ORIGINAL RESEARCH

Occurrence of Dental Caries among the Adults Attending a Regional Referral Hospital in Tanzania

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ABSTRACT

Background: Dental caries remain the main oral disease with greatest socioeconomic impact that correlates with lifestyle specifically dietary patterns and oral hygiene practices. Being a cumulative process, the numbers of individuals affected increase with age. This study aimed at determining the occurrence of dental caries among adult patients attending a public regional hospital.

Materials and methods: A cross-sectional studies involving 436 adult patients who attended at Musoma Referral Hospital for dental care. Patients were systematically examined for dental caries, which were scored as per WHO criteria.

Results: Among 436 patients 256 (58.7%) were female, with male to female ratio of 1: 1.42. The mean age was 36.9 ± 15.61 years with range of 18 to 91 years. One or more carious tooth was observed in 87.8%, the 18 to 29 years was the age group most affected. The mean decayed, missing, filled teeth (DMFT) was 4.67 ± 0.19 whereby the D (decayed) component had the highest proportion 3.01 ± 0.12, and F (filled) component the lowest 0.1 ± 0.03. On average the M (missing) teeth was 1.57 ± 0.12. When compared within the gender the mean D component was significantly higher among female ($p < 0.05$).

Conclusion: The caries observed occur more in females and in younger age group. The observed DMFT is much higher than population average since this is a cohort of patients seeking care. There is high D component and very low F component of DMFT mainly due to lack, and to some extent low utilization of restorative dental services.

Keywords: Dental caries, Occurrence, Adults.

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INTRODUCTION

Dental caries is one of the most common infectious multifactorial diseases worldwide, characterized by the progressive demineralization of the tooth, following the action of bacterial acid metabolism.[1] It is in essence a life style disease[2] that is the major oral health condition in developing countries, affecting 60 to 90% of school children and vast majority of adults[3] and affects both gender, all races, all socioeconomic status and all age groups.[4]

The impact of dental caries includes oral pain which may affect speech, eating, sleeping, swallowing and breathing. The altered appearance it causes can lead to low self-esteem and undermine social acceptance.[5-8]

The prevalence and incidence of dental caries in a population is influenced by number of risk factors such as age, sex, ethnic group, dietary patterns and oral hygiene.[9]

Dental caries is a disease with both high prevalence and severity in adult worldwide populations.[10] It affects over half of the population in industrialized countries and since it is a cumulative process, the number of affected individual's increases with ageing.[11-13] Although caries was not taken to be a major problem in Africa,[14,15] there is now evidence of a rise[13,16,17] in prevalence of dental caries in developing countries.

In several industrialized countries the prevalence and severity of dental caries have declined substantially because of wide spread use of fluorides, preventive oral healthcare programs and changes in living conditions and lifestyles,[18-21] while developing countries have experienced a deterioration in oral health due to a change in socioeconomic condition, dietary habits and lack of education.[22,23]

Several studies show that dental caries in adult populations affects 5 to 10 teeth per individual, being the most significant cause of tooth loss among adults.[6-8]

In Tanzania several studies have been done regarding prevalence of dental caries in children of up to 12 years, but very few recent studies have been documented that include examination by dentists to ascertain prevalence of caries or tooth loss in adults. Therefore, the resources that are needed to treat affected people remain unknown at large. Data

collected in this study may be useful to build a profile of oral health conditions of the adult population.

The objective of this study was to determine the occurrence of dental caries among adults in relation to gender and age in Mara region in Tanzania.

MATERIALS AND METHODS

Source of data: Data was collected from every second patient who was 18 years and above, attending the Musoma Referral Hospital in Mara with different oral health related problems. A total of 436 patients were recruited for the period of 2 months from July 2013 to September 2013.

Study design: This was a prospective cross sectional descriptive study. Data was collected by clinical and visual examination of every single tooth, surface by surface starting from upper right last molar to the lower right last molar tooth, to detect dental caries. Caries were scored according to WHO criteria.[24] Examination was done while patient seated on the dental chair using mouth mirror and probe under artificial light. Interview was done in order to confirm social demographic information documented on the treatment card. All examination was done by the same investigator.

All patients aged 18 years and above who gave consent were included in the study. Only one patient who did not consent was excluded. The information collected from interview and clinical examination were coded, transferred to the computer and analyzed by using the SPSS computer program version.[19]

RESULTS

A total of 436 patients were examined in 2 months of the study. The age range of the participants ranged from 18 to 91 years, with the mean age being 36.99, with most of the patient falling in the age group of 18 to 29 (179 patients, 41.1%). Of the 436 patients who were included in this study, 256 patients (58.7%) were female, with the male to female ratio being 1:1.42. (Table 1).

