

Socio-Demographic Factors Associated with Otitis Media Among Children in Enugu, South-East Nigeria

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Abstract

Background: The discharging middle ear is a source of global concern. There is every need to investigate and report on the socio-demographic factors of this illness especially in Nigerian children. **Aim:** To determine the Socio-demographic factors associated with otitis media among children in Enugu, South-east Nigeria. **Subjects and Methods:** This study was a cross-sectional in design and done at the University of Nigeria Teaching Hospital, Enugu. All consecutive children aged 0 and 17 years presenting during the months of June and August 2006 with middle ear discharge were included in the study. Informed consent was obtained from parents or guardians of the children. Assent was obtained from older subjects. Children who had discharge of the middle ear were consecutively recruited into this study. Auroscopy was carried out on all of them to ascertain middle ear pathology. A structured questionnaire designed for this study was used to record information on subjects' biodata. Data was analysed using SPSS version 11.0 and PEPI version 4.0 statistical software. **Results:** One hundred children aged 0 to 17 years were included in this study. There were 53 males (53%) and 47 females (47%) with a male: female ratio of 1.13:1. Twenty-five (25.0%) of the 100 subjects were from the upper socio-economic class, whereas 24/100 (24.0%) and 51/100 (51.0%) subjects were from the middle and lower socio-economic class respectively. A significant interaction was found when a chi-square test of independence was calculated between social class and type of otitis media ($\chi^2 = 8.78$; $P = 0.01$), hence chronic otitis media was more common than acute otitis media in children from the lower socio-economic class when compared with the upper and middle classes. **Conclusion:** Discharging otitis media was commoner among the under 5's population. Chronic discharging otitis media tended to affect more the children from the lower social class.

Keywords: Discharging otitis media, Social class, Sex

Introduction

Otitis media is the inflammation of the mucous membrane of the middle^[1]. When the inflammation is associated with a discharge from the ear through a perforation in the tympanic membrane or via a ventilating tube, suppurative (or discharging) otitis media results. It may be acute (less than 6 weeks) or chronic (more than 6 weeks). Review of the literature review indicate that otitis media and its various sub-types are prevalent and a burden across the 90 developing and newly industrialised countries^[2].

In Nigeria, otitis media in children is not an uncommon diagnosis in both community- and hospital- based studies^[3]. It is particularly prevalent among children of Australian Aboriginal descent^[4,5] as well as those with cleft palate or other craniofacial defects. Ethnic differences in the incidence of otitis media may arise from disparities in socioeconomic status^[5,6] accessibility of health care facilities, and variations in the prevalence of environmental factors such as exposure to wood and charcoal smoke^[7]. The socio-demographic features of children with discharging otitis media are worth researching into, as this will give more insight into some predisposing factors to otitis media especially in the developing world. This study therefore, sought to determine the Socio-demographic factors associated with otitis media among children in Enugu, South-east Nigeria.

Subjects and Methods

This study was cross-sectional in which consecutive children presenting at the University of Nigeria Teaching Hospital (UNTH) Enugu with ear-related problems were enrolled. The study was carried out at the out-patient Paediatric and Otorhinolaryngology Clinics of the Teaching Hospital in Enugu State.

Sample size determination

The sample size was calculated using the formula^[8].

$$N = \frac{Z^2 p(100 - p)}{d^2}$$

Where N = minimum sample size,

Z = confidence interval (1.96),

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P = prevalence with reference to a previous study (6%)^[9]

D = standard error (5%).

Substitutions in the above formula give a minimum sample size of 87 subjects. Adding an attrition rate of 10% will bring the minimum sample size to 96 subjects, rounded up to 100 subjects.

