Antenatal determinants of oro-facial clefts in Southern Nigeria

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Abstract

Objectives: Cleft lip with or without cleft palate, is the most common serious congenital anomaly that affects the orofacial regions. The management and care of the cleft patient constitutes a substantial proportion of the workload of the Nigerian maxillofacial surgeon and allied specialties. Yet, there are no specific programmes targeted at this group. We believe that the findings of this study is capable of identifying useful interventions for designing programs that will lead to a reduction in the burden of orofacial cleft in Nigeria.

Methods: It was a transverse cross-sectional study that was undertaken at the Maxillofacial Units of the University of Benin Teaching Hospital and the Central Hospital, Benin City respectively. The prevalence and antenatal determinants of cleft lip and palate were determined.

Results: Cleft lip and palate were often encountered in clinical practice in Benin City with a prevalence of 1.35%. The results showed that orofacial clefts were commoner in females and that the combined unilateral cleft lip and palate was the commonest entity encountered amongst the cases. The following risk factors were associated with the risk of development of cleft lip and palate: Paternal age >40years, maternal age >35years, genetic/family history, low socio-economic status, alcohol consumption and indulgence in the intake of herbal medications in pregnancy.

Conclusion: Public health education programmes and advocacy activities geared towards raising awareness of the identified risk factors for the development of cleft lip and or cleft palate would go a long way to obviate the occurrence and reduce the burden.

Key Words: Prevalence, Antenatal determinants, orofacial clefts, Southern Nigeria
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Introduction

Available evidence indicates that cleft lip with or without cleft palate, is the most common serious congenital anomaly that affects the orofacial region[1] in humans. These deformities can be seen, felt and heard hence they constitute a serious affliction to those who have them and their families.

Reports[1,2,3] show that there is higher incidence of cleft in the Asians than in the Caucasians and least amongst the black race. The worldwide incidence is reported to be 1 in 700 among Asians and 1.7/1000 live births amongst Japanese. It is 3.6/1000 live births in a group of American Indians and 1/1000 live births amongst Caucasians. Boys are affected more than girls with a ratio of about 3:2[1]. Clefts of the lip are more frequent in boys (60%) while isolated clefts of the palate are more frequent in girls (59%).[4]

Although the etiology of cleft lip and palate is uncertain, studies[1,2,4] suggest that it is multifactorial with both genetic and environmental factors implicated. In 20-30% of patients with left sided cleft there are associated hereditary factors[6]. The probability of a child having cleft lip is reported to be 2% if one of the parents has a cleft but this increases to 14% in subsequent children if a child already has a cleft. If neither of the parents has cleft but one child has it, the chances of another child having a cleft are 4.5% and this increases 2, 4 and 40 times in third, second and first degree relatives of affected patients[2,3]. On the other hand, several reports[1,2,4,6] have associated a number of environmental factors with the causation of cleft.

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Such factors include vitamin deficiencies particularly vitamins A and B, viral agents such as the rubella virus and infestation with toxoplasma gondii — the causative agent of toxoplasmosis. Others are exposure to irradiation, cortisone excess and ingestion of drugs like thalidomide, steroids, anticonvulsants (phenytoin), diazepam, amino pectin and nitrogen mustard, subjection to hypoxic situations, ACTH excess, maternal alcohol consumption and cigarette smoking, all in pregnancy especially in the first trimester [1,2,4,6].

The care of patients with cleft lip and palate is quite challenging for both parents and the care givers as the patients have to be seen and monitored from birth to early adulthood[1,4,6]. This is often due to the fact that such children have associated defective sucking, hearing defect and airway obstruction[1,2,4,5]. Others are speech defect, poor aesthetics, malocclusion, as well as dental abnormalities like missing teeth, rotated teeth and malpositioned teeth[1,4,6]. Provision of health care for these patients is therefore protracted and expensive as it involves many different specialties.

Although the reported incidences of cleft lip and palate in the few published Nigerian works [7,8,9] is less than the Caucasian and Oriental figures, the management and care of the cleft patient still constitutes a substantial proportion of the workload of the Nigerian maxillofacial surgeon and allied specialties. Yet, there are no specific programmes targeted at this group in order to reduce the incidence and offer comprehensive management strategies geared towards optimizing outcome of treatment. The purpose of this study therefore, is to determine the prevalence and associated risk factors of cleft lip and palate in UBTH and Central Hospital, both in Benin City. We believe that the findings of this study is capable of identifying useful interventions for designing programs that will lead to a reduction in the burden of orofacial cleft in Nigeria.

Method

It was a transverse cross-sectional study that was undertaken from November 1 2006 to October 31st 2007. The study was conducted at the Maxillofacial Units of the University of Benin Teaching Hospital (UBTH) and the Central Hospital (CH), Benin City respectively. UBTH is the largest tertiary center with 575 bed spaces and CH is the largest secondary health institution with 435 bed spaces, in Edo state of Nigeria. They serve as referral centers for Edo, Delta, Ondo and Kogi States with an overall approximate population size of about 14 million people (2006 National population census).

The sample size of 60 was determined using Taylor's Formula[10] and the maximum known prevalence of 0.4/1000 live births reported in Nigerians[7], although all 68 consenting patients with Cleft defect seen in the Hospitals within the study period were included in the study. Patients who declined giving their consent and those with previous cleft repair presenting for follow up were excluded from the study.

A pre-tested and validated study protocol was used for the data collection. The study protocol which was filled by trained interviewers elicited the following information; socio-demographic profile of the patients and parents, family history surveying both paternal and maternal aspects particularly family history of cleft (we did not evaluate family history of other congenital anomalies), dietary/nutritional history, patient's antenatal and delivery history. Specifically, the protocol explored the following antenatal events – parental history of alcohol ingestion, cigarette smoking, cooking method, drug use during pregnancy and exposure to irradiation.

Approval for this study was obtained from the Ethics committee of the University of Benin Teaching Hospital. The rights of patients to participate or not was respected, and the study was carefully explained to the patients or their parents and their informed consent obtained before they were recruited into the study.

All information obtained was recorded on the data collection sheet designed for the study. The coded data were then fed into the computer using the SPSS statistical software and analysis was conducted. This consisted of univariate and bivariate analysis and comparisons of identified relationships. Test of the statistical significance was based on 95% confidence interval using Chi –square test with the Yates or Fischer exact correction where applicable. Odds ratio and confidence interval was then calculated to determine the association between the risk factors and cleft lip and palate.

Results

Overall, 5,037 patients presented at the Dental Centres of UBTH and CH Benin City for treatment during the study period, and 68 of these patients had cleft lip and palate giving a prevalence rate of 1.35%. There were 33 males (48.5%) and 35 females (51.5%) whose ages (table 1) ranged from 5 days to 37 years (mean + SD; 3.22+ 6.82 years). The mean age for

males was 2.9+ 6.8 years while that of females was 2.9+ 7 years, this difference is not statistically significant (P> 0.05)). Forty patients (58.4%) were children less than a year with 14 (20.1%) less than a month old. Three adult clefts were also seen during the study period (two females and a male). Over half of the cases (58.8%) were delivered at maternity homes, while home deliveries accounted for 5 cases (8.7%), 8 patients (11.8%) were delivered at Traditional birth attendants' homes and 15 patients (22.1%) at general and teaching hospitals.

Table 1: Age and gender distribution of 68 cleft lip and palate patients

Age group (Years)	Gender		
	Male	Female	Total
	no (%)	no (%)	no (%)
<1	19 (27.9)	21 (30.9)	40 (58.4)
1-4	6 (8.8)	8 (11.8)	14 20.6)
5-8	5 (7.4)	2 (2.9)	7 10.3)
9-12	2 (2.9)	2 (2.9)	4 (5.9)
>12	1 (1.5)	2 (2.9)	3 (4.4)
Total	33 (48.5)	35 (51.5%)	68 (100)

Of the 68 patients, there were 40 cases (58.8%) of unilateral cleft lip with or without cleft palate, 12 cases (17.6%) of bilateral cleft lip with or without cleft palate, 15 (22.1%) of isolated cleft palate and 1 case (1.5%) of submucous cleft as shown in table 2. The unilateral clefts were equally distributed on the right and left sides of the face but had more male distribution (23 cases).

Table 2: Distribution of cleft types according to gender

Types of cleft	Males no(%)	Females no(%)	Total no (%)
URL	2(2.9)	0(0)	2 (2.9)
URLA	1(1.5)	6(8.8)	7 (10.3)
URLAP	5(7.3)	6(8.8)	11(16.2)
ULL	1(1.5)	1(1.5)	2 (2.9)
ULLA	3 (4.4)	0(0)	3(4.4)
ULLAP	10(14.5)	5(7.3)	5(22.1)
BLA	0(0)	2(2.9)	2(2.9)
BLAP	4(5.9)	3(4.4)	7(10.3)
BLABP	2(2.9)	1(1.5)	3(4.4)
SMC	1(1.5)	0(0)	1(1.5)
IP	4(5.9)	11(16.2)	15(22.1)
Total	33(48.5)	35(51.5)	68(100)

URL =Unilateral right sided cleft lip
URLA=Unilateral right sided cleft lip and alveolus
URLAP= Unilateral right sided cleft lip, alveolus and palate
ULL=Unilateral left sided cleft lip
ULLA= Unilateral left sided cleft lip and alveolus
ULLAP= Unilateral left sided cleft lip, alveolus and palate
BLA=Bilateral cleft lip and alveolus
BLAP= Bilateral cleft lip, alveolus and palate
BLABP= Bilateral cleft lip alveolus and bilateral cleft palate
SMC=Submucous cleft
IP=Isolated cleft palate

While equal distribution of bilateral cases was observed amongst male and female patients (tables 2), isolated cleft palate in contrast, had more female distribution (11 females and 4 males). Overall, thirty six patients (52.9%) had combined cleft lip and palate defects, 4 patients (5.9%) had isolated cleft lip, 12 patients (17.6%) had cleft lip and alveolus while 15 patients (22.1%) had isolated cleft palate. Of the 12 patients (17.4%) with bilateral cleft, 10 patients (14.9%) had combined cleft lip and cleft palate. The single case of submucous cleft palate presented with bifid uvula, palatal bone dehiscence and covering oral epithelium.

