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TOOTH MORTALITY IN A SELECTED POPULATION IN SANAA

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Abstract

Tooth loss is the dental equivalent of mortality. It is the end product of oral disease, since tooth loss is the. ultimate result of untreated dental caries and periodontal disease, tooth mortality figures such as the mean number of missing teeth are recognized as being a crude but useful measure of the oral health status of community. In Yemen- Sana'a although a limited number of epidemiological studies have revealed oral disease patterns typical of many Third World countries, very little information is available on patterns of tooth mortality despite the simplicity of the survey methods required to assess tooth loss. The present study was designed to examine tooth mortality in a selected Yemenites sample, and to examine the patterns of tooth loss over a wider age range. A total of 2506 persons ranging from 15 to 64 years were examined, the status of every permanent tooth, third molar teeth were not included in the study on account of their frequent impaction or agenesis. Missing teeth included both extracted teeth and missing teeth. The number of teeth loss per person was calculated and this mean was used for all tests. The t test and analysis of variance (ANOVA) test were performed to compare the means between groups. Mean tooth loss increases with the age group and is the highest in old age group. The severity of tooth loss was higher in females than in males in all age groups and the differences is highly significant, females also represent higher mean tooth loss in upper and lower jaws compared to males and the difference is significant. The mean number of lost teeth at different age group in this study was approximately equal to that in Australia and more than in China and less than that for several western contouries. The predominant loss teeth are the first and second molars in the total sample, while incisors, laterals and canines represent a high significant mean loss in male than female. This study has shown that the severity of tooth loss among the total mean teeth loss by age and gender was higher in females than in males, mean tooth loss increases with the age group and is the highest in older age group.

Key words: tooth mortality, epidemiology, Sanaa

INTRODUCTION

Tooth loss is the dental equivalent of mortality. It is the end product of oral disease but it also reflect the attitudes of patients and providers, availability and accessibility of care, and the prevailing philosophies of dental treatment at various times in the past. Tooth loss is the result of complex interaction of factors of which the clinical condition of the tooth may be only the triggering factor, rather than the one, a reason for the loss of a given tooth. Among the global goals set out for year 2000 regarding to the tooth loss, it was proposed that 85% of the population should retain all their teeth at the age of 18 years, and 90% of the population should be dentate at the age of 35-44 years with at least 75% of them should have a minimum of 20

functional teeth. It is assumed that fewer than 20 teeth would not provide adequate function.[1] For year 2010, WHO recommended oral health goals for those aged 35-44 years that there should be no more than 2% of edentulous persons in this age group and 90% should have a minimum of 20 functional teeth.[2] Since tooth loss is the ultimate result of untreated dental caries and periodontal disease, tooth mortality figures such as the mean number of missing teeth are recognized as being a crude but useful measure of the oral health status of community. Consequently, many studies have provided information on tooth loss in various parts of the world, such as United Kingdom, USA, Germany and Australia.[4,5] Among Asian populations, such as Tonga ,W. Samoa,[6] Sri Lanka and China.[7] In Yemen-Sana'a although a limited number of epidemiological studies have revealed oral disease patterns typical of many Third World countries, very little information is available on patterns of tooth mortality despite the simplicity of the survey methods required to assess tooth loss. The present study was designed to examine tooth mortality in a selected Yemenites sample to examine the patterns of tooth loss over a wider age range.

MATERIALS AND METHODS

The investigation was carried out at the Department of Periodontology of the College of Dentistry at Sana'a University and University of Sciences & Technology over a period of 2 years. A total of 2506 persons ranging from 15 to 64 years were examined, the status of every permanent tooth, third molar teeth were not included in the study on account of their frequent impaction or agenesis. Missing teeth included both extracted and missing teeth. A tooth was classified as requiring extraction due to dental caries, if caries had so destroyed the crown that it could not be restored, if there were septic roots, or if there was carious exposure of the pulp, criteria used in Yemen dental clinics for extraction. A tooth was regarded as requiring extraction due to periodontal disease if it tended to satisfy the score eight criteria of Russell's PI, namely the presence of considerable mobility or a non functional tooth. Prior to the intraoral examination background information such as name, age, sex and occupational status was recorded. The number of teeth loss per person was calculated and this mean was used for all tests. The t test and analysis of variance (ANOVA) test were performed to compare means between groups. The Bonferroni and Scheffe post-hoc tests were used for pair-wise comparisons. Normality assumptions were assessed using the Kolmogorov-Smirnov test and homogeneity of variances were tested using the Levene's test. All statistical tests were carried out using a significant level of 0.05.