Pre-testing of the questionnaire

A pilot study to test information collection tool was conducted on 35 patients who qualified for the inclusion criteria. Some symptoms which were omitted in the pilot study questionnaires were later included in the final questionnaires which were used in the study

Data collection

Structured questionnaires designed for the study were used to record subjects' information. Symptoms of the patients and duration of ear discharge were recorded. Acute otitis media was taken as duration of ear symptoms of less than 6 weeks; while chronic otitis media was taken as ear problems of at least 6 weeks. Auroscopy was carried out on all the children who had ear-related problems and findings were appropriately recorded. In cases where children were referred from one clinic to the other, their names were counted only once at the first clinic they presented. The social class of the parents of the patients was determined using the method of Olusanya et al.^[10] which uses the father's occupation and the mother's educational attainment.

Ethical considerations

The study protocol was reviewed and approved by the Health Research and Ethics Committee of the University of Nigeria Teaching Hospital. Informed consent was obtained from parents or guardians of the children. Assent was obtained from older subjects.

Data analysis

Data was analysed using SPSS version 11.0 and PEPI version 4.0 statistical software. Means, medians and ranges were used to summarize quantitative variables while simple descriptive analysis was carried out on qualitative data. Frequency tables and charts were constructed as appropriate. The chi-square test (χ^2) and Yates correction were used to test for statistical significance; and a probability (p-) value of <0.05 was accepted as significant.

Results

During the period of study, a total of 2,822 patients were seen at the Paediatric Out-patients Clinic and 77 (2.7%) of them had discharging otitis media while at the Otorhinolaryngology

Clinic, 44 (22.1%) out of 199 children who were seen had discharging otitis media. Overall, the prevalence of discharging middle ears among children attending the University of Nigeria Teaching Hospital, Enugu was 4.01%.

The age range of the 100 patients recruited into this study was from 1 month (0.08 year) to 17 years (median 3 years). The mean age was 4.8 years (standard deviation 4.55). There were 53 males (53%) and 47 females (47%) with a male: female ratio of 1.13:1. Children aged between 1 month and 5 years accounted for 68/100 (68%) of the study population while 32/100 (32%) were between 6 years and 17 years. Twenty-two percent (22.0%) of the 100 patients were in the second year of life and 19.0% in their first. Twenty-five of 100 (25.0%) subjects were from the upper socio-economic class, whereas 24/100 (24.0%) and 51/100 (51.0%) subjects were from the middle and lower socio-economic classes respectively [Table 1].

Type of otitis media

Fifty-one (51.0%) of the 100 subjects studied presented with acutely discharging otitis media, while 49/100 (49.0%) presented with chronically discharging otitis media. Twenty-two (64.7%) of 34 subjects with acutely discharging otitis media were less than 2 years and 17/30 (56.7%) were between 2 and 4 years [Table 2]. Among subjects with the chronic variety, 12/34 (35.3%) were under 2 years and 13/30 (43.3%) were between 2 and 4 years [Table 2]. The distribution among those aged 1 to 24 months is shown in Table 3. There was significant association between the age of patients and type of ear discharge [Tables 2 and 3].

Socio-economic status and duration of ear discharge

The distribution of subjects with acute and chronic discharging

Table 1: Socio-demographic characteristics of subjects

Socio-demographic variable	Number of subjects	Percent
Age range (months)		
1 – 12	19	19.0
13 – 48	45	45.0
49 – 84	10	10.0
85 – 120	11	11.0
121 – 156	8	8.0
>156	7	7.0
Gender		
Female	47	47.0
Male	53	53.0
Socio-economic class		
Upper	25	25.0
Middle	24	24.0
Lower	51	51.0

Table 2: Age group of subjects and type of otitis media

Type	Age group of subjects (years)				Total (%)
	Under 2 (%)	2 – 4 (%)	5 – 9 (%)	10 -17 (%)	
Chronic	12 (35.3)	13 (43.3)	9 (52.9)	4 (21.1)	49 (49.0)
Total	34 (100.0)	30 (100.0)	17 (100.0)	19 (100.0)	100 (100.0)

($\chi^2=9.87$; df = 3; P=0.02)

Table 3: Age group of subjects and type of ear discharge among those aged 1 – 24 months