Table 3: Ethnic and social class distribution of cleft types

	Cleft Types							
	ULA	**ULAP**	**BLA**	**BLAP**	**SMC**	**IP**	**Total**	
	no(%)	no(%)	no(%)	no(%)	o(%)	no(%)	no(%)	**p- value**
Ethnic distribution								
Esan	4(5.9)	4(5.9)	0(0)	1(1.5)	0(0)	2(2.9)	11(16.2)	
Bini	4(5.9)	3(4.4)	0(0)	4(5.9)	0(0)	0(0)	11(16.2)	
Edo(others)	1(1.5)	3(4.4)	0(0)	2(2.9)	0(0)	3(4.4)	9(13.2)	
Urhobo	2(2.9)	8(11.8)	1(1.5)	1(1.5)	1(1.5)	2(2.9)	15(22.1)	
Delta others	0(0)	8(5.9)	1(1.5)	2(2.9)	0(0)	5(7.3)	16(23.5)	
Yoruba	3(4.4)	0(0)	0(0)	0(0)	0(0)	3(4.4)	6(8.8)	**0.179**
Social class								
I (High)	0(0)	1(1.5)	0(0)	0(0)	0(0)	0(0)	1(1.5)	
II(Middle)	3(4.4)	5(7.4)	1(1.5)	4(5.9)	1(1.5)	6(8.8)	20(29.4)	
III(Low)	11(16.2)	20(29.4)	1(1.5)	6(8.8)	0(0)	9(13.2)	47(69.1)	**0.689**

Of the 68 patients who presented during the study period, the ages of 61 fathers (89.7%) and 62 mothers (91.2%) were obtained while others failed to volunteer such information. The ages of the fathers ranged from 20 years to 70 years with a median of 37 years (mean + SD; 37.13 + 8.51 years), while that of the mothers as shown in table 5 ranged from 15 years to 45 years with a median of 28 years (mean + SD; 29.19 + 5.86 years). The difference was statistically significant ($p < 0.05$).

Table 4: Age distribution of parents according to cleft types

	Cleft Types							
	ULA	**ULAP**	**BLA**	**BLAP**	**SMC**	**IP**	**Total**	
	no(%)	no(%)	no(%)	no(%)	no(%)	no(%)	no(%)	**p-value**
Fathers age (years)								
20-29	4(5.9)	3(4.4)	0(0)	0(0)	0(0)	3(4.4)	10(14.7)	
30-39	4(5.9)	15(22.1)	0(0)	4(5.9)	0(0)	5(7.3)	28(41.2)	
40-49	4(5.9)	6(8.8)	2(2.9)	3(4.4)	0(0)	5(7.3)	20(29.4)	
>49	0(0)	0(0)	0(0)	2(2.9)	0(0)	1(1.5)	3(4.4)	**0.111**
Mean age= 37.13								
Mother's age (years)								
15-24	4(5.9)	4(5.9)	0(0)	0(0)	0(0)	2(2.9)	12(17.6)	
25-34	7(10.3)	14(20.6)	1(1.5)	5(7.3)	0(0)	10(14.7)	37(54.4)	
35-44	1(1.5)	4(5.9)	1(1.5)	4(5.9)	0(0)	2(2.9)	12(17.6)	
>44	0(0)	0(0)	0(0)	0(0)	1(1.5)	0(0)	1(1.5)	**0.000**
Mean age=29.19								

Among the various paternal age groups, 41.2% were within the 30-39 year age group and they accounted for a significantly high proportion of patients (22.1%) with unilateral cleft lip and palate while a greater percentage of mothers (54.4%) where in the 25-34 age group and they accounted for a significantly high proportion of patients (14.5%) with isolated cleft palate. A family history of cleft was obtained in 9 patients (13.2%) with cleft palate either in isolation, or with cleft lip. Of the 61 fathers and 62 mothers, there were positive family history in one father (1.5%) and 4 mothers (5.9%) respectively (table 5). Additionally, there was a positive family history from 6(8.8%) maternal relatives and one paternal relative. Four patients (5.9%) had siblings with a cleft. Bilateral cleft lip and palate was the cleft type noted to be most commonly associated with family history (5 cases) while patients with cleft lip alone or cleft lip and alveolus had no family history of cleft. Three mothers had van der woude syndrome and this was replicated amongst two of their children.

Although nine patients had positive family history, some patients had multiple family history with the highest record of a patient whose mother had bilateral cleft lip, and also additional maternal and paternal family history of cleft lip and palate.

Table 5: Family history according to cleft types

	Cleft types							
	ULA	**ULAP**	**BLA**	**BLAP**	**SMC**	**IP**	**Total**	
	no(%)	no(%)	no(%)	no(%)	no(%)	no(%)	no(%)	**p-value**
Family history								
Paternal family	0(0)	0(0)	0(0)	1(1.5)	0(0)	0(0)	1(1.5)	
Maternal family	0(0)	2(2.9)	0(0)	3(4.4)	0(0)	1(1.5)	6(8.8)	
Father affected	0(0)	0(0)	0(0)	1(1.5)	0(0)	0(0)	1(1.5)	
Mother affected	0(0)	0(0)	0(0)	3(4.4)	0(0)	1(1.5)	4(5.9)	
Siblings	0(0)	1(1.5)	0(0)	3(4.4)	0(0)	0(0)	4(5.9)	**0.250**

Thirty-seven patients (54.4%) had a positive history of maternal illness during their pregnancy course with 17 (25%) being febrile illness/malaria, followed by upper respiratory tract infection in 13 mothers (19.1%). Others were abdominal pain in 4 cases (5.9%), diarrhoea in 2 cases (2.9%) and 1 case (1.5%) of threatened abortion (table 6). A total of 40 mothers (58.8%) ingested orthodox medications during their pregnancy and another 15 mothers (22.1%) took herbal medications. Twenty two

(32.4%) of such mothers ingested routine antenatal hematinics, three mothers (4.4%) took antibiotics while 3 others (4.4%) ingested antimalarials. Other drugs taken include one each of primolut injection and franol while a significantly large number of mothers (14.7%) took unspecified medications as shown in table 6.

Table 6: Cleft types and pregnancy associated events

Pregnancy Associated Events	Cleft types							
	ULA	**ULAP**	**BLA**	**BLAP**	**SMC**	**IP**	**Total**	**p-value**
	no(%)	no(%)	no(%)	no(%)	no(%)	no(%)	no(%)	
Pregnancy type								
Singleton	13(19.1)	24(35.3)	2(2.9)	8(11.8)	1(1.5)	14(20.6)	62(91.2)	
Twin	1(1.5)	2(2.9)	0(0)	2(2.9)	0(0)	0(0)	5(7.3)	
Higher order	0(0)	0(0)	0(0)	0(0)	0(0)	1(1.5)	1(1.5)	**0.705**
Cooking method								
Kerosene stove	7(10.3)	17(25.0)	2(2.9)	7(10.3)	0(0)	12(17.6)	45(66.2)	
Firewood	4(5.9)	8(11.8)	0(0)	2(2.9)	0(0)	1(1.5)	14(20.6)	
Gas cooker	1(1.5)	1(1.5)	0(0)	0(0)	1(1.5)	1(1.5)	4(5.9)	**0.026**
Maternal illness								
Malaria/fever	2(2.9)	9(13.2)	0(0)	3(4.4)	0(0)	3(4.4)	17(25.0)	
URTI	1(1.5)	6(8.8)	0(0)	1(1.5)	0(0)	4(5.9)	13(19.1)	
Abdominal pain	1(1.5)	2(2.9)	0(0)	0(0)	0(0)	1(1.5)	4(5.9)	
Diarrhoea	0(0)	1(1.5)	1(1.5)	0(0)	0(0)	0(0)	2(2.9)	
Threatened Abortion	0(0)	0(0)	0(0)	0(0)	1(1.5)	0(0)	1(1.5)	**0.020**
Drug intake								
Hematinics	2(2.9)	9(13.2)	1(1.5)	5(7.3)	0(0)	5(7.3)	22(32.4)	
Antibiotics	0(0)	0(0)	0(0)	1(1.5)	0(0)	2(2.9)	3(4.4)	
Antimalaria	1(1.5)	0(0)	0(0)	0(0)	0(0)	2(2.9)	3(4.4)	
Franol	0(0)	1(1.5)	0(0)	0(0)	0(0)	0(0)	1(1.5)	
Primolute	0(0)	0(0)	0(0)	0(0)	1(1.5)	0(0)	1(1.5)	
Don't know	4(5.9)	4(5.9)	0(0)	0(0)	0(0)	2(2.9)	10(14.7)	**0.006**
Trad. Herbs								
Boiled leaves	1(1.5)	2(2.9)	0(0)	3(4.4)	1(1.5)	1(1.5)	8(11.8)	
Herb with alc	2(2.9)	3(4.4)	0(0)	1(1.5)	0(0)	1(1.5)	7(10.3)	**0.649**
Alcohol								
Local gin	3(4.4)	2(2.9)	0(0)	2(2.9)	0(0)	2(2.9)	9(13.2)	
Beer	1(1.5)	1(1.5)	1(1.5)	1(1.5)	0(0)	2(2.9)	6(8.8)	
Gin	0(0)	1(1.5)	1(1.5)	0(0)	0(0)	1(1.5)	3(4.4)	**0.772**

None of the mothers volunteered a positive history of cigarette smoking or tobacco consumption. However, majority of them (66.2%) cooked with kerosene stove followed by firewood in 14 (20.6%) cases and gas in 4 (5.9%) cases (table 6). Thirty four patients (50.0%) had their kitchens located outdoor, 30 (44.1%) cooked indoors while kitchen location could not be ascertained in 4 (5.9%) cases. This difference was not statistically significant ($p>0.05$).

