

THE DISTRIBUTION OF DENTAL DISEASES AND DISORDERS OBSERVED IN AN URBAN DENTAL CLINIC IN ZAMBIA

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INTRODUCTION

There is a reported rapid increase in the prevalence of dental diseases particularly caries (tooth decay), in many developing countries. The increases has been ascribed to dierse circumstances, specifically :

- Increase in sugar consumption.
- Inadequate dental health expenditure.
- Lack of Community and National dental programs and policies.
- Economic stagnation.
- Insufficient dental manpower.
- Rapid increase in population.

The state of dental health services in Zambia hardly presents any better account than the above. Lack of research in the field has consequently failed to record the diversity of dental problems in the country as a whole. The remarkably few studies on dental health in Zambia have done little to demonstrate the levels of dental diseases and disorders. These studies have been conducted on a limited bases in isolated areas on a selected section of the community.

In 1973 Desai reported a 14.5 percent caries in 7 - 16 years old school children in the Northern Province of Zambia. Sims in the same year recorded 28 percent poor oral hygiene in 5 - 17 years old rural school children. Baboo et al (1981) found a caries incidence of 17.5 percent in rural area. Chitu and Kaunda (1986) reported high levels of fluoride in Chinyunyu area. Mudenda (1989) recorded a DMF of 0.294 but an alarming 25.8 percent of untreated caries among 12 years old urban school children. Noar and Sarah (1991) found a 37.3 percent level of caries and 14.7 percent level of periodontal disease in school children aged 7 - 22 years in Ndola rural.

It is apparent that from the above studies a national incidence level of caries and periodontal disease cannot be deduced. In as much, the statistical significance of these findings were not reported.

This study was undertaken to assess the prevailling levels of dental diseases and ather related disorders encountered in an average equipped dental clinic. In view of the new political and health policies, this

information may also be used in evaluation and radical planning of dental services.

METHODS AND MATERIALS

This study was carried out at Ndola Central Hospital dental department. Patients who attended the dental clinic between 23rd July, 1992 through to 21st September, 1992 comprised the population of this study. Information pertaining to their age, sex dental attendance, dental diagnosis, dental treatment, employment status and residential address were recorded. Patients who could not provide any of the above information were excluded from the study. These patients were examined and treated by the dental staff, which comprised two dental surgeons and three dental assistants. The diagnostic criteria used in the clinic is what is outlined in much of the dental literature.

Records of 1062 patients were reviewed and included in the study. The data collected was analysed using the chi-square test.

RESULTS

The 1062 patients had a mean age of 29.8 years with a range of 2 1/2 - 75 years. Of these, 516 (48.5 percent) were females and 546 (51.5 percent) were males.

The age distribution of the 1062 patients was found to be as follows :

- 259 (24.4 percent) fall in the age group of 2^{1/2} - 20 years.
- 517 (48.7 percent) in the 21 - 35 years age group.
- 200 (18.8 percent) in the 36 - 50 years age group.
- 65 (6.1 percent) in the 51 - 65 years age group and 21 (2 percent) in the 66 years and above (tab. 1).

Age group in years	No. of patients
2 1/2 - 20	259
21 - 35	517
36 - 50	200
51 - 56	65
66 and above	21
Total	1062

The distribution of dental...

825 (77.7 percent) of the 1062 patients attended the dental clinic for the first time and thus required new dental cards : 167 (15.7 percent) came on their second attendance ; 40 (3.8 percent) on their third attendance ; 18 (1.7 percent) on their fourth attendance ; 5 (0.5 percent) on their fifth ; 6 (0.6 percent) on their sixth attendance and 1 (0.09 percent) on their ninth and tenth attendance respectively (tab. 2).

Attendance	No. of Patients
1st	825
2nd	167
3rd	40
4th	18
5th	5
6th	6
9th	1
10th	1
Total	1062

The 1062 patients were grouped as follows when related to diagnosis ; 816 (76.4 percent) of cases were caries (tooth decay), 74 (7.0 percent) were periodontal disease, 70 (6.8 percent) were impacted mandibular third molars, categories of diagnosis formed a basis for statistical analysis.