RESULTS

A total of 2506 patients were examined. Of these 48.5% were male and 51.5% were female. Table 1 displays the breakdown by age group and gender. Overall, there is a slight preponderance of female patients seen. In the youngest age group (15-24) males outnumber females by 2 to 1. However, this is reversed in the next 3 age groups i.e. in the 25-34, 35-44 and 45-54 age groups, female patients outnumber male patients. In the oldest age group (55-64) males slightly outnumber females.

The mean total teeth loss by the age group and gender is displayed in Table 2. In both males and females, mean teeth loss increases with the age group and the highest in the oldest age group. Overall, males have a lower mean teeth loss (2.4507) compared to females (3.0457). This difference is statistically significant (mean diff -0.5951; 95% CI -0.7962, -0.3939). Mean teeth loss is significantly higher in females across all age groups except for the 55-64 age group where males have a significantly higher mean teeth loss (8.6242) compared to females (6.1957).

The mean upper teeth loss by the age group and gender is displayed in Table 3. In all age groups except for the 55-64 age group, females have higher mean upper teeth loss compared to males. In the 55-64 age group, the mean teeth loss is higher in males compared to females. All the differences are statistically significant except for the 25-34 age group (p=0.059).

The mean lower teeth loss by the age group and gender is displayed in Table 4. In all age groups except for the 45-54 and 55-64 age groups, females have higher mean upper teeth loss compared to males. In the 45-64 and 55-64 age groups, the mean teeth loss is higher in males compared to females. All the differences are statistically significant except for the 35-44 (p=0.788) and 45-54 age groups (p=0.064).

Table 1. Breakdown of patients by age group and gender.

Age group	15-24 (%)	25-34 (%)	35-44 (%)	45-54 (%)	55-64 (%)	Total
Male	549 (66.1)	240 (42.8)	120 (24.8)	150 (44.6)	157 (53.2)	1216 (48.5)
Female	282 (33.9)	321 (57.2)	363 (75.2)	186 (55.4)	138 (46.8)	1290 (51.5)
Total	831 (100.0)	561 (100.0)	483 (100.0)	336 (100.0)	295 (100.0)	2506 (100.0)

Table 2. Total mean teeth loss by age group and gender.

Age group	Male	Female	Mean difference	95% CI of difference (Male-Female)	p-value
15-24	0.3661	0.7624	-0.3963	(-0.4498, -0.3427)	<0.001
25-34	1.3917	1.8972	-0.5055	(-0.5990, -0.4120)	<0.001
35-44	3.1583	3.4215	-0.2632	(-0.4370, -0.08934)	<0.001
45-54	4.7467	5.4194	-0.6727	(-1.0758, -0.2696)	<0.001
55-64	8.6242	6.1957	2.4286	(2.1030, 2.7541)	<0.001
All groups	2.4507	3.0457	-0.5951	(-0.7962, -0.3939)	<0.001

Table 3. Mean upper teeth loss by age group and gender.

Age group	Male	Female	Mean difference	95% CI of difference (Male-Female)	p-value
15-24	0.2077	0.3014	-0.0938	(-0.1296, -0.0579)	<0.001
25-34	0.8792	0.8224	-0.0567	(-0.0021, 0.1155)	0.059
35-44	1.4500	1.6942	-0.2442	(-0.2948, -0.1936)	<0.001
45-54	2.0333	2.9355	-0.9022	(-1.1090, -0.6953)	<0.001
55-64	4.4013	3.3913	1.0100	(0.7411, 1.2789)	<0.001
All groups	1.2294	1.5333	-0.3039	(-0.4112, -0.1966)	<0.001

Table 4. Mean lower teeth loss by age group and gender.

Age group	Male	Female	Mean difference	95% CI of difference (Male-Female)	p-value
15-24	0.1585	0.4610	-0.3025	(-0.3222, -0.2829)	<0.001
25-34	0.5125	1.0748	-0.5623	(-0.6247, -0.4998)	<0.001
35-44	1.7083	1.7273	-0.0189	(-0.1576, 0.1198)	0.788
45-54	2.7133	2.4839	0.2295	(-0.0013, 0.4722)	0.064
55-64	4.2229	2.8043	1.4186	(1.3516, 1.4856)	<0.001
All groups	1.2212	1.5124	-0.2912	(-0.3911, -0.1913)	<0.001

The mean teeth loss (upper, lower and total) by the age group is displayed in Table 5. There is a trend of increasing mean teeth loss for both lower and upper teeth with increasing age. Overall the differences between age groups for all teeth are statistically significant. As expected, the differences between the age groups for upper and lower teeth are also all statistically significant.