Out of 436 patients, 383 (87.84%) had at least one or more carious tooth. The female patient had higher occurrence of dental caries prevalence than their counterparts 54.4%, while the occurrence of dental caries within the age groups was highest in group of 18 to 29 (92.7%) and lowest in group of 50 to 59 (79.1%) (Tables 2 and 3). The DMFT of the sample ranged from 1 to 28, with the mean DMFT being 4.67 ± 0.19. The mean of D-component was 3.01 ± 0.12, while of M-component was 1.57 ± 0.12 and that of F-component being 0.1 ± 0.03. (Tables 4 and 5).

The difference in the means of D component and M components by gender were statistically significant (p = 0.02 and 0 respectively), while the mean difference of DMFT and F component was statistically insignificant (p = 0.47 and 0.43 respectively). The difference in the means of DMFT, D component and M components by age group were statistically significant (p = 0.001, 0.003 and 0.002) respectively, however, the mean difference of F component was statistically insignificant (p = 0.23).

A total of 1312 teeth were carious among the 383 patient, who had at least one carious tooth. The molars were the most affected teeth (82.85%), followed by premolars (10.98%) and finally the anterior teeth (6.17%). With the exception of molars, the teeth in upper jaw were more affected by caries than those of lower jaw (Table 6).

DISCUSSION

This study was conducted to assess the occurrence of dental caries among the adult patients who attended Musoma government hospital, coming from different parts of Mara region, so as to provide baseline data for planning intervention programs that will assist in reducing the occurrence of dental diseases.

In the study there were more female than male patients who had come to undergo dental treatment, the former

Table 1: Distribution of the patient by age groups and gender

Age groups	*Gender*		*Total (%)*
	Male (%)	*Female (%)*	
18-29	79 (18.1)	100 (22.9)	179 (41.1)
30-39	42 (9.6)	58 (13.3)	100 (22.9)
40-49	25 (5.7)	40 (9.2)	65 (14.9)
50-59	16 (3.7)	27 (6.2)	43 (9.9)
60+	18 (4.1)	31 (7.1)	49 (11.2)
Total	180 (41.3)	256 (58.7)	436 (100)

Table 2: Occurrence of dental caries by gender

Gender	*Presence of at least one carious tooth*		*Total (%)*
	Yes (%)	*No (%)*	
Male	146 (33.5)	34 (7.8)	180 (41.3)
Female	237 (54.4)	19 (4.4)	256 (58.7)
Total	383 (87.8)	53 (12.2)	436 (100)

The difference in the occurrence of dental caries between male and female patients was statistically significant (p = 0)

Table 3: Occurrence of dental caries by age group

Age groups	*Presence of at least one carious tooth*		*Total (%)*
	Yes (%)	*No (%)*	
18-29	166 (92.7)	13 (7.3)	179 (100)
30-39	86 (86)	14 (14)	(100)
40-49	54 (83.1)	11 (16.9)	(100)
50-59	34 (79.1)	9 (20.9)	(100)
60+	43 (87.8)	16 (12.2)	(100)
Total	383 (87.8)	53 (12.2)	436 (100)

The difference in occurrence of dental caries between the age groups had no statistical significance (p = 0.066)

comprised of 58.7%. The difference can be attributed to number of factors, including differences in attendance to dental clinics between males and females, male patients having tendency of bearing with pain more than female.[25,26]

The caries occurrence in this study was quite large 87.84%, with the female patient having significantly higher occurrence of dental caries when compared within the same gender than the male patients (92.6% for female and 81.1% for male) .The high level of caries is consistent with the other studies done on rural parts of other countries.[27,28] This can be attributed to the easy and increased availability of fermentable carbohydrates including sweets to the rural population owing to globalization.

The mean DMFT was found to be 4.67, which was lower when compared to the 11.4 reported in a study done in Turkey[29] and 5.1 in a study one in rural part of India,[28] but higher than of the study done in Kenya (3.4).[30] The mean DMFT was increasing with age generally and this is compatible with the results of other studies.[29,31-33] It was also noted that the D-component decreased by age while the M-component did increase with age, the former can be ascribed to the fact that dental caries development is a gradual process, and the habit of sugar consumption in the form of sweets and other sticky sugar rich food is relatively high among the teenagers. In case of the later, it might be explained that dental caries being a cumulative process with aging the progression of untreated caries in risky individuals is likely to be more than in younger individuals and this leads to tooth extraction. Another assumption could be since people with advanced age have higher dental pain threshold[34] are more likely to attend for care when caries will be at an advanced stage ending up with extraction, also in most cases aged individuals are more likely to decline restorative care and opt for extraction.