Eighteen mothers (26.5%) ingested alcohol during their pregnancy with 9 cases (13.2%) taking local gin, thus making local gin the most frequently ingested type. Seven mothers (10.3%) suffered one form of trauma or the other while 13 mothers (19.1%) had radiographic exposure during pregnancy. The highest incidence (10.3%) of radiographic exposure was in the third trimester.

Table 7: Logistic regression to determine the risk factors for developing cleft lip and palate

Variable	OR	CI (95%)
Parental age		
Paternal age > 40 years	1.33	0.52 – 5.25
Maternal age > 35 years	3.14	1.14 – 8.69
Alcohol Consumption		
Occurrence of syndactyly	3.00	0.39 – 23.07
Occurrence of CHD*	1.88	0.85 – 4.85
Cooking location		
Indoor cooking	1.70	0.69 – 4.42
Drugs taking in pregnancy		
Herbal medications	2.35	0.58 –4.47

** Congenital Heart Disease*

Of the study population, 6 (8.8%) were products of multiple gestation with five sets of twins and a set of triplet. Among the twin pregnancies, there were 2 cases of monozygotic twinning and 3 cases of dizygotic twining. The only set of triplets was monozygotic. Of the affected dizygotic twins, 2 (2.9%) were females and one was a male while the monozygotic twins were all boys. In all cases of multiple gestations, only one of each set was affected. Majority of the patients (92.6%) were delivered at term while one each of preterm birth (34 weeks) and postdated delivery (45 weeks) was recorded. The mean gestational age in this study was 37.64 + 1.82weeks.

We further subjected the key risk factors for cleft development to logistic regression analysis to eliminate the impact of chance and or other confounding variables, and the positive findings noted are shown in table 7.

Discussion

This study showed an overall prevalence rate of cleft lip and palate in the two Benin City hospitals to be 1.35%. Interestingly from the literature search, it was difficult to locate any Nigerian study that documented the prevalence of cleft lip and palate amongst patients seen in any of our maxillofacial centers. The only study that reported on population incidence (prevalence at birth) was by Iregbulem[7] from Enugu in eastern Nigeria when he found a prevalence rate of 0.04% after he examined 21,624 consecutive infants born at the University of Nigeria Teaching Hospital over a 5-year period. However, in this study setting prevalence of 1.35% is at variance with other studies with a known range of 0.06% – 0.2%[11-13]. The studies from which these prevalences were derived had larger sample sizes as compared to this study conducted on patients who attended the dental clinics.

Although the overall prevalence of cleft lip with or without cleft palate has been reported to be commoner in males than females,[9,14-22] this study revealed the contrary with a slight female preponderance which was however not statistically significant (p-value = 0.103). Similarly, isolated cleft lip was commoner in males than females this being similar to other study setting[16-22] as was isolated cleft palate in females as widely reported.[9,23-27]

While there has been no consensus on the most common type of cleft lip and palate,[14,15,28-31] this study revealed combined unilateral cleft lip and palate as the commonest type of cleft in Benin City with no side predilection but commoner in males than females. A high prevalence of cleft palate either in isolation or in combination with cleft lip (75%) was also noted in this study which agrees with reports from West Scotland, Northern Ireland and Finland.[24,25]

Varied literature[32-35] reports suggest that both genetic and environmental factors interact in the aetiology of orofacial clefts. This fact is clearly replicated in this study as family history is positively associated with the risk of cleft deformities in 13.2% of the study population which is in keeping with previously reported incidence of 10-20%[32]. Lack of 100% genetic factor[34,35] in the aetiology of cleft in twins was also identified in this study as only one each of all patients of multiple gestation in this study had cleft. This further gives credence to the fact that environmental factors play a significant role in the aetiology of orofacial cleft deformities. In fact, it is likely that environmental factors probably were the major agents at play in those twin patients that were seen in this study. Certainly further study in this regard is advocated. Although the highest incidence of genetic factor in cleft aetiology has been reported in females with bilateral clefts [33,36] this study recorded a higher proportion of males with bilateral cleft lip and palate.

While the role of both maternal and paternal ages in the aetiopathogenesis of cleft remain contentious,[37-40] maternal and paternal ages greater than 35 years and 40 years respectively were observed as significant risk factors for the development of specific cleft types. Paternal age greater than 40 years is specifically more associated with isolated cleft palate (OR=1.33 CI=0.52-3.25) in agreement with previous report by Bille et al.[37]. Likewise, maternal age greater than 35 years was significantly more

associated with bilateral cleft lip and palate and unilateral left sided cleft lip and palate (OR=3.14 CI=1.14-8.69; OR=1.35 CI=0.75-3.05) respectively.

Although the effect of socioeconomic class as an aetiologic factor in the development of cleft lip and palate is still in contention,[32] well over half (69.1%) of the study population came from low socioeconomic class. The exact import of ethnicity on the risk of development of cleft deformities in this study is not certain, even though it was noted that various ethnic groups were associated with different types of cleft. The Urhobo's of Delta State who made up the largest single ethnic group of this study commonly had unilateral left sided cleft lip and palate, unilateral right sided cleft lip and alveolus and bilateral cleft lip and alveolus. While amongst the other ethnic groups in Delta State, the commonly encountered cleft deformities were cleft palate, either in isolation or with cleft lip and alveolus. The reasons are inexplicable bearing in mind that all the ethnic groups live within same environmental milieu, have similar dietary pattern, alcohol intake and cultural norms. On the other hand, the Bini's who constituted the second largest ethnic group are more likely to have isolated cleft lip and bilateral cleft lip with bilateral cleft palate.

In keeping with existing data[41-43] on the impact of alcohol consumption on the risk of developing cleft deformities, a positive association was noted between alcohol intake and development of cleft palate with or without cleft lip in mothers who took alcohol occasionally or regularly. Also, it was noted that there was an increased risk of having a child with other congenital defects in mothers who drank alcohol during pregnancy especially syndactyly (OR=3.0 CI 0.39-23.07) and congenital cardiac anomalies mainly ventricular septal defect, atrial septal defect and patent ductus arteriosus (OR=1.13, p=0.011and OR=1.88) respectively.

Cigarette and tobacco smoking are well documented risk factors for orofacial cleft.[42-52] However, in this study there was no history of smoking in any form by the mothers of our cleft patients. But what gives an indication of the relationship between smoking and risk of developing cleft deformities in this study was the evaluation of the cooking method and the location of their kitchens. It was noted that there was an increased risk of unilateral left sided and bilateral cleft lip and palate (**OR**=1.70 CI=0.69-4.42; **OR**=1.42 CI=0.42-4.80) respectively in those who cooked indoors as compared to those who did their cooking outdoors. The implication of this being that those who cooked indoors were more likely to have inhaled smoke from the cooking source that can be likened to cigarette smoking. An increased relative risk (OR=2.35 CI= 0.58-9.47) was also noted in isolated cleft palate and unilateral left sided cleft lip and palate (OR=1.08; CI=0.39-2.94) in mothers who took herbal medications during their pregnancy.

The potential limitations of this study was the fact that part of the information/data collected were based on history from the patients and or their parents and therefore there was the possibility of concealing facts or information and indeed may even have recall bias. However, efforts were made to overcome this difficulty by counseling the patients/ parents appropriately. The importance of volunteering accurate information/data was emphasized vis-à-vis the patient's management and identifying preventive strategies that will avoid a recurrence in future conceptions in the family. Additionally, efforts were made to determine the associated environmental risk factors for the development of clefts and not genetic factors, which was only indirectly inferred from the family history due to lack of facilities for DNA testing at both centers.

Conclusion

In conclusion, this study revealed that cleft lip and palate are encountered often in clinical practice in Benin City with prevalence higher than the overall worldwide prevalence and those from other regions of the world. Also, this study revealed that orofacial cleft lip +/- palate were commoner in females and that the combined unilateral cleft lip and palate was the commonest entity in the study. A number of risk factors that were associated with the risk of development of cleft lip and palate were recorded – they include paternal age >40years, maternal age >35years, genetic/family history, low socio-economic status, alcohol consumption and indulgence in the intake of herbal medications in pregnancy.

Certainly a larger country case control study is advocated to conclusively document a national prevalence of orofacial cleft and the associated risk factors/aetiology in Nigeria. This will help in quantifying the burden of orofacial cleft and also identify national strategies that will help reduce the incidence and improve its management. There is the need for public health education programmes and advocacy activities on the identified risk factors from

this study for the development of cleft lip with or without cleft palate and preventive measures to obviate the occurrence amongst the populace.

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Overweight and obesity among patients attending a Nigerian oral surgery clinic: implications for oral surgical practice in Nigeria

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Abstract

Aim: To determine the prevalence of overweight and obesity among patients attending oral and maxillofacial outpatient clinic of the Lagos University Teaching Hospital, Nigeria; and discuss the clinical and surgical implications that obesity has on the delivery of oral and maxillofacial surgical and anaesthetic care.

Methods: Consecutive patients presenting to the oral and maxillofacial surgery outpatient clinic at the Lagos University Teaching Hospital, Nigeria over a 4-month period (May-August 2004) were screened for age, sex, height and weight. All of the patients were treated for dentoalveolar surgical procedures (routine and surgical extractions), incisional and excisional biopsies, and enucleation under local anaesthesia.

Results: The BMIs of the studied patients ranged from 16.7 to 39.8 kg/m^2, with a mean of 24.6 ± 4.5 kg/m^2. Prevalence of excess weight was 39.1%. Thirty-one (11.4%) patients were obese and 75 (27.7%) patients were overweight. A significant difference was observed in the BMIs of male and female patients (P=0.000). The age groups < 30 years had mean BMIs that were considered normal; whereas other age groups above 30 years had mean BMIs that were considered overweight. Prevalence of obesity increases with increasing age. Obese individuals were seen in all the age groups except those < 20 years.

Conculsions: The prevalence of excess weight (overweight and obesity) in patients presenting in the studied oral and maxillofacial outpatient setting was 39.1%. Oral and maxillofacial surgeon needs to be aware of obesity-/overweight-related medical and surgical issues and take them into consideration when treating these patients.

