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SOCIO-DEMOGRAPHIC CHARACTERISTICS AND CLINICAL FEATURES AMONG PATIENTS ATTENDING A PRIVATE PAEDIATRIC DENTAL CLINIC IN NAIROBI, KENYA

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ABSTRACT

**Objectives:** To evaluate the socio-demographic characteristics, chief complaints and clinical presentation of children attending a private dental clinic in Nairobi, Kenya.

**Design:** A retrospective survey of dental clinic records.

**Setting:** A private dental clinic in Nairobi, Kenya.

**Subjects:** All patients aged 0-18 years who were first-time attenders at the dental clinic during a three year period.

**Results:** The records of 800 patients were examined, comprising 395 males and 405 female children. The average age was 7.2 years (95% CI, 6.9-7.4).

Referral to the clinic for treatment was mostly by self (81.4%). Most patients (57.9%) were self-sponsored for their dental treatment. Majority of the patients attending (86.8%) did not clinically have any underlying medical conditions. The major complaints for most patients were dental decay (27.4%) and dental pain (21.6%). Very few children (7.6%) attended for dental check-up. Five hundred and forty nine (68.6%) of the children suffered from dental decay while 294(36.8%) suffered from gingivitis. The average number of teeth decayed was 4.02, SD±2.4 (95 % CI 3.8-4.2). Most carious lesions occurred in the younger children. There was a significant increase in the occurrence of decay over the three year period of the study. Significantly higher levels of gingivitis was observed in the prepubertal and pubertal age group. Attendance for traumatic injuries was relatively low with only 46(5.8%) children reporting traumatic injuries to their dentitions. Most traumatic injuries involved the anterior teeth as a result of falls. Treatment given at the first visit was mainly restorative (28.6%) followed by dental extractions (25.4%).

**Conclusion:** The average age of patients attending the clinic was 7.2 years. Interdisciplinary referral was low since most patients were self-referred and self sponsored for treatment. Dental caries was prevalent, necessitating a high demand for restorative treatment. Although gingivitis was less prevalent, it was significant among children in the prepubertal years.

INTRODUCTION

Dental caries and gingivitis are the two most prevalent diseases in children world-wide. Several epidemiological studies on these diseases have been carried out in the last few decades in Kenya forming the basis of the status of Oral health in children in the country.

Data reported on dental caries in some of these studies showed low to moderate levels of the disease in both the permanent and deciduous dentitions. In the permanent dentition the reported DMFT ranged between 0.2 to 1.8 for 12 -15 year -old children and 1.7 for the 6 - 8 year olds(1,2). Studies on caries in the deciduous dentition reported DMFT values ranging between 1.5 - 2.95 in five year olds(1,3,4) and 1.35 in three year- old children(3). The findings of these epidemiological studies suggest that the caries prevalence in Kenyan children is well within the WHO goals of

2000 of DMFT of three or less in 12 year old children. Occurrence of dental caries in children in East Africa was found to be of a fairly similar pattern(5,6).

Studies carried out on oral hygiene and gingivitis reported moderate to high levels of plaque and gingivitis ranging between 40% and 90% in children of various ages(1-3). Most children were reported to demonstrate plaque induced chronic gingivitis that is commonly associated with children and adolescents. All the studies showed a pattern of proportionate increase in gingivitis with age.

Documented data on traumatic injuries, a common concern in dental practice for children, is scanty with the few available studies limiting themselves to evaluating the occurrence of fractured upper anterior teeth. Prevalence ranges of 15% - 16.8% have been reported which included dental injuries to handicapped children(7-9).

The socio-demographic characteristics of the child population that seeks dental treatment has not been well documented locally despite there being a number of public institutions that attend to the dental needs of paediatric dental patients. Yet this is an important area of study as demographic statistics on populations in Kenya reveal that out of 30 million people, 50% are under the age of 15 years. This young population has been shown to be one of the most susceptible target groups to common dental diseases especially dental caries(10-12). It is against this background that this retrospective study was undertaken to obtain baseline data on the characteristics of children who attend for dental treatment and to evaluate the occurrence of dental caries, gingivitis and traumatic injuries in children in Nairobi based on actual attendance at a dental clinic. Such data would be invaluable in reporting the dental health status of children in terms of their treatment needs. The treatment carried out at the first visit was also evaluated.

