present study found no association between tonsillar enlargement and BMI, probably because tonsil is a lymphoid tissue with no fatty tissue within it, except in diseased conditions.[22] This is in contrast to report from other similar studies which found significant association.[16,23] The difference in the above studies might be due to differences in the mean BMI. In the study by Cahali et al[15], the mean BMI of the participants was 29.0±3.1 kg/m^2 as against 24.32 ± 4.50 kg/m^2 in this present study.

CONCLUSION

In conclusions, the prevalence of tonsillar enlargement among adults at Oyo rural community is high. The enlarged tonsils are not related to neck circumference and body mass indices. We recommend routine oropharyngeal examination by physicians and health workers to facilitate early recognition of enlarged tonsils among general population, with prompt referral to otolaryngologists for further evaluation, thus preventing the consequence of obstructive sleep apnea.

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