Others were 6 (0.6 percent) cases of dislocation of the mandible and T M J dysfunction, 3 (0.3 percent) over rotations of deciduous teeth, 6 (0.6 percent) post operative pain and alveolar osteitis, 4 (0.4 percent) pain syndrome, 3 (3.0 percent) hypersensitive of the dentine and finally 11 (1.04 percent) were oral ulcerations and lesions :

Diagnosis	No. of Patients
Caries	816
Periodontal Disease	74
Impacted mandibular third molar	70
Trauma	69
Others	33
Total	1062

Management of the diagnosed cases were as follows :

- 553 (52.2 percent) patients had their teeth removed.
- 473 (44.5 percent) were treated therapeutically.
- 6 (0.5 percent) cases of dislocation were reduced and one was self-remitting.
- 25 (2.4 percent) cases of mandible fractures were treated with intermaxillary fixation by wires.
- 2 (0.2 percent) had opeculectomy done.
- 50 (4.8 percent) cases were temporal fillings.

- 6 (0.6 percent) had scaling done and 1 (0.09 percent) had biopsy taken.

Out of 1062 patients, 320 (30.1 percent) were in some form of employment, 578 (54.4 percent) were unemployed and 164 (15.4 percent) patients were students or dependants.

505 (47.5 percent) patients were residents in high density areas ; 125 (11.8 percent) in medium cost areas : 292 (27.5 percent) in low density areas and 140 (13.2 percent) in shanties and surrounding villages and farms.

Statistical analysis

This was extended to the four main categories of diagnosis, being, caries, periodontal disease, impaction of lower wisdom teeth and trauma. These were related to sex, age, attendance and treatment.

Caries

Tooth decay (caries) was diagnosed in 816 (76.8 percent) patients, a clear indication that this remains the predominant diagnosis in the dental clinic.

When related to sex, 427 (40.2 percent) of caries cases were in females and 389 (36.6 percent) were in males. The difference was not significant statistically.

When related to attendance, 629 (59.2 percent) patients attended as new cases, 138 (13 percent) patients made their second attendance, 28 (2.6 percent) made their third visit, 12 (1.13 percent) on their fourth attendance, 4 (0.38 percent) on their fifth attendance, 3 (0.28 percent) on their sixth attendance and finally 1 (0.09 percent) each on the ninth and tenth attendance respectively. The difference in attendance was statistically significant. More cases of caries were recorded in patients on initial attendance ($P < 0.5$).

On analysing in relation to age, 214 (26.2 percent) fell in the 2^{1/2} - 20 years age group, 387 (47.4 percent) in the 21-35 years age group, 159 (19.4 percent) in the 36-50 years age group, 41 (5.0 percent) in the 51-65 years age groupe and finally, 15 (1.8 percent) in the 66 years and above age group. The difference in distribution of caries in relation to age was statistically significant ($P < 0.01$) with more cases observed in the youth and young adults.

The management of caries was distributed as follows :

- 462 (43.5 percent) cases underwent tooth removal ;
- 304 (28.6 percent) cases were treated therapeutically and 50 (4.71 percent) cases had restorations done (permanent or temporary).

Management of caries by tooth removal was statistically significant ($P < 0.01$). Caries remain the main cause of tooth mortality.

Periodontal diseases

This constituted 7.0 percent of the total number of patients included in this study. The diseases were exclusively plaque associated (Gingivitis - acute ulcerative and chronic ; Periodontitis - acute and chronic).