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Introduction

Obesity is the most prevalent nutrition-related disorder in most parts of the developed and developing countries.[1] It is a condition in which excess body fat may put a person at health risk,[1] and also a condition with poorly established specific aetiology, due to the multifactorial nature of the disorder.[2] Various components have been implicated in obesity, including genetic, metabolic, biochemical, cultural, and psychosocial factors.[2] It is a disorder in which diet, sedentary life and genetic predisposition, all play a part .[3] Obesity appears to be worldwide and in many countries has reached sufficient proportions to be considered epidemic.[4] Overall the obesity problem is fuelling increasing concern worldwide.

The definitions of obesity are variable, but a reliable and easy to perform index is the body mass index (BMI).[5] BMI is considered one of the most accurate ways to determine the extent of obesity and its correlation with health risk.[2] BMI is equal to (weight in kilograms)/(height in metres^2).[6] A BMI between 20 and 24.9kg/m^2 is usually considered normal for most individuals. A person is considered overweight witha BMI between 25 and 29.9kg/ m^2, and obesity is classified as greater than or equal to 30kg/ m^2. Morbid obesity is defined by a BMI of greater than 40, or between 35 and 40 when other medical conditions such as high blood pressure and diabetes are present.[7]

Due to increasing prevalence of obesity worldwide, increasing number of obese patients is expected to present for oral and maxillofacial treatment. Such treatment includes routine oral and maxillofacial procedures (teeth extraction, fracture fixation, biopsies), specific corrective procedures for snoring and obstructive sleep apnea, and intermaxillary fixation for weight reduction. Such patients provide a unique challenge because of their body habitus, medical conditions, and physiologic response to treatment, all of which have significant consequences on the surgical procedure being performed.[7] Therefore, the oral and maxillofacial surgeon needs to be aware of these associated medical and surgical issues and take them into consideration when treating these patients.

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The aim of the present study was to determine the prevalence of overweight and obesity among patients attending oral and maxillofacial outpatient clinic of the Lagos University Teaching Hospital, Nigeria. In addition, this paper discusses the clinical and surgical implications that obesity has on the delivery of oral and maxillofacial surgical and anaesthetic care.

Methods

Consecutive patients presenting to the oral and maxillofacial surgery outpatient clinic at the Lagos University Teaching Hospital, Nigeria over a 4-month period (May-August 2004) were screened for age, sex, height and weight. All of the patients were treated for dentoalveolar surgical procedures (routine and surgical extractions), incisional and excisional biopsies, and enucleation under local anaesthesia. A BMI was calculated on all patients (weight in kilograms divided by the heights in metres squared). BMI data was compared and classified into 4 main groups: underweight, with a BMI less than 19.9 kg/m^2; normal weight, with a BMI of 20 to 24.9 kg/m^2; overweight, with a BMI of 25 to 29.9 kg/m^2; and obese with a BMI of greater than or equal to 30 kg/m^2.

Data was analysed using the SPSS for Windows (version 12.0; SPSS Inc, Chicago, IL) statistical software package. Comparisons between age, sex and associated BMI was examined and presented in descriptive and tabular forms. Test of significance was used as appropriate, and *P* value was set at d" 0.05.

Results

Of the two hundred and seventy-one patients that were included in the study, 141 were male and 130 were female (M: F =1.1:1). The ages ranged from 9 to 85 years, with a mean of 33.8 ± 13.8 years. The mean height and weight was 1.7 ± 0.1 metres (range, 1.22 - 1.96 metres) and 68.9 ± 13.7 kilograms (range, 35 - 113 kilograms) respectively. The BMIs ranged from 16.7 to 39.8 kg/m^2, with a mean BMI of 24.6 ± 4.5 kg/m^2. A significant difference was observed in the height, weight and BMI between male and female patients as indicated in Table 1.

Table 1: Gender variation in height, weight and body mass index

Variables*	Sex		P value
	M	F	
Height (m)	1.7 ± 0.1	1.6 ± 0.1	0.000
Weight (kg)	71. 3 ± 12	66. 2 ± 15	0.000
Body mass index (kg/ m^2)	23. 8 ± 3.5	25.4 ± 5.2	0.000

*Values as mean ± standard deviation

The prevalence of excess weight (overweight and obesity) was 39.1%. One hundred and thirty-four (49.4%) studied patients were normal weight, thirty-one (11.4%) were obese and 75 (27.7%) patients were overweight as shown in Table 2. Obesity was more prevalent in female (P< 0.05). Nineteen percent of the females studied were considered obese, and 28.5% were overweight. In contrast, only 4% of the males were obese, and 27% were overweight.

Table 2: Sex of patients and BMI category

Sex	BMI category				
	Underweight	Normal weight	Overweight	Obese*	**Total**
Male	16	81	38	6	**141**
Female	15	53	37	25	**130**
Total	**31**	**134**	**75**	**31**	**271**

*P< 0.05

The study population was also compared according to age-groups as shown in Table 3. The age groups < 30 years had mean BMIs that were considered normal; whereas other age groups above 30 years had mean BMIs that were considered overweight. It is noteworthy that obese individuals were seen in all the age groups except those < 20 years. Prevalence of obesity increases with age; and prevalence was highest in patients above 60 years.

Table 3: Distribution of BMI and prevalence of excess weight according to age groups

Age group	Mean ± SD (Kg/m²)	Range (Kg/m²)	Number of patient	Prevalence		
				Overweight	Obese	Excess weight
<20	21.7 ± 2.9	18.2 - 29.1	21	9.5	0	9.5
20-29	22.8 ± 3.6	16.7 - 37.8	109	18.3	2.8	21.1
30-39	25.5 ± 3.9	19.2 - 35.7	70	32.9	15.7	48.6
40-49	27.3 ± 4.8	19.1 - 39.8	36	47.2	19.5	66.7
50-59	25.7 ± 5.2	18.4 - 35.2	12	33.3	16.7	50
60-69	28 ± 5.4	19.1 - 38	17	35.3	35.3	70.6
More or equal to70	28.6 4.0	21.3 - 32.9	6	50	33.3	83.3
Total	24.6 ± 4.5	16.7 - 39.8	109	27.7	11.4	39.1

Discussion

In the past 20 years, the rates of obesity have tripled in developing countries that have been adopting a Western lifestyle involving decreased physical activity and over consumption of cheap, energy-dense food.[9] Such lifestyle changes are also affecting children in these countries; the prevalence of overweight among them ranges from 10 to 25%, and the prevalence of obesity ranges from 2 to 10%.[9] The Middle East, Pacific Islands, Southeast Asia, and China face the greatest threat. The relationship between obesity and poverty is complex: being poor in one of the world's poorest countries (i.e., in countries with a per capita gross national product [GNP] of less than $800 per year) is associated with underweight and malnutrition, whereas being poor in a middle-income country (with a per capita GNP of about $3,000 per year) is associated with an increased risk of obesity.[9,10] Some developing countries face the paradox of families in which the children are underweight and the adults are overweight. This combination has been attributed by some people to intrauterine growth retardation and resulting low birth weight, which apparently confer a predisposition to obesity later in life through the acquisition of a "thrifty" phenotype that, when accompanied by rapid childhood weight gain, is conducive to the development of insulin resistance and the metabolic.[10]

In Nigeria, not much has been written on obesity, although, it has been reported to be commonly seen among the affluent business executives and middle-aged females with a sedentary life-style.[3] It is also seen among those in the catering profession who are exposed to food preparation and consumption.[4] In Nigeria and other developing countries, obesity is not generally regarded as a disease until complication sets in.[3] In fact, a mild degree of obesity is socially acceptable in African culture as a sign of affluence.[3] A study by Kumanyika et al[11] among African American women revealed that 40% of moderately and severely overweight women considered that their figures were attractive or very attractive.

Although, there is presently no established figure for the national prevalence of obesity in Nigeria,[3] anecdotal evidence suggests that the general public (especially the affluent ones) is becoming less active and becoming prone to adverse health affects of obesity and overweight. Few studies on the prevalence of overweight and obesity in Nigerian children can be found in the literature .[12-14]

In the present study, 11.4% of the studied patients were considered obese; and obesity was observed in all age groups except in those below the age of 20 years. This prevalence of 11.4% is much lower than the prevalence of 36.5% and 23% in two similar studies from the United States.[7,8] This difference may reflect the fact that obesity has become a serious health issue in the US with more than 51million American considered obese and about 70 million considered to be overweight including at least 1 in 5 children.[15] The prevalence of obesity in the US adults is reported to be between 25% and 32% ; and this has been projected to increase to 30% - 44% by the year 2020.[16] The socio-cultural environments that influence food, eating patterns and physical activity vary enormously across populations and these influences undoubtedly explain many of the differences in obesity prevavlence among populations and sub-populations.[17] In addition, the fact that obesity and excess weight was observed to increase with increasing age in the present series has been reported in previous studies.[8,10,16,18] Closely akin to obesity is the overweight problem, and about 28% of the studied patients were overweight. This is also significantly lower than 62% and 51% prevalence reported by Marciani et al[7] and Kempers et al[8]

respectively. An overweight individual is at greater risk for the morbidity and mortality associated with obesity.[19] It has been reported that overweight, which may progress to obesity, is an evolving concern and may be related to the equally evolving change in lifestyle.[12] Although, none of our patient had a BMI of 40kg/m^2, few of them could be considered morbidly obese because of hisory of hypertension and diabetes.[12]

In this study, female patients had a significantly higher BMIs than their male counterparts; and obesity was also significantly prevalent in female. Women andgirls have been widely reported to have higher BMIs than men and boys.[7,8,12] This has been attributed to the fact that the social environment of women especially black and African American is less negative about obesity. Some Nigerian African women actually regard excess weight (overweight and obesity) as a sign of a good living. Similar studies in patients attending oral and maxillofacial practice have also shown that obesity was more prevalent in female patients.[7,8]

Overweight and obese patients present the oral and maxillofacial surgery with anaesthetic, surgical, practice ergonomics, and potential postoperative problems that distinguish heavy patients from other patient cohorts.[7] Therefore, the operative team must be alert to the increased potential for airway obstruction, poor surgical visibility and accessibility, and the influence of intercurrent diseases on intraoperative and postoperative outcomes. Also, obese and overweight patients are not compatible with standard size office equipment (surgical chairs, monitoring cuffs, wheel chairs) that are designed for small patients.[7] Obese and overweight patients tend to be less mobile, may depend on wheelchair transportation, and may pose a challenge to establish peripheral intravenous access.