#### MATERIALS AND METHODS

This was a retrospective study based on clinical records of children aged between 0-18 years who had attended the clinic for the first time over a three year period(2000 - 2002). The patients were identified from the clinic day book. Their medical records were retrieved and all the necessary information was recorded in a proforma. The information obtained included age, sex, source of referral, sponsorship for treatment, underlying medical condition, presenting complaint, clinical findings and treatment at first visit. The information obtained from the records were found to have been fairly consistent as all medical notes had been recorded by the same clinician. Statistical analysis was then performed using the SPSS analytical package. Results were considered to be significant if  $P < 0.05$ .

#### RESULTS

*Sociodemographic characteristics and chief complaints:* Eight hundred records were available for

analysis (96% return). The attendance by year of study showed a consistent distribution of patients attending within each year; 279(34.9%), 255(31.9%), 266(33.2%) respectively. Gender was fairly balanced within the sample with 395 (49.4%) male and 405 (50.6%) female children. The average age of the patients was 7.21 years (95% CI, 6.9 - 7.4), the youngest child being less than one year of age while the oldest was 18 years. Self sponsored patients were 463 (57.9%) as opposed to 337 (42.1%) whose treatment was sponsored by their employers or health insurance companies. Referral for treatment was mostly by self (81.4%), a category that included friends, relatives, colleagues and neighbours. Very few patients were referred by medical counterparts either general dental practitioners (10.3%), or medical practitioners (8.4%).

Majority of patients attending (86.6%) did not have any underlying medical conditions. Of patients who gave a positive medical history, most suffered from respiratory disorders mainly bronchitis(5.6%) and allergies to various substances (3.4%). Patients with congenital cardiac disease or cerebral palsy were few (0.5%,0.4% respectively). There were isolated cases of sickle cell anaemia, tuberculosis, those exposed to HIV infection, hydrocephalus and epilepsy .

The most commonly presenting major complaint was decay of teeth in 27.4% patients. Decay was expressed in various terms such as 'rotten teeth', 'breaking teeth', 'browning teeth' or teeth being eaten away'. These patients did not necessarily complain of pain. However, 21.6% of patients expressed their major complaint as pain. The other frequently encountered complaints were malocclusion of teeth or 'teeth that were not well arranged' and presence of over retained deciduous teeth. Complaints related to aesthetics and discolouration of teeth were few (2.0%). Relatively few children (7.6%) attended merely for dental check-up. The distribution of patients according to the presenting complaints is illustrated in Table 1.

Table 1

*Distribution of patients according to the presenting complaints*

Presenting Complaint	No. of patients	(%)
Decay	219	27.4
Pain	173	21.6
Malocclusion	123	15.4
Over retained dec. teeth	95	11.9
Check-up	61	7.6
Swelling	58	7.3
Aesthetic	16	2.0
Bleeding	15	1.9
Others	40	4.9
Total	800	100

Relatively few patients attended for dental check-up

**Table 2a***Percentage distribution of caries lesions according to age group*

Age group (yrs)	Decay Present	Decay absent	Total
0-4	77.7	22.3	100
5-9	66.1	33.9	100
10-14	70.2	29.8	100
15 and above	61.8	38.2	100

The difference is significant,  $\chi^2 = 11.84$ , 3DF,  $P=0.008$ , the younger children with more decay

**Table 2b***Percentage distribution of dental caries according to year*

Year	Decay present (%)	Decay absent (%)	Total
1	63.1	36.9	100
2	70.2	29.8	100
3	72.1	27.9	100

Significant increase in presence of decay over the three year period,  $\chi^2 = 6.565$  2DF  $p = 0.038$