- 50 of the 74 cases were diagnosed in males and 24 in females. The difference in occurrence of periodontal diseases in relation to sex was significant with the diseases occurring more in males than females ($P < 0.01$).
- 6 (8.1 percent) cases of periodontal diseases were observed in the 2^{1/2} - 20 years age group, 22 (29.7 percent) in the 21-35 years age group, 24 (32.4 percent) in the 35-50 years group, 16 (21.6 percent) in the 51 - 65 years age group and 4 (5.4 percent) in the 66 years and above age group. The observed trend was that more cases of periodontal diseases were observed after 36 years and this was statistically significant ($P < 0.5$).
- 66 (89.1 percent) cases of periodontal diseases were observed in patients who attended the clinic for the first time, 6 (8.1 percent) in patients on their second attendance and 2 (2.7 percent) on their third attendance. This clearly shows that periodontal diseases are recognized as dental problems and such are referred to the dental clinic on identification.
- 47 (63.5 percent) cases of periodontal diseases were managed therapeutically (after prophylactic procedures such as scaling) and in 27 (36.5 percent) tooth removal was done. Resolution of periodontal diseases therapeutically was significant ($P < 0.25$).

Mandibular third molar impaction

- 70 (6.6 percent) of the cases observed were diagnosed with impacted mandibular third molars. Of these 60 (85.7 percent) were partially erupted, 4 (5.7 percent) were imbedded (unerupted) and 6 (8.6 percent) were fully erupted.
- 41 (58.6 percent) were diagnosed in males and 29 (41.4 percent) in females. Lower third molar impaction in males was more but this difference was not statistically significant.
- 55 (78.6 percent) cases of impaction were surgically removed using a drill and bur and 15 (21.4 percent) preferred drug therapy to settle the pericoronitis followed by the removal of the flap (operculum).
 - Operculectomy. Surgical removal of impacted

lower third molars was very pronounced and this type of management was statistically significant ($P < 0.01$).

- 10 (14.2 percent) cases of impaction fell in the 2^{1/2} - 20 years age group ; 58 (82.9 percent) fell in the 21-35 years age group and 2 (2.9 percent) in the 36-50 years age group. Cases of impacted mandibular third molars were predominant in the 21-35 years age group and this was statistically significant ($P < 0.001$).
- 54 (77.1 percent) cases were in patients who attended the dental clinic for the first time, 8 (11.4 percent) in patients on their second attendance, 4 (5.7 percent) on their third attendance and 4 (5.7 percent) on their fourth attendance. Diagnosing of impactions was high in patients who attended for the first time and this was highly significant ($P < 0.001$).

Trauma to dental and periodontal structures

- 69 (6.5 percent) cases of trauma were recorded in this study. These included unilateral and bilateral fractures of the mandible, fractured crowns of teeth, knocked out teeth, displaced teeth, cuts of lips and laceration of the labial and gingival mucosa. The causes of these injuries were mainly domestic and urban violence and, to a lesser extent, due to falls and road traffic accidents.
- 51 (73.9 percent) of these injuries were in males and 28 (26.1 percent) in females. The difference was statistically significant ($P < 0.01$).
- 40 (58.0 percent) cases of trauma fell in the 21-35 years age group, 15 (21.7 percent) in the 2^{1/2} - 20 years age group ; 9 (13 percent) in the 36 - 50 years age group, 3 (4.3 percent) in the 51 - 65 years age group and finally 2 (2.9 percent) in the 66 years and above age group. The difference in distribution in relation to age was however not statistically significant.
- 56 (81.2 percent) cases of trauma were diagnosed in patients who attended the clinic for the first time, 10 (14.5 percent) in those on their second attendance and 2 (2.9 percent) on their fourth attendance. This difference in distribution in relation to attendance was statistically significant ($P < 0.001$).
- 38 (55.1 percent) cases of trauma were treated mainly therapeutically, coupled with procedures such as relining of teeth, suturing of the soft tissues, interdental wiring, restoration of crown, 25 (36.2 percent) cases of trauma required intermaxillary fixation using wire and 6 (8.7 percent) resolved by removal of the remaining roots of the fractured teeth.

The treatment of these injuries depended on the extent of the injury and its structure locality.