In addition, outpatient and inpatient anaesthesia will require patients to be in recumbent or supine position on either the dental chair or operating table which will predispose them to increased work of breathing, hypoxemia, and increased metabolic demands.[8] This is due to the fact that obese patients are known to experience periods of hypoxemia.[20] Elevated intra-abdominal pressures and difficulty expanding the thoracic cavity leads to incomplete inflation of the lungs. These changes in the lung volume lead to closure of small airways and cause ventilatory/perfusion defects (V/Q mismatch). The V/Q mismatch eventually leads to hypoxemia and hypercapnia.[20] Obese patients also have a corresponding increase in metabolic demand at rest.[8] The increased work of breathing also causes a higher metabolic rate, requiring more energy and oxygen utilization. This situation is aggravated when the patient is in a supine position. This increased risk for increased work of breathing is a concern when oral and maxillofacial surgery is performed.[7,8] In addition, obesity-hypoventilation syndrome results when chronic hypoventilation exists because of the large weight preventing full expansion of the lung fields.[20] Hypercapnia is the cardinal sign of obesity-hypoventilation syndrome. The normal central response to high levels of CO_2 does not exist, the work of breathing is severely elevated, and respiratory efficiency and lung compliance are dramatically reduced. These patients are an extremely high anaesthetic and surgical risks.[21] Obese oral and maxillofacial surgery patients can develop severe hypercapnia during sedation for outpatient procedures because of positioning and the administration of opiates.[8]

Many adult patients with obstructive sleep disorder are obese/overweight and should be identified as much higher anaesthetic risk. Surgeons should be cautious scheduling obese patients for conscious and deep sedation when oropharyngeal examination indicates that the base of the tongue obliterates visualization of the palatal arches and the planned surgery is expected to contribute to airway obstruction.[7]

Obese and overweight patients who will require surgery with local anaesthesia with sedation or general anaesthesia will need additional care for safe treatment and successful outcomes.[8] Inherent to the safe and effective practice of surgery is the surgeon's ability to visualize and have ready access to the surgical site. Operations are more likely to proceed smoothly when the surgical team is comfortably positioned around the patient.[7] Morbidly obese patients have been reported to require longer operative times than non-obese patients.[22] Poor posture and poor visibility translates into increased risk of surgical adventures, increased operating time, and physical and mental stress on the OMS surgical team.[8,22]

The positioning of obese patients should maximize pulmonary mechanisms during surgery. If possible supine and Trendelenberg positions should be avoided.[8] During surgical procedures, patients should be sitting upright or positioned in reverse Trendelenberg. All pressure points should be padded. If the patient does not adequately fit in the surgical

chair or operating room table, additional support should be provided. Prevention of venous thrombosis and subsequent pulmonary embolism can be achieved with pneumatic compression stockings, subcutaneous heparin, and early ambulation.[8]

Delayed postoperative recovery due to pulmonary atelectasis following general anaesthesia is not uncommon in morbidly obese patients.[23] Therefore, if inpatient anaesthesia and surgery are anticipated; early consultation with the anaesthetist should be requested. However, if outpatient treatment is scheduled, proper resuscitative equipment should be available. Oxygen is critical before, during, and after surgery. Short, simple surgical procedures are best performed under local anaesthesia. Longer and more complicated surgeries may be managed better in an inpatient setting.

Obesity is considered a risk factor for increased complications in several surgical specialties like cardiothoracic, orthopaedic, reconstructive and transplant surgery.[24,25,26] Obesity as a risk factor for postoperative complications following an oral and maxillofacial procedure has not been widely studied. Marciani et al[26] found that excess weight and obesity do not appear to be risk factor for postoperative complications following dentoalveolar surgery. However, Gbotolorun et al[27] found that increasing body mass index was siginificantly associated with occurrence of postoperative complications following impacted mandibular third molar surgery. A recent study also found that increased surgical difficulty in third molar surgery was associated with increasing body mass index.[28] Obesity has also been reported a strong risk factor for the development of osteonecrosis of the jaw.[29]

Adult obesity is a well-established risk factor for development of cancers in different parts of the body.[30-32] Adult weight gain, particularly during the peri-menopausal period, has been reported to play a significant role in the development of endometrial and breast cancers.[30,32] Presently, little is known about the association between obesity/ overweight and the risk of development of oral cancer. Therefore, studies are needed to elucidate the role of obesity in the development of oral cancer.

Conclusion

The prevalence of excess weight (overweight and obesity) in the studied oral and maxillofacial patients was 39.1%. Obesity was commoner in female; and was observed to increase with age with highest prevalence in patients above 60 years. Obese individuals were seen in all the age groups except those < 20 years. Oral and maxillofacial surgeon needs to be aware of obesity-/overweight-related medical and surgical issues and take them into consideration when treating these patients.

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Waiting time for emergency abdominal surgery in Zaria, Nigeria

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Abstract

Background: Management of surgical emergencies in Nigeria is characterised by mismatch between supply of facilities and demand for care. This study aimed to evaluate the waiting time between presentation at hospital with acute abdominal disease and operative intervention.

Patients and Method: We prospectively studied adult patients with abdominal diseases requiring emergency operation. The interval between presentation and first contact with emergency room doctors was defined as T1; time from contact to decision to operate as T2; time taken to resuscitate patient T3 and to commencement of operation T4. Causes of delay and its impact on outcome of treatment were noted.

Results: There were 488 patients, mean age 32 ± 1.7SD years. TT ranged between 0.8 and 79.0 hours, mean 22.3 ± 10.0 hours. In 81.6% operative intervention was delayed beyond 6 hours of which financial constraints accounted for 53.8%. T3 accounted for the longest delay (0.5 -53.0hours). Patients of lower socio-economic class had longer T3 ($p<0.005$). Waiting for complementary investigations caused delay in 22.1%. Post-operative complications ($p=0.0001$) and their severity were higher in patients with longer TT. Prolonged TT ($p<0.001$), ASA grade (0.005) and time from onset of symptoms to admission ($p=0.009$) were associated with mortality. Patients whose operations were delayed beyond 24 hours had a longer hospital stay.

Conclusion: Emergency abdominal operations were delayed in our patients mainly because of scarce financial resources. Delayed interventions were associated with higher morbidity and mortality.

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Introduction

The emotional and psychological trauma following emergency admission can increase significantly if surgical intervention is unduly delayed. Although some surgical emergencies can and often should be dealt with some hours or even days after admission, there remains a group of conditions for which surgery should be available within hours or even minutes of arrival[1,2,3]. In these patients, a delay could mean loss of life or permanent disability. Strangulated hernia carries a mortality of 10-37% compared to 1% in simple obstruction[4,5,6]. Therefore, the timing of surgical intervention is essential for successful outcome in emergency surgery. In practice the timing of operative intervention is influenced by many factors including clinical diagnosis, complications of disease, consequences of delay, work load of physicians and availability of theatre space[7, 8, 9].

Recent reports from developing countries have indicated increasing difficulties with the preparation of patients for emergency surgery and getting the patients to theatre within a time limit felt acceptable by the operating surgeon[1,4,10,11]. In developed countries, advanced imaging technology and critical care support have improved diagnostic accuracy and facilitated changes in operative timing in acute care surgery. In addition, patients are promptly resuscitated hence delays are occasioned after adequate resuscitation[12, 13]. Unfortunately, in developing nations government hospitals provide few suppliesfor resuscitation, forcing patients to provide their own[2, 10, 14]. Delayed procurement of these supplies and inadequate low-technology apparatus often leads to delayed surgical intervention which is associated with increased morbidity and mortality.

In our institution, patients with emergency abdominal diseases present late after other forms of treatment have failed and life-threatening complications have set in[2, 15]. In addition, many of them have intercurrent medical problems such as diabetes and cardiorespiratory disease which could deteriorate if the conditions were not expeditiously treated. These patients require prompt resuscitation including blood transfusion and haemodynamic monitoring. Unfortunately the patients must buy the needed medical supplies before treatment can begin. Emergency surgery has been defined as immediate life saving operation where resuscitation is carried

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out simultaneously with surgical treatment[16]. Because of the factors militating against prompt surgical intervention in our patients, emergency surgery has come to include operations performed sometimes days after the diagnosis of life threatening disease. The aim of this study was to determine the waiting time between diagnosis and surgical intervention in patients with abdominal surgical emergencies. We also determined the causes of delay and its effect on outcome of treatment.

Method

This prospective study was conducted in the department of Surgery Ahmadu Bello University Teaching Hospital Zaria between January 2005 and December 2006. Consecutive adult patients in whom a clinical diagnosis of abdominal disease requiring emergency operative treatment were included. Patients who were admitted following abdominal trauma and those admitted for observation were excluded from the study. As per protocol, time taken for preparing patient for surgery which includes detailed history taking, proper clinical examination, essential investigations and resuscitation should not exceed six hours[1,7,14,15]. Waiting time was defined as follows: waiting at hospital for the first contact with emergency room doctors T1; time between contact and decision to operate T2; time taken to resuscitate patient T3 and time to the commencement of operation T4. The total waiting time TT, was from presentation at hospital to commencement of operation. The ASA score at the time of diagnosis and at commencement of operation were noted. The causes of delay and its impact on the outcome of treatment were noted. Socio-economic class was classified into upper, middle and lower based on the modification of the National Statistics Socio-Economics Classification (NS-SEC) [17].

For meaningful comparison of outcome of treatment we used a complication stratification and severity score previously described as follows[18]:

Severity 0: No complication.

Severity 1: Minor complication with minimal patient discomfort.