**Table 3***Percentage distribution of cases of gingivitis according to age group*

Age group (yrs)	Gingivitis Present (%)	Gingivitis Absent (%)	Total
0-4	18.7	81.3	100
5-9	30.3	69.7	100
10-14	29.3	70.7	100
15 over	21.8	78.2	100

The difference is significant  $X^2 = 9.31$ , 3DF,  $P = 0.025$  Significant increase in 5 -14 year old age bracket

**Table 4***Distribution of treatments offered to all the patients attending the clinic at first visit*

Treatment	No. of patients	(%)
Restorations/Endo	229	28.6
Extractions	203	25.4
Reassurance	136	17.0
Oral Prophylaxis	77	9.6
Ortho Evaluation	66	8.3
Medication	66	8.3
G.A.	18	2.3
Splinting	5	0.6
Total	800	100

Patients largely required intervention of disease already present

*Clinical findings*

**Dental caries:** Dental caries was diagnosed in 549 (68.6%) of the children, with only 251 (31.4%) children having been caries free. The average number of decayed teeth was 4.02,  $SD \pm 2.4$  (95% CI 3.8-4.2). A T-test showed no difference in gender affliction ( $P > 0.05$ );

the average for males being 4.01 and females 4.02. The presence of dental caries by age group of the patients was analysed and the results as presented in Table 2a indicate highly significantly that the younger children had more carious lesions ( $P = 0.008$ ). Only 23% of these young children in the 0-4 year old age bracket were

found to have been caries free. The presence of dental caries by year of study was also evaluated and the results are presented in Table 2b, depicting a significant increase in carious lesions over the three year period ( $P=0.038$ ).

*Gingivitis:* Occurrence of gingivitis was found to have been comparatively lower, with only 294 (36.8%) children recorded as having gingivitis. When the presence of gingivitis was related to age group, there was a significant increase in the prepubertal (Age 5-14 years) and pubertal age bracket ( $P=0.025$ ) as presented in Table 3. There was no significant difference ( $P>0.05$ ) when gingivitis was evaluated according to gender.

*Traumatic injuries:* There was a low frequency of traumatic injuries with only 46 (5.8%) of patients attending with acute or chronic traumatic injuries. The highest cause of traumatic injuries (56.5%) resulted from falls followed by injury from knocks (32.6%). These figures contrasted with that of injury from organised sports such as swimming or school games which had a relatively low contribution of 8.7% to traumatic injuries in this study. When types of injury by dentition was evaluated most permanent teeth (30.4%) suffered fractures compared to the 6.5% deciduous teeth that fractured. Conversely, more deciduous teeth (21.7%) suffered subluxation compared to the 4.4% of the permanent dentition that suffered subluxation. A relatively large percentage (26.10%) of teeth in both the deciduous and permanent dentitions were found to have been discoloured as a result of long-standing traumatic injuries. An evaluation of traumatic injuries according to gender was insignificant ( $P > 0.05$ ).

The other notable clinical findings were malocclusion, with crowding in 16% patients, proclination of upper anterior teeth in 8.3% patients, the presence of over-retained deciduous teeth in 15.8% patients, swellings in 11.9% patients and missing teeth in 1.6% patients.

*Treatment at first visit:* The most frequently performed treatment at the first visit was restorative treatment which included endodontic treatment, followed by dental extractions. This made up 28.6% and 25.4% respectively of treatment given at first visit. Further evaluation of the need to extract at the first visit revealed that 62.1% of the extractions were done for over retained deciduous teeth, 28.3% for other reasons such as trauma and serial extractions, and only 9.6% of the extractions were performed for irrestorable caries lesions. Reassurance was considered as a form of treatment when no invasive treatment was carried out at that first visit. Only 2.3% of patients were scheduled for treatment under general anaesthesia (GA) during the three year period. Table 4 illustrates the forms of treatment that were undertaken at the first visit.