Table 6 shows the mean teeth loss for every tooth (upper and lower jaw combined). There is a significant difference in mean teeth loss between males and females for every tooth and for all teeth. The pattern of teeth loss is different between males and females. Overall, males have significantly lower mean teeth loss compared to females but a breakdown of individual tooth loss shows that there are differing patterns of tooth loss. Males have significantly higher mean teeth loss for tooth 1 to 3 but females have signifycantly higher mean teeth loss for tooth 4 to 7. The pattern can be seen in Figure 1.

Mean upper teeth loss (every tooth) by gender is displayed in Table 7. In the upper jaw, there are differences between males and females. For tooth 1, males have a significantly higher mean teeth loss compared to females. There is however,

no significant difference in mean teeth loss between males and females for tooth 2 and 3. From tooth 4 onwards, females have signify-cantly higher mean tooth loss compared to males. This pattern can be observed in Figure 2.

Mean lower teeth loss (every tooth) by gender is displayed in Table 8. In the lower jaw, there are differences between males and females. For tooth 1 to tooth 3, males have a significantly higher mean teeth loss compared to females. There is however, no significant difference in mean teeth loss between males and females for tooth 4. From tooth 5 onwards, females have significantly higher mean tooth loss compared to males. This pattern can be observed in Figure 3.

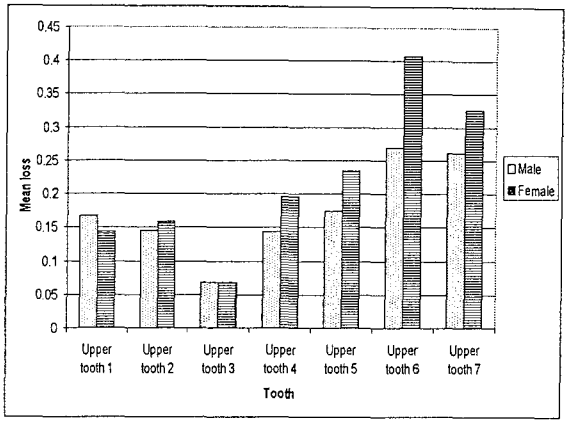

Figure 2. Upper teeth loss by gender.

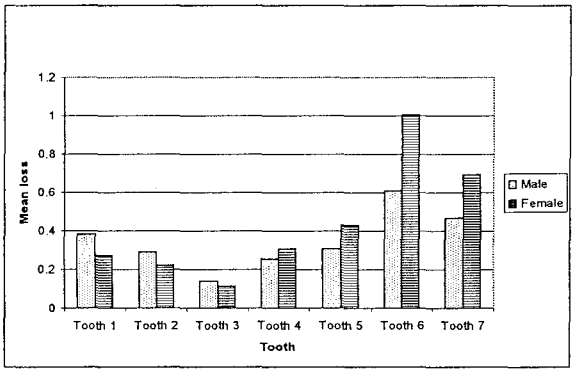

Figure 1. Teeth loss (upper and lower jaw) by gender.

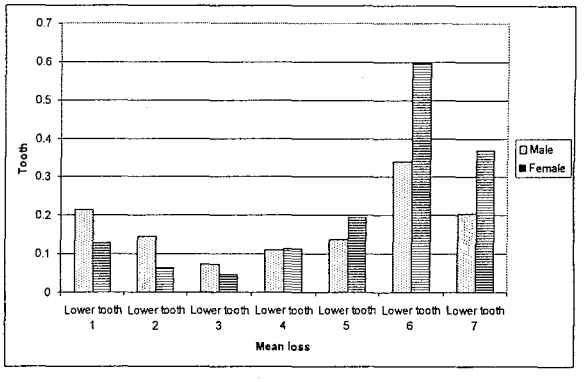

Figure 3. Lower teeth loss by gender.

Table 5. Mean teeth loss by age group.