Duration	Age group of subjects (months)		Total (%)	
	1 – 6 (%)	7 – 12 (%)	13 – 24 (%)	
Acute	8 (100.0)	8 (72.7)	11 (50.0)	27 (65.9)
Chronic	0 (0.0)	3 (27.3)	11 (50.0)	14 (34.1)
Total	8 (100.0)	11 (100.0)	22 (100.0)	41 (100.0)

($\chi^2=6.84$; df = 2; P=0.03)

Table 4: Social class of subjects and type of discharging otitis media

	Duration	Social Class		Total (%)
	Upper (%)	Middle (%)	Lower (%)	
Acute	18 (72.0)	14 (58.3)	19 (37.3)	51 (51.0)
Chronic	7 (28.0)	10 (41.7)	32 (62.7)	49 (49.0)
Total	25 (100.0)	24 (100.0)	51 (100.0)	100 (100.0)

($\chi^2= 8.78$; df = 2; p = 0.01)

middle ears into various social classes is shown in Table 4. A significant interaction was found between these two variables ($\chi^2 = 8.78$; P = 0.01) [Table 4].

Discussion

Discharging middle ears are not an uncommon presentation in Enugu as found in this study. Generally, otitis media has been shown to be one of the most common diagnoses made at the Otorhinolaryngology Clinics [2,7,11,12]. Various prevalence rates have been reported, and the figure in the present study is comparable to findings by other researchers [12].

This study shows that males were more affected than the females. This sex pattern has been documented in the literature [11,13]. However, the literature is scarce on possible attributable factors. There is need for more scientific researches that focus on possible anatomical and/or physiological upper airway gender differences.

The peak age prevalence reported in the present study agrees with that in the literature [1]. Children aged <5 years accounted for a greater percentage (64.0%) of the study population. Some reasons adduced for the high prevalence of otitis media among younger children include: immature immune system with increased predisposition to infection, shorter and more horizontal Eustachian tube, which permits easier access to organisms from the naso-pharynx into the middle ear; increased predisposition to allergy; and the relative scanty cartilaginous support of the Eustachian tube with consequent inefficient active opening mechanism. Our study showed that acute otitis media was more likely among the younger children and chronic among the older ones. This is similar to a Kenyan study that also reported higher rates of acute infection in younger children and higher CSOM rates in the older children [14]. There could be multiple reasons for the lower rates of chronic otitis media among younger infants: such children are usually treated with great care by their parents. There is also the protective effect of breastfeeding against respiratory tract infections among infants.

Subjects with acute middle ear discharge were more or less evenly distributed among the various social cadres. In contrast, those with chronic middle ear discharge were mainly from the lower socio-economic class. This is in keeping with previous reports from Nigeria and other parts of the world. Paradise et

al [15] had observed that low socio-economic status was one of the most important socio-demographic risk factors for otitis media. However, a study done in Kenya, reported no significant difference in the prevalence of acute and chronic suppurative otitis media between children living in urban and rural areas [15].

The postulations given for this lower-class preponderance and affinity include poor nutrition, crowded living conditions, poor sanitation and inadequate medical care which predispose to progression of acute otitis media to chronicity and other complications. The poor and illiterate are likely to live in over-crowded facilities with poor sanitary habits. These lead to recurrent respiratory tract infections of which otitis media can be a part or a complication. In addition, individuals from low socio-economic backgrounds have poor access to expert medical services mostly due to financial constraint or lack of local health facilities. Hence, an episode of acute otitis media that is inadequately or not treated can progress to chronic otitis media with its attendant complications.

Conclusion

Discharging otitis media is not uncommon at the Paediatric and Otorhinolaryngology Clinics of the University of Nigeria Teaching Hospital, Enugu. While the acute form was more common among infants, the chronic form was more prevalent among children from low socio-economic class. There is need for greater efforts towards improving the living standards of children. Interventions known to protect against acute respiratory tract infections in infants such as exclusive breastfeeding should be encouraged.

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