DISCUSSION

The provision of dental services to combat dental diseases and disorders is an inevitable and integral component of any viable health program. This study was undertaken in view of the new political and consequently new health policies, the government is implementing. The creation of some of the major public hospitals into autonomous boards with the aim of generating their own resources prompting the introduction of paying for medical services as a cost-sharing measure, means that much information is required on which the new charges could be based. This study sort to present data which could be used for evaluation of dental services, delivery and rational planning in the new environment.

Dental clinics in Zambia (except for one at UTH) were constructed to function on an out-patient basis. Theatre and other facilities are limited and, as such, the absence of diagnosis and treatment of oral and maxillofacial tumours and injuries of the maxillary which are usually referred to UTH in the capital.

This study confirms that caries levels, even at the clinic level, remain substantial and a major cause of teeth mortality. Much as there may be discrepancies in methodology and diagnostic criteria, all previous studies report dramatic increases in caries levels in the community. Noar et al (1991) attributed this increase to dietary factors rather than any change in oral health measures. Shepherd (1992) noted that the prevalence of caries in many African countries is rapidly raising in marked contrast to the downturn in many Western countries and associated this to the increase in sugar consumption of approximately 20 percent between 1975 - 1985.

However, modern understanding of cariogenic factors firmly acknowledges and accepts the concept that all fermentable carbohydrates and starches can promote tooth decay. More importantly it is the frequency intake rather than the type of sugar that plays a major role in cavitation. With that in mind, the reality in Africa, and Zambia in particular, is that the absence of community primary dental health programs contribute heavily to people's ignorance of personal oral hygiene and other oral preventive measures. Poor oral hygiene could in fact be the main cause of high levels of caries. 742 (69.8 percent) of the patients attended to during the period of study were unemployed or dependants who cannot afford the luxury of even one snack every day.

Even those in employment do not earn enough to afford basic tools of oral hygiene regularly (toothbrush,

toothpaste, mouthwash, etc). The stage at which people with carious teeth come for dental attention also contributes to the high levels of teeth mortality. This is usually at the very late stage when one can no longer withstand the severe toothache with periapical dento alveolar abscess or infection, leaving tooth removal the only option.

Funding of the dental sector in the Ministry of Health remains miserably negligible. Noar et al (1991) recorded that between 1980 - 1984 dental health expenditure was only 0.04 percent of the total expenditure on health in Zambia. This only means that facilities and materials mostly for restoration are long non-existent. Economic stagnation and depression have eroded people's standard of living to embarrassing levels. Much as refined sugar, sweets and fruit drinks have become more available, (Noar et al 1991), only the rich few can afford them. The non-availability of community and social preventative measures such as flouridation of community drinking water, fluoride supplements, low community awareness of personal dental health, inadequate manpower and equipment have done little to improve the ever raising levels of caries.

The high number of new patients with caries (629 or 59.2 percent) coming on the first attendance, clearly reflects a desperate situation in dental health in Zambia. There are many people out there in need of dental treatment and advice. This was also acknowledged by Mudenda (1989). The majority of these patients are from high density areas, shanties and surrounding villages (645 or 60.7 percent).

When compared in relation to age, caries levels were significantly high among the youth and young adults (73.6 percent). This confirms the already known fact that caries is predominant in the young (2^{1/2} - 35 years in the case of this study).

Studies on periodontal diseases in Zambia are remarkably few. Available are those of Sims (1973) who reported a 28 percent level of poor hygiene and Noar et al (1991) who recorded a 14.7 percent of periodontal disease in school children aged 7 - 22 years. This study observed 74 (7.0 percent) at Clinic level. This constituted the second to caries in dental diagnosis.

Periodontal diseases were significantly high in males (67.6 percent) than females (32.4 percent). This finding agrees with that of Jeboda (1992).