## DISCUSSION

The findings of this study indicate a consistency in the number of patients attending a private dental clinic per year and a fair balance in gender distribution. Private dental clinics make a substantial contribution to oral health care delivery in Kenya. The finding that most patients who attended the clinic sponsored themselves for treatment may lend credence to the suggestion that patients who are treated at private dental clinics are somewhat from an elite group within the society(13). However, there is also the concern that health insurance companies and health management organisations are not adequately favouring provision of dental care in their policies. This issue was highlighted in the recently launched Kenya National Oral Health Policy where it was noted that lack of organised insurance schemes to subsidize the high cost of Oral health care may prove to be a fundamental barrier to oral health(13). A resolve to this problem will only come about when policies are formulated that accommodate oral health as an integral part and parcel of an essential health care package.

A very large percentage (86.6%) of children who attended the clinic did not have any overt underlying medical conditions. A likely explanation for this may be that such compromised patients are more likely to attend hospital based clinics, which they may view as the right place to address their medical and dental problems. A study of such an hospital based clinic would make interesting comparison. Interdisciplinary referral was very low considering that the attending clinician was specialised in the dental care of children. There appears to be a need for sensitisation and improvement in referral within the medical and dental fraternity such that dental care for paediatric patients may fall squarely in the hands of practitioners who are appropriately trained.

Dental caries and pain caused attending patients the greatest concerns (27.4% and 21.6% respectively). Attendance merely for a dental check-up scored a poor 7.6%. This is a consistent finding in developing countries and in minority groups in developed countries where patients attend only when there is an urgent need for treatment(14). This finding begs for further research into what the mitigating factors really are that cause patients to attend only when disease or pain becomes obvious. That notwithstanding, an approach to health promotion through a preventative approach and regular attendance even when there is no apparent illness is desirable.

Dental caries and gingivitis were similarly observed in this study as the most prevalent dental diseases in children attending for treatment. DMFT and dmft values were not evaluated as this was a retrospective analysis of data already present. However, with 68.6%

patients attending with dental caries and the average number of teeth decayed standing at 4.02, the prevalence of dental caries from this study can be considered to be fairly high. The small percentage (23%) of the younger children in the 0-4 year age bracket who were found to be caries free compared unfavourably with those figures obtained in previous epidemiological studies where between 50 and 62% of children in a similar age group were reported as having been caries free(1,3,4). Similar patterns were observed in the older age groups. Only 33.9% of the 5 - 9 year olds in this study were caries free compared to 44% of the 6 - 8 year olds in a previous report(2), and only 29.9% of the 10-14 year olds were caries free in this study compared to 50% of the 13-15 year olds in previous epidemiological results(1,2). It is obvious of course, that to the study population carries some bias in demonstrating high levels of disease as it is obvious that children seeking treatment are those who suffered from the disease and this may not necessarily reflect the true situation in across section of the population. However, when one further considers the results obtained here on caries by year of study, it is noticeable that even within this sample of children, caries experience indeed showed an upward trend during the subsequent years of the study. Hence this may be a reflection of an increase in prevalence of the disease.

This study found no difference in gender disparities in caries experience. Gender disparities have been shown in some studies in Kenyan children (2,15), where females were found to have had a higher caries experience in the permanent dentition than their male counterparts. The probable explanation given was that females have an earlier median age of eruption of permanent teeth which consequently suffer early exposure to cariogenic foods(2). Another suggestion given was that females may indulge in cariogenic foods more frequently than males. Neither of these suggestions have been proved nor disapproved. Thus although epidemiological information and analysis have previously reported that the occurrence of dental caries is low for the permanent dentition of children of the Third World countries (mean 12 year old DMFT = 1.9) the treatment needs for caries from this study appear high for both the permanent and primary dentitions with as many as 68.8% of the children presenting with dental caries and a need for treatment.