The F-component in the study was found to be very low, and this can be explained by the fact that people tend not to take time to seek for dental care until the pain becomes unbearable, hence by the time they seek for the care the caries is very advanced, requiring advanced treatment, and in most cases extraction of the tooth/teeth will be carried out because either the tooth is beyond restoration, higher cost for advanced treatment (endodontic treatment) or lack of material to carry out the advanced procedure in most of the rural areas.

Moreover, it was found that, the teeth most affected by dental caries in this study were the molars and finding corroborates with previous studies in Uganda,[35-37] Zambia,[38] Nigeria[39] and Tanzania.[25,40,41] The anatomy and eruption time of molar teeth could be the probable explanation of why molar teeth are prone to dental caries; however, the study depicts that dental caries affects lower molar teeth more than upper molars, the same results were reported in another research.[41] The mandibular molars are the common type of teeth affected by the dental caries due to the architecture of the occlusal surfaces that is the presence of pits and fissures. Hence, they retain foods due to escape from flushing action of saliva and difficulty of brushing them. Mandibular anterior were least affected, and this may be ascribed to the reality that these teeth are constantly cleansed by flushing effect of saliva and the tongue.

Table 4: Mean of DMFT and its components by gender

Gender	*Mean ± SE*			
	DMFT	*DT*	*MT*	*FT*
Male	3.93 ± 0.27	2.58 ± 0.19	1.21 ± 0.14	0.14 ± 0.06
Female	5.20 ± 0.26	3.31 ± 0.16	1.82 ± 0.18	0.07 ± 0.03
Total	4.67 ± 0.19	3.01 ± 0.12	1.57 ± 0.12	0.1 ± 0.03

The difference in means of D and M component in relation to gender were statistically significant (p = 0.02 and 0 respectively)

Table 5: Mean of DMFT and its components by age group

Age groups	*Mean ± SE*			
	DMFT	*DT*	*MT*	*FT*
18-29	4.35 ± 0.22	3.39 ± 0.17	0.89 ± 0.10	0.07 ± 0.03
30-39	5.15 ± 0.49	3.2 ± 0.3	1.86 ± 0.34	0.09 ± 0.04
40-49	4.43 ± 0.40	2.4 ± 0.21	1.89 ± 0.27	0.14 ± 0.08
50-59	4.81 ± 0.72	2.51 ± 0.48	2.3 ± 0.47	—
60+	5.10 ± 0.69	2.49 ± 0.33	2.39 ± 0.47	0.22 ± 0.21
Total	4.67 ± 0.19	3.01 ± 0.12	1.57 ± 0.12	0.1 ± 0.03

Difference in means of M and D components and DMFT in relation to age groups was statistically significant (p = 0.002, 0.001 and 0.003 respectively)

Table 6: Distribution of carious teeth by Jaws

Location	*Teeth type*			*Total (%)*
	Molars (%)	*Premolars (%)*	*Anterior (%)*	
Upper Jaw	492 (37.5)	92 (7.01)	76 (5.79)	660 (50.3)
Lower Jaw	595 (45.35)	52 (3.96)	5 (0.38)	652 (49.7)
Total (%)	1087 (82.85)	144 (10.98)	81 (6.17)	1312 (100)

Findings of this study might need some caution in interpretation because of some inherent limitations. The study recruited a group of adult patients, who attended the dental clinic, and this does not reflect actual occurrence of dental caries in the community. In addition, the age range of the study sample was quite large with relatively few patients in some age subgroups and this is based on the same fact that this was a hospital based study.

The results of the present study shades light on the dental health of adult population in most of rural parts of Tanzania in general, and thus laying a foundation for the health policy makers and administrators to design prevention and treatment programs for dental diseases and conditions, like wise make necessary efforts of ensuring constant and timely supply of necessary dental materials to rural parts, so as to improve life standards of the people through quality dental services.

CONCLUSION

The observed findings imply that the magnitude of dental caries in this rural part of the country is high. The caries observed occur more in female and in younger age group. The observed DMFT is much higher than population average since this is a cohort of patients seeking care. There is high D component and very low F component of DMFT mainly due to lack, and to some extent low utilization of restorative dental services. The impact of these diseases on individuals and communities as a result of the pain and suffering, impairment of function, reduced quality of life and eventually increased economic burden, is considerable. It is expected that the incidence of dental caries in developing countries will increase in the near future as a result of growing consumption of sugary foods and inadequate exposure to fluorides. This suggests further studies should be done on surveillance of the magnitude of dental caries and monitoring the effectiveness of the preventive strategies.

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