When related to age, periodontal diseases were significantly high as one advances in age, i.e 35 years and above (59.4 percent). A substantial level 29.7

percent was also recorded in the 21-35 years. On attendance, a significant level (89.1 percent) was recorded in the first attendance. 63.5 percent of periodontal diseases were treated using prophylactic measures and recommendations, coupled with therapeutic prescription. 36.5 percent cases of periodontal diseases resulted in tooth removal. This was recorded as the third cause of tooth mortality.

There are no reported studies on impacted mandibular third molars in Zambia as such comparable levels can only be those done elsewhere. Kramer and Williams (1970) carried out a study at Harlem Hospital and recorded an incidence of 7.6 percent of impacted teeth in black oral surgery patients.

Brown et al (1982) reported 15 - 30 percent of impacted lower molars in black and white South Africans. This study recorded a 6.6 percent.

Two hypotheses (nature and nurture) seem to satisfactorily explain the aetiology of impaction (Hunter 1771). Firstly, in the cause of primate evolution, an increase of brain size at the expense of jaw size has not always been accompanied by a commensurate reduction in tooth size or number. The second is that in modern civilised man a change of diet has occurred in the last 2000 years or so and that, as a result, the teeth are underused and not worn down. As a result, the dentition has not been reduced in size as it should have been by attrition. The reduction in muscle activity which acts as a stimulator of jaw growth has resulted in jaws not reaching full size.

Furthermore, the high retention and low mortality rate of teeth as a result of caries, particularly in the Western countries, has contributed to the high levels of impaction.

58.6 percent of the impactions were in males and 41.4 percent in females. The difference was not significant and these impactions are not sex related. This agrees

with the findings of Hellman (1936), Dachi and Howell (1961), Kramer and Williams (1970).

Over 78.6 percent of these impacted mandibular third molars were surgically removed using a drill and bur. Removal was essentially for therapeutic reasons. These included acute infections such as dental abscess and pericoronitis, associated dental pain and caries. As such impaction constituted the second cause of tooth mortality. Impactions were found to be age related. 82.9 percent impacted mandibular third molars was recorded in the 21 - 35 years age group.

Trauma or injury to dental and periodontal organs and tissues constituted the fourth major dental problem recorded in the clinic (6.5 percent). The cause is mainly the ever rising domestic and urban violence (assault). Trauma resulting from industrial accidents, sport, falls and road traffic accidents are not so common. 73.9 percent of the injuries were recorded in males and 26.1 percent in females and the difference was significant. The injuries occurred more in young adults of 12 - 35 years (58.0 percent). 81.2 percent constituted new cases on the first attendance. 55.1 percent of the injuries were relatively minor and were managed by measures such as relining, suturing, interdental wiring, restoration of crowns, etc. 36.2 percent cases of injuries were fractures of the mandible and required inter-maxillary fixation. 8.7 percent cases of trauma were managed by removal of root remnants

In conclusion, this study clearly reflects the urgent need to revive the collapsed dental infrastructure and community programs to tackle the already alarming levels of dental diseases and disorders in Zambia. The need for dental policies and services based on prevention rather than curative cannot be over-emphasised. More research in this field should be encouraged to record and establish the root causes of these diseases and consequently their solution.

SUMMARY

The introduction of fee-paying medical and dental services in Zambia has raised so much outcry from all quarters of the community. Sentiments range from inadequate medical and dental facilities and community programs to unaffordable fees due to poverty and merge incomes.

This study of a population of 1062 dental patients at Clinic level identified caries (76.8%), periodontal diseases (7.0%), mandibular third molar impaction (6.6%) and trauma (6.5%) to constitute the four major dental disorders mostly encountered.

The raising levels of these disorders could be attributed to poor oral hygiene due to lack of community dental programs, absence of adequate dental facilities, high levels of domestic and urban violence.

The need to resuscitate the rundown dental infrastructure and community programs and policies to combat the high levels of dental disorders is clearly exposed the emphasised.

Key-words : Dental diseases and disorder, attendance, diagnosis, management, employment status, Residential address.

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