Severity 2: Moderate complication, significant patient compromised or prolonged hospital stay.

Severity 3: Severe complication, life threatening, need for another surgical procedure or admission to intensive care unit (ICU).

Severity 4: Death.

Therefore, the need for another surgical procedure is considered as a severe complication to the primary surgery. It is taken into account if it happened during the same admission and related to the primary procedure.

All emergency cases were seen immediately after admission by the emergency room doctors. A decision was then made about resuscitation and investigations. A treatment plan was organised by the senior registrar and timing of operation was confirmed after discussion with the consultant. All cases were booked for operation at the time of the consultant decision to operate. Theatre delay was defined as any factor contributing towards a delay in operating on an emergency general surgical patient following the consultant decision to operate and his contacting the operating theatre.

Emergency treatment voucher which is a short-term credit facility was used for patients that could not immediately pay for surgery if the patient or his relatives undertake to pay later. All operations were performed in the emergency theatre which was solely dedicated for emergency operations.

Data were analysed using the SPSS statistical software (version 17.0, SPSS, Chicago IL). Data were analysed with mortality being the initial outcome. This was followed by analysis based on severity of complications score as the outcome. Data ware reported as proportions, means ± SD or median (range). Categorical variables and proportions were compared with Fisher exact test. The Mann–Whitney test was used for univariate analysis of continuous variables when comparing two independent groups. Direct logistic regression was used to identify independent preoperative risk factors significant for prediction of mortality and severity of complication. Factors included in the model were age, sex, interval from onset of disease to presentation at hospital, ASA score at the time of surgery, total waiting time, and duration of surgery. A p-value of less than 0.05 was taken as significant.

Result

There were 488 patients, 301 males and 187 females giving a male to female ratio of 1.6:1. Their age ranged from 15 to 68 years, mean of 32 ± 1.7 SD years. The interval from onset of disease to presentation at hospital ranged from0.5 to 168 hours. Thirty six (7.4%) patients presented within 3 hours of onset of their illness. The TT ranged from 0.8 to 79 hours as shown in Table 1, mean of 22.3 ± 10.0.

Table 1: Waiting time for emergency abdominal operations

Total Waiting Time (hours)	Number	%
0 – 6	90	18.4
7 – 12	52	10.7
13 – 24	102	21
25 – 48	166	34
> 48	78	16

The longest waiting was at the resuscitation time (T3) which ranged 0.5 to 53.0 hours as shown in Table 2. The proportion of patients in the upper, middle and lower socio-economic classes were 16.6%, 25.0% and 58.4% respectively. Patients of lower socio-economic class had significantly longer T3 compared to others ($p< 0.005$). The causes of delayed surgical intervention are shown in table 3. Of the 214 patients that had delayed surgical intervention because of financial constraint 176 (82.2%) were of the lower socio-economic class. These patients were unable to purchase the prescribed materials for resuscitation or pay for surgery. Emergency treatment voucher was used for 122 (25.0%) patients. Despite efforts at resuscitation, the ASA score deteriorated with prolonged TT. The proportion of patients with ASA e"3E increased from 35% at presentation to 42% at commencement of operation in patients waiting for more than 24 hours. In 230 (47.1%) patients, operation was performed between 9.00PM and 8.00AM. The duration of operation ranged from 0.7 to 8.0 hours with a median of 2.7. Prolonged TT was associated with longer operation time. The mean operation time for patients that had surgery within 6 hours of admission was 1.8 ± 0.75 hours.

Table 2: Waiting time from presentation to commencement of operation

Waiting Time	Range (Hours)	Mean ± SD (Hours)
T1	0.1 – 1.6	0.5 ± 1.2
T2	0.1 – 1.2	0.2 ± 1.0
T3	0.5 – 53.0	9.4 ± 5.6
T4	0.2 – 7.4	1.3 ± 1.8
TT	0.8 – 79.0	22.3 ± 10.0

T1 =waiting at hospital for the first contact with emergency room doctors
T2 =time between contact and decision to operate
T3 =time taken to resuscitate patient
T4 =adequate resuscitation to commencement of operation
TT = presentation to commencement of surgery

The operation time was 2.3 ±1.5 and 3.5 ±1.8 for patients that had operation within 24 hours or later respectively. The median operation time in patients with appendicitis was 0.85 hours compared to 2.20 in patients with perforated bowel. Three patients presented with obstructed inguinal hernias 1-3 hours after onset of symptoms. At admission they had colicky abdominal pain and vomiting. The hernias were irreducible and tenderness was localised to the site of the hernia. Their pulse rates were 76-86/minute while their temperature and leucocytes counts were normal. At the time of surgery 28-36 hours after admission they had developed persistent generalised abdominal pain and tenderness, had pulse rates of 125-142/minute, had fever and leucocytosis of 11-15x10^3/L. These patients required resection and anastamosis of bowel because of gangrenous changes which probably developed while the patients were on admission.

Table 3: Causes and mean duration of delay beyond six hours in 398 patients

Cause	Number	%	Waiting Time Mean ± SD
Financial constraint	214	53.8	19.2 ± 17.3
Delayed investigation results	96	24.1	12.5 ± 8.3
Late night admission	52	13.1	8.0 ± 3.5
Lack of cross matched blood	31	7.8	12.3 ± 6.0
Lack of theatre space	28	7.0	6.1 ± 2.2
Problem of personnel	15	3.8	3.7 ± 2.1
Other	5	1.3	8.0 ± 6.5

Note: many patients had multiple causes.
SD = Standard deviation.

Post-operative complications increased with TT (Figure 1). Three hundred thirty two (68.0%) patients did not have any complications (severity score of 0). Overall, 23 (4.7%) patients died (severity score of 4). The median (range) severity of post-operative complication in patients operated within 6 hours of diagnosis was 0 (0-4) compared to 2 (0-4) in patients that waited for more than 24.0 hours ($p<0.001$). The characteristics of patients with post-operative complications are shown in table 4.

Figure 1: Waiting time and postoperative complications

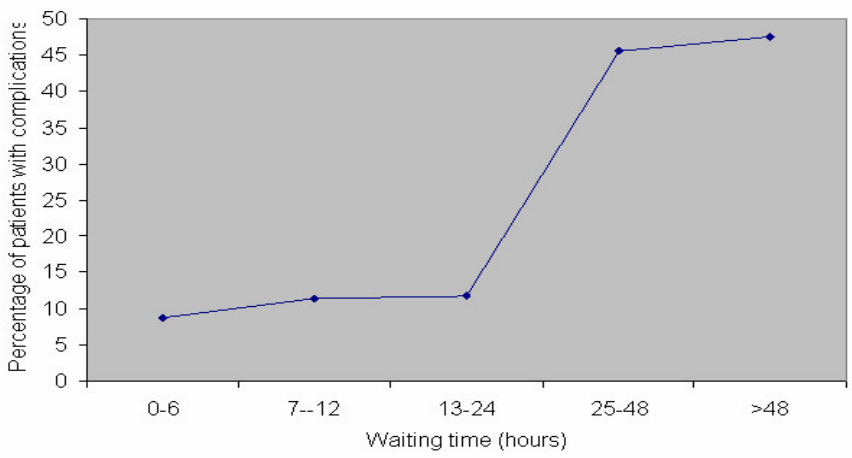

Table 4: Characteristics of patients with or without post-operative complications

	With complications			Without complications			
Characteristics	n	Mean (SD)	Standard error	n	Mean (SD)	Standard error	p-value
Age (years)	156	33.5 (6.5)	3.55	332	32.0 12.5)	2.76	0.382
Male	95			202			0.758
Female	61			130			
Time from onset of symptom to hospital admission (hours)	156	58.0 (17.5)	10.60	332	26.7 (5.2)	4.3	0.001
Time from hospital admission to surgery (hours)	156	37.4 (12 .6)	7.91	332	16.8 (7.5)	4.6	0.0001
Duration of operation (hours)	156	4.5 (1.7)	0.75	332	2.3 (1.5)	0.25	0.005
Hospital stay (days)	156	17.0 (4.9)	3.20	332	5.8 (3.7)	1.6	0.001

These patients had a mean TT of 37.4 ± 12.6 hours compared to 16.8 ± 7.5 in those without post-operative complications (p=0.0001). The TT is also a significant determinant of severity of complications (Figure 2). Multiple regression analysis in table 5 shows that the TT (p=0.0001), ASA grade (p=0.003) and time from onset of symptoms to hospital admission (p=0.0001) are significantly associated with severity of complications. The TT is also a significant determinant of post-operative mortality. Univariate analysis (Table 6) revealed that the factors that predicted mortality were TT (p=0.0001), duration of illness before presentation at hospital (p<0.005), ASA grade at commencement of surgery (p=0.0001), socio-economic class (p<0.001), duration of surgery (p<0.01) and intraperitoneal abscess (p<0.005). Multivariate analysis (Table 7) revealed that independent mortality-related factors ware the ASA grade (p<0.005), the time elapsed between onset of symptoms and hospital admission (p<0.009) and the TT (p<0.001). Prolonged TT was also associated with longer hospital stay. Among the 240 patients that had operations within 24 hours of admission the mean hospital stay was 5.3 ± 2.7 days compared to 14.8 ±6.1 in those delayed beyond 24 hours (p=0.01). Other factors associated with prolonged hospital stay ware ASA grade and presence of complications (p=0.0001).