The prevalence of gingivitis in this study was found to be 36.8%. This figure is comparatively lower than what has been reported in epidemiological studies of gingivitis in children in Nairobi. The disparity may have arisen from the subjectivity involved in the determination of gingival status in children. Assessment of gingivitis in a clinical situation in most instances tends to be given note only when it warrants treatment, as opposed to the situation in an epidemiological study

where gingivitis is purposely investigated and scored for. Indeed gingivitis was not scored for by a particular index in these clinical records, therefore, it is possible that gingivitis may have been undernoted.

The status of oral hygiene too, though noted was not scored for. However, gingivitis in this study demonstrated the expected distribution curve, with a prepubertal spurt that peaked at puberty, a postpubertal decline, with possibly a gradual rise towards adulthood. Gingivitis evaluated according to gender did not demonstrate any gender bias unlike other studies locally where males have demonstrated significantly higher gingival index scores compared to females(15,16).

Results on traumatic injuries were contrary to what would be expected at a children's dental clinic. The prevalence of children attending with traumatic injuries of 5.8% was surprisingly low. The explanation for this finding may be that most patients who suffer traumatic injuries will tend to visit hospital based clinics as they may view trauma as a medical emergency needing hospital care especially where soft tissue injuries accompany traumatic injuries to the dentition. Documentation of traumatic injuries in children attending hospital based clinics is lacking. Further evaluation of the small number of patients who attended with traumatic injuries indicated that most injuries occurred in the anterior teeth and were as a result of falls. Surprisingly, organised sports had a relatively low contribution to traumatic injuries even though the use of mouthguards in contact sports has been so strongly recommended. Expectedly permanent teeth were frequently fractured as a result of the traumatic injuries compared to the deciduous teeth which were more often subluxated as they are embedded in the more pliable bone.

Traumatic injuries in this study had no significant correlation with gender. This finding is similar to that observed by Osugi(17), but unlike other studies where boys have been shown to be more prone to traumatic injuries than girls(9,18,19). One cannot overlook the small number of cases involved in the present study which may have influenced the statistical outcome.

A curative approach to tackling dental diseases was frequently undertaken at the first visit because patients attending in this study largely required intervention after damage by the disease had already taken place. Restorative treatment and dental extractions topped the table on treatment that was offered at the first visit (28.6%, 25.4% respectively). This curative approach may work well at a private setting where patients are able to meet the cost of treatment. However, it must be appreciated that the same approach would not deal effectively with dental caries and other dental diseases at a community or public setting where government expenditure especially on oral health is pitifully low. Fortunately the Ministry of Health in Kenya is undertaking the development of a National

oral Health policy to oversee the promotion of Oral health. This should hopefully ensure a desirable shift towards prevention rather than curative services.

The "Arrest of Caries Technique (ACT)" / "A traumatic Restorative Treatment Technique (ART)" may be an effective and satisfactory solution as has been reported in other Third World Countries(20).

Very few extractions (9.6%) were carried out for irreparable caries in this study. This finding may be taken with some bias. The attending clinician being a paediatric dental specialist would be more inclined towards restorative treatment rather than extractions. Further, the patients in the private sector are more likely to afford the restorative treatment prescribed for them. Epidemiological findings have reported a high rate of untreated caries in children in Nairobi(15,21,22). Another finding related to treatment that may also carry some bias regarding the speciality of the attending clinician is the nominal number of patients (2.3%) who were scheduled for general anaesthesia. There is no published comparative data on the use of dental general anaesthesia (DGA) in Kenya. However, a related report on the patterns of use of DGA in various centres in the United Kingdom by Fung *et al*(23), strongly recommended that while the use of DGA has a place in very young children with severe forms of dental disease who are unable to accept local anaesthesia (LA), it should not be used indiscriminately. He suggested that dental practitioners needed to be better trained to enable and encourage them to offer alternatives as a way of reducing the risk of general anaesthesia (G.A).

In conclusion, this study has demonstrated that the normative treatment needs for caries is high for both the permanent and deciduous dentitions in children attending a private dental clinic in Nairobi. Further, health policies need to be strengthened to promote oral health as an integral part of general health, requiring the support of health insurance schemes, to subsidize the cost of treatment.

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