Figure 2: Waiting time and severity of complication

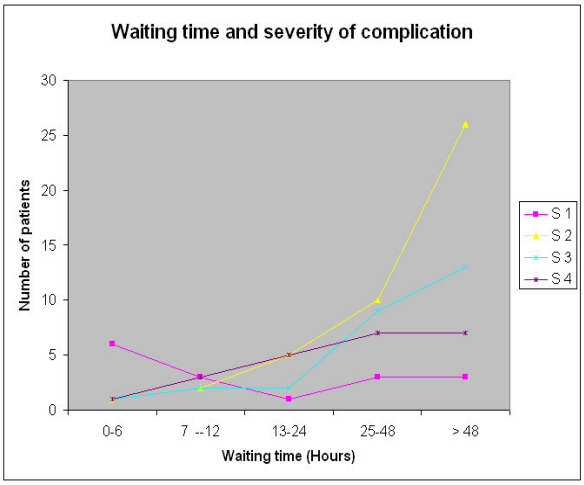

Table 5: Results of logistic regression analysis of factors associated with severity of post-operative complications

Variable	Estimate	Standard error	Wald test	Odds ratio	P- value
Time from onset of symptom to hospital admission (hours)	-0.705	0.08	38.4	0.35	0.0001
Time from hospital admission to surgery (hours)ASA grade	-0.701 -0.628	0.11 0.13	59.3 20.2	0.47 0.55	0.0001 0.003
Duration of operation (hours)	-0.517	0.12	18.5	0.49	0.001
Age (years)	-0.245	0.27	2.6	1.35	0.085
Sex	-0.221	0.25	1.7	1.06	0.271

ASA= American Society of Anaesthesiologists

Table 6: Univariate analysis of factors associated with post-operative mortality

Variable	Deaths No. (%)	X^2	p-value
Sex		1.24, 1df,	0.39
Male (n=301)	13 (4.3)		
Female (n=187)	10 (5.3)		
Social Class		8.27, 2df	0.001
Class I (n=81)	1 (1.2)		
Class II (n=122)	4 (3.3)		
Class III (n=285)	18 (6.3)		
ASA grade at presentation		57.24, 4df	0.0001
I or II (n=273)	7 (2.5)		
III (n=205)	13 (6.3)		
IV (n=10)	3 (30)		
Age (years)			
15-24 (n=166)	8 (4.8)		
25-49 (n=259)	11 (4.4)		
Greater or equal to 50 (n=63)	4 (5.8)		
Time from onset of symptoms to hospital admission (hours)		12.75, 1df	0.005
< 48 (n=327)	8 (2.4)		
Greater or equal to 48 (n=161)	15 (9.3)		
Time from hospital admission to surgery (hours)		46.25, 3df	0.0001
< 24 (n=240)	3 (1.2)		
Greater or equal to 24 (n=248)	20 (8.1)		
Operative diagnosis		17.92, 1df	0.005
Appendicitis (n=248)	2 (0.8)		
Intestinal obstruction (n=123)	7 (5.7)		
Intestinal perforation (n=59)	7 (11.9)		
Intra peritoneal abscess (n=34)	6 (17.7)		
Other (n=24)	1 (4.2)		

ASA= American Society of Anaesthesiologists

Table 7: Results of logistic regression analysis of factors associated with post-operative mortality

Variable	Deaths No. (%)	Odds ratio	95% CI	p-value
Sex				0.75
Male (n=301)	13 (4.3)	1.00		
Female (n=187)	10 (5.3)	1.28	0.57-1.32	
ASA grade at presentation				0.005
I or II (n=273)	7 (2.5)	1.00		
III (n=205)	13 (6.3)	2.35	1.65-4.97	
IV (n=10)	3 (30)	3.99	1.22-5.36	
Age (years)				0.35
15-24 (n=166)	8 (4.8)	1.00		
25-49 (n=259)	11 (4.4)	0.80	0.53-1.34	
Greater or equal to 50 (n=63)	4 (5.8)	1.08	0.75-1.50	
Time from onset of symptomsto hospital admission (hours)				0.009
< 48 (n=327)	8 (2.4)	1.00		
Greater or equal to 48 (n=161)	15 (9.3)	3.97	1.54-4.58	
Time from hospital admission to surgery (hours)				<0.001
< 24 (n=240)	3 (1.2)	1.00		
Greater or equal to 24 (n=248)	20 (8.1)	4.96	2.65-7.68	
Operative diagnosis				0.005
Appendicitis (n=248)	2 (0.8)	1.00		
Intestinal obstruction (n=123)	7 (5.7)	0.89	0.64-2.63	
Intestinal perforation (n=59)	7 (11.9)	2.61	1.73-7.81	
Intra peritoneal abscess (n=34)	6 (17.7)	3.27	2.64-12.59	
Other (n=24)	1 (4.2)	1.25	0.92-1.75	

ASA= American Society of Anaesthesiologists

Discussion

This study has shown that patients with emergency abdominal diseases waited for too long before they had surgical intervention. The waiting time, ASA grade of the patient and the time elapsed between onset of symptoms and hospital admission had the maximum impact on the postoperative mortality. The same factors in addition to the duration of surgery are related to the severity of the postoperative complications. In this study, 81.6% of patients had surgical intervention more than 6 hrs after admission compared to 54.2% to 90.4% reported from other developing countries[1, 19, 20]. In developed countries, most emergency operations are performed within one hour of admission but delay beyond 3 hours is seen in about 15.0% of patients[12, 13]. The mean waiting time in our patients was 22.3 ± 10.0SD which compares favourably to 39.5 to 44.0 hours reported from our sub-region[1, 19, 20]. In developing countries it is not unusual for emergency operations to be delayed beyond 48 hours[1,2,4,19,20]. Prolongation of the waiting time was usually a result of prolonged T3, the time taken for the patient to be resuscitated. For most inflammatory and obstructive conditions responsible for acute abdomen a period of preoperative resuscitation is usually necessary. The dangers of inappropriate hasty surgery have been highlighted by the National Confidential Enquiry into Perioperative Deaths (NCEPOD) [16]. However, the optimum time of surgery is a balance of the benefits of resuscitation weighted against the risks of progression of disease. In this study, delayed resuscitation was usually due to inability of the patients to immediately purchase the materials for resuscitation because of financial constraint. This is similar to other reports from our sub-region[1, 20,21]. The Bamako initiative has given a prominent role to community financing through user fees[22]. The inequitable impact of user fee is such that it deters the poor more than the rich from using health facilities. Emergency treatment voucher was used to cover for surgical fees pending the time the patient was able to pay. This is similar to the indigenous patient's loan scheme of the Sokoto initiative which significantly reduced maternal mortalty[23]. The impact of user fee particularly in relation to equity should be properly designed and implemented otherwise it will widen the gap between the rich and the poor on access to health services. In this study following essential resuscitation, the mean delay in operating on abdominal emergencies was 2.8 hours, similar to the findings in developed countries[12, 13, 24].

Waiting for complementary investigations was the second most common cause of delay in our patients and accounted for 22.1%. Many of these investigations were delayed because the patients could not pay for them on time or the staffs to perform them were not available. In a study from Libreville, waiting for complementary investigations was the most common cause of delay[1]. Other studies have shown that greater attention to emergency investigations would result in more timely interventions in emergently hospitalised patients[2, 25]. Admissions at night are important causes of delayed surgical intervention. Most of these patients had acute appendicitis. Many reports have shown that with appropriate use of intravenous fluid and antibiotics such operations can be safely delayed to the following morning without increasing morbidity[9, 26]. Prolongation of T4 (booking to start of operation) in our setting was mainly due to non-availability of theatre staff including surgeons, anaesthetist and nurses, and was usually due to inadequate staffing [13, 27].

However, it may also be due to poor commitment of the staff. A report from Pakistan revealed that the most common cause of delayed surgical intervention in their patients (36.3%) was inefficiency of the surgical team[9]. Another report from Ibadan, Nigeria revealed inefficiency of the doctors of the surgical team to bethe major cause of poor emergency theatre time utilization[21]. In the present study, it is salutary to note that lack of electricity, anaesthetic gasses, operation gowns and linen which featured prominently in a previous study from our institution did not contribute to delays[2].
Several studies have demonstrated worse outcome in patients who waited too long for emergency operations[4,10,20,28]. The waiting time is an independent predictor of mortality and severity of morbidity. Prolonged delay would also influence the course of time-defendant diseases. In this as in other studies, patients that presented with simple obstruction required resection and anastamosis of bowel because of gangrenous changes due to delayed surgical intervention[4,19,20]. Prolonged delay in patients with appendicitis has also been shown to be associated with significantly higher risk of complications[25,29,30]. The better outcome of early surgical intervention in our study compared with prolonged delay is consistent with other reports[1,4,20,26]. Delayed surgical interventions also resulted in a high proportion of

emergency operations occurring late at night. At that time there is increased reluctance to involve more senior members of staff and standards of care may be compromised.

In conclusion, this study has shown that a significant portion of our patients waited too long for emergency abdominal surgery which resulted in high morbidity and mortality. The main constraints in our setting are poverty and institutional organizational problems. Although the surgeon may not influence the long delays before patients with acute abdominal emergencies in our sub-region present to the hospital, once in the hospital, these patients should be promptly resuscitated to facilitate the safe conduct of both anaesthesia and surgery. Patients scheduled for emergency surgery should be taken to the theatre within an acceptable time limit, perhaps within 60 minutes of the decision to operate. By reducing the waiting time for surgical intervention, this would reduce mortality and morbidity. We suggest that our emergency treatment voucher should be made to also procure consumables to enable prompt resuscitation of the patient. The commencement of the national health insurance scheme (NHIS) in Nigeria is laudable as it would provide solution to most of these problems. However, for it to be effective the NHIS must provide cover for the lower socio-economic class which constitutes a significant portion of our patients. Finally, hospitals should be provided with efficient management system which would make surgical services readily available and affordable.

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Ophthalmic admissions in a tertiary hospital in Nigeria

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Abstract

Background: Hospitalization for eye care is required for different reasons. The pattern of admissions into the ophthalmic wards of a sub-urban tertiary hospital was studied.

Methodology: Records of patients admitted into the Ophthalmology wards of the Obafemi Awolowo University Teaching Hospitals Complex Ile-Ife from January 2004 to December 2007 were reviewed and the age, sex, duration of admission and diagnosis recorded. Data was analyzed with SPSS version 13 and statistical significance inferred at $P<0.05$.

Results: Of the 523 patients admitted, 60.2% were males while 39.8% were females ($P<0.0001$); the male preponderance becomes less prominent with increasing age ($P=0.001$). The duration of admission ranged between 2 and 24 days with a mean of 2.86± 1.95 days and 63% were admitted for 3 days. The main indications for admission were cataract (58.3%), ocular trauma (14.3%) and glaucoma (13.4%). Eye injuries were more common among children and young adults while cataract and glaucoma were the leading indications in the middle aged and elderly.

Conclusion: Cataract, trauma and glaucoma were the leading indications for ophthalmic hospitalization. Human and infrastructural development of the ophthalmology unit should lay emphasis on the more prevalent needs to enhance effective and efficient management of these diseases.

Keywords: Hospitalization; Eye care; Daycare; Cataract; Glaucoma; Nigeria

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Introduction

Traditional hospitalization for in-patient care remains an integral part of specialist eye care globally. In-patient eye care is required for different reasons and eye diseases.[1-7] Medical reasons, surgeons preference, ocular surgeries, presence of home support and distance of patients domicile from the hospital are among the factors guiding ophthalmic admissions.[1-4,8] Medical reasons for ophthalmic admissions range from the need for intravenous medications, frequency of monitoring or application of topical medications, vision threatening disorders to head positioning.[1]

In- patient care is costly for the health system and the patient; the necessity for admission must be justified since out-patient eye care reduces the cost.[2] The indications for admission varies in different centres; infection and trauma were the leading indications for ophthalmic admissions in southwestern Nigeria while retinal detachment and trauma were the leading indications in Paris.[1,9] The rates and duration of admissions for ophthalmic care may be influenced by ethnicity and may be indicative of the level of efficiency of ophthalmic care and management in the region studied.[5] In sub-saharan Africa, there is maldistribution of the few available Ophthalmologists;[10] this in combination with the many isolated rural communities translates to many patients living far from the available ophthalmic centres.

Studies on pattern of ophthalmic admissions in sub saharan Africa is sparse; those available deal with specific subsets like trauma and children.[9,11] The characteristics of ophthalmic admissions have important implications for ophthalmic health care planning.[5] This study of the pattern and indications for ophthalmic admission was carried out in a tertiary hospital located in a sub-urban city in Nigeria to provide data which will be informative in planning efficient eye care for the area served and the next phase of development plan for the Ophthalmology Unit.

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Methods

A retrospective study of the patients managed as in-patients in the Ophthalmology wards of the Obafemi Awolowo University Teaching Hospitals Complex, Ile-Ife, from January 2004 to December 2007 was conducted. Patients who were admitted for 24 hours or more were considered as inpatients and constituted the study population.[2] Patients who were admitted for observation for less

than 24 hours or for day-case surgeries were excluded.

The tertiary hospital is located in a sub-urban city and serves as a referral centre of eye care for patients in Ife-Ijesa zone of Osun State and some parts of Ondo, Ekiti, Oyo and Edo States; self reporting patients are also managed. Information on the age, sex, diagnosis and duration of hospital stay were retrieved and recorded for each patient and diagnoses were further grouped for easy presentation. Data was imputed into SPSS version13 and analyzed for simple descriptive statistics. Variables were further compared using chi square and ANNOVA as appropriate and statistical significance inferred at $P<0.05$.

Results

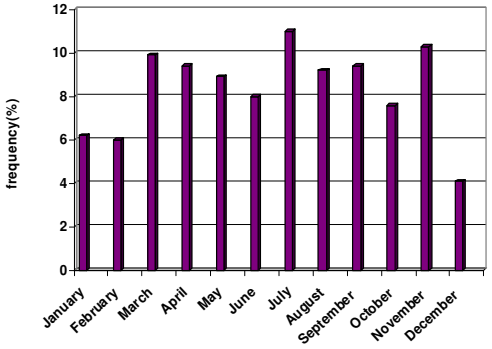
Five hundred and twenty three patients admitted during the study period formed the study population. Most of the patients 315 (60.2%) were males while 39.8% were females ($p<0.0001$). The male preponderance becomes less prominent with increasing age ($P=0.001$). The number of patients admitted in the ophthalmic wards increased with increasing age with 388 (74.6%) aged forty- five years and above while 40(7.6%) were children (Table 1).

Table I: Age group and gender characteristics of ophthalmic admissions

Age group (yrs)	Male (%)	Female %)	Total(%)	Male:Female
<16	32(80)	8(20)	40(7.7)	8:1
16-44	66(71)	27(29)	93(18.0)	2.4:1
45-64	105(60.3)	69(40.1)	172(33.3)	1.5:1
>/=65	112(51.9)	104(48.1)	216(41)	1.1:1
Total	315(60.2)	208(39.8)	523(100)	1.5:1

The duration of admission ranged between 2 and 24 days with a mean of 2.86± 1.95 days; 63% were admitted for 3 days. Ophthalmic admissions peaked in the months of July (11%) and November (10.3%) while it was lowest in December (4.1%). (Fig I)

Figure 1: Distribution of Ophthalmic Hospitalization per months of the year



The main indications for admission were for surgical management of cataract (58.3%), ocular trauma (14.3%) and for surgical management of glaucoma (13.4%). Eye injuries were more common (68%) among children and young adults while cataract and glaucoma were the leading indications in middle aged and elderly as indicated in Table 2. The mean age of patients admitted for trauma and tumours were significantly lower than for cataract and glaucoma ($P <0.0001$) as shown in Table3.

Table 2: Indications for ophthalmic admission

	Age group (years)				
Diagnosis	<16(%)	16-44(%)	45-64(%)	>65(%)	Total(%)
Cataract	5(1.6)	20(6.6)	102(33.4)	178(58.4)	305(58.3)
Trauma	17(22.7)	34(45.3)	15(20)	9(12)	75(14.3)
Glaucoma	3(4.3)	14(20)	36(51.4)	17(24.3)	70(13.4)
Pterygium	-	5(22.7)	10(45.5)	7(31.8)	22(4.2)
Orbital cellulitis	5(45.5)	3(27.3)	2(18.2)	1(9.1)	11(2.1)
Lid disorders	2(18.2)	7(63.6)	1(9.1)	1(9.1)	11(2.1)
Corneal ulcer	1(14.3)	2(28.6)	3(42.9)	1(14.3)	7(1.3)
Tumours	3(42.9)	4(57.1)	-	-	7(1.3)
Conjuctival mass	1(33.3)	1(33.3)	1(33.3)	-	3(0.6)
Staphyloma	1(33.3)	2(66.7)	-	-	3(0.6)
Panophthalmitis	-	-	1(50)	1(50)	2(0.4)
Others	2(28.6)	1(14.3)	3(42.9)	1(4.3)	7(1.3)
Total	40(7.6)	93(17.8)	174(33.3)	216(41.3)	523(100)

Table 3: Mean age against diagnosis in ophthalmic admissions

Diagnosis	Mean age (years)	Standard Deviation
Pterygium	54.6	14.1
Glaucoma	50.7	18.5
Cataracts	63.9	15.3
Eye injury	32.8	20.5
Conjunctival mass	35.0	25.2
Corneal ulcer	43.3	21.5
Lid disorders	35.8	20.4

Continuation of table 3

Diagnosis	Mean age (years)	Standard Deviation
Orbital cellulitis	25.9	21.6
Staphyloma	19.0	13.0
Tumours	17.1	14.4
Panophthalmitis	74.5	14.9
Others	41	29.9
Total	54.27	21.6

Discussion

Male preponderance is similar to the male to female ratio of 1.3:1 reported in a tertiary hospital in Midwestern part of Nigeria.[6]The reduction in the degree of male preponderance with increasing age in this study may be related to the differences in the indications for admission in the different age groups. Ocular trauma had been previously associated with male preponderance;[11-13] trauma was the most prominent indication for admission amongst children and young adults in this study thus accounting for the marked male preponderance in the younger age group. Prevalence of blindness increases with increasing age and cataract is the leading cause blindness in Nigeria.[14,15] Cataract was the leading diagnosis amongst the patients studied; thus accounting for the trend of increasing number of admission with increasing age. Ferguson et al[16] reported an increase in age specific ophthalmic admission rates among the elderly with increase in cataract procedures being a major contributory factor; a decrease in admission rate for children was also accounted for by decrease in admission for strabismus. In our series, no patient with strabismus underwent surgery during the study period hence the absence of strabismus as indication for admission. Sixty three percent of patients were admitted for three days while the mean duration of admission was 2.86± 1.95 days. Gaujoux et al in Paris reported a mean duration of admission of 3 days while Onabolu reported a mean stay of 2.87 days.[1,9] Prolonged length of stay may be a reliable surrogate measure of disease severity.[2] In our study, patients that were admitted for cataract or glaucoma surgeries usually stay for three days. Although the advantages and safety of daycase cataract surgery are known,[3,17,18] this practice remains restricted to well selected few in our environment. Hospitalization for cataract surgery is still required as many patients live far from the hospital in numerous isolated communities with poor road network such that it becomes more expensive and painstaking for the patient and escort relative to travel to and from the hospital for a daycase cataract surgery compared to being hospitalized. Moreover, the absence of outpatient-housing,[1] adequate home support including ease of communication with health facility makes traditional hospitalization for cataract surgery to remain relevant for many patients in our setting. Ocular trauma may require in-patients care especially when severe, open, and associated with hyphaema or with other injuries requiring admission. Longer hospitalization periods are reported for traumatic eye admissions with 65% staying longer than seven days.[11]

Glaucoma was responsible for 8.1% of all ophthalmic admissions in Pakistan [4] as compared to 13.4% in our series. While there is a decline in the rate of glaucoma surgery in advanced countries due to the availability of newer topical medications to lower intraocular pressure,[7] surgery still remains the mainstay of treatment for glaucoma especially among black African patients due to poor compliance with medical therapy for various reasons especially from the unavailability and high cost of topical therapy.[19] In conclusion, ophthalmic hospitalizations tended towards male bias, short period of stay and were largely for cataract, trauma and glaucoma. Infrastructural development should be considerate of provision of more bed space for males in the ophthalmic wards especially for young adults and children. Personnel capacity development of the ophthalmology team should lay emphasis on the more prevalent needs to enhance effective and efficient management of these diseases.

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