Teeth	Age group	Mean loss	Std error	95% Confidence Interval
Upper teeth	15-24	0.2395	0.007142	0.2255, 0.2535
	25-34	0.8467	0.014843	0.8175, 0.8759
	35-44	1.6335	0.008521	1.6168, 1.6503
	45-54	2.5327	0.062086	2.4106, 2.6549
	55-64	3.9288	0.076669	3.7779, 4.0797
	All groups	1.3859	0.027360	1.3322, 1.4395
Lower teeth	15-24	0.2611	0.006438	0.2485, 0.2738
	25-34	0.8342	0.021479	0.7920, 0.8764
	35-44	1.7226	0.022468	1.6784, 1.7667
	45-54	2.5863	0.058519	2.4712, 2.7014
	55-64	3.5593	0.045016	3.4707, 3.6479
	All groups	1.3711	0.025262	1.3216, 1.4206
All teeth	15-24	0.5006	0.012040	0.4770, 0.5242
	25-34	1.6809	0.028462	1.6250, 1.7368
	35-44	3.3561	0.026476	3.3041, 3.4081
	45-54	5.1190	0.105827	4.9109, 5.3272
	55-64	7.4881	0.111397	7.2689, 7.7074
	All groups	2.7570	0.051091	2.6568, 2.8572

Table 6. Tooth loss by gender.

Tooth	Male	Female	Mean difference	95% CI of difference (Male-Female)	p-value
1	0.3816	0.2721	0.1095	(0.0775, 0.1415)	<0.001
2	0.2895	0.2233	0.0662	(0.0388, 0.0936)	<0.001
3	0.1398	0.1140	0.0258	(0.0105, 0.0412)	0.001
4	0.2541	0.3070	-0.0529	(-0.0767, -0.0291)	<0.001
5	0.3100	0.4302	-0.1202	(-0.1483, -0.0921)	<0.001
6	0.6094	1.0039	-0.3945	(-0.4414, -0.3476)	<0.001
7	0.4663	0.6953	-0.2290	(-0.2709, -0.1873)	<0.001
All teeth	2.4507	3.0457	-0.5950	(-0.7962, -0.3939)	<0.001

Table 7. Upper jaw teeth loss by gender.

Tooth	Male	Female	Mean difference	95% CI of difference (Male-Female)	p-value
1	0.1669	0.1442	0.0227	(0.0081, 0.0374)	0.002
2	0.1456	0.1581	-0.0125	(-0.0281, 0.0030)	0.113
3	0.0683	0.0674	0.0009	(-0.00842, 0.0100)	0.863
4	0.1431	0.1953	-0.0522	(-0.0667, -0.0378)	<0.001
5	0.1743	0.2349	-0.0606	(-0.0765, -0.0446)	<0.001
6	0.2697	0.4078	-0.1381	(-0.1622, -0.1138)	<0.001
7	0.2615	0.3256	-0.0641	(0.0890, 0.0391)	<0.001
All teeth	1.2294	1.5333	-0.3039	(-0.4112, -0.1966)	<0.001

Table 8. Lower jaw tooth loss by gender.

Tooth	Male	Female	Mean difference	95% CI of difference (Male-Female)	p-value
1	0.2146	0.1279	0.0867	(0.0675, 0.1059)	<0.001
2	0.1439	0.0651	0.0788	(0.0646, 0.0930)	<0.001
3	0.0715	0.0465	0.0250	(0.0176, 0.0325)	0.001
4	0.1110	0.1116	-0.0006	(-0.0129, 0.0117)	0.923
5	0.1357	0.1953	-0.0596	(-0.0737, -0.0456)	<0.001
6	0.3396	0.5961	-0.2565	(-0.2816, -.02313)	<0.001
7	0.2048	0.3698	-0.1650	(-0.1851, -0.1449)	<0.001
All teeth	1.2212	1.5124	-0.2912	(-.0391, -0.1913)	<0.001

DISCUSSION

Tooth mortality figures, such as the mean number of missing teeth are recognized as being a crude but useful measure of the oral health status of a community.[8] This study has provided a profile of tooth loss in a selected population in Sana'a. Age is universally accepted to be associated with increasing number of lost teeth and edentulous persons and many studies showed the differences between the younger and the older age groups with respect to tooth loss, but those differences can be attributed to the cumulative effects of dental diseases on oral health, oral hygiene status, and the treatment philosophies of the old past days.[6,9]

It is clearly demonstrated from the current results that mean tooth loss increases with the age group and is highest in older age group. This finding is in agreement with many studies,[16-19] and in accordance with what is universally accepted that the severity of tooth loss increased with the increasing age.

The results of this study have shown that the severity of tooth loss among the total mean teeth loss by age and gender was higher in females than in males and this difference is highly significant. This finding is in agreement with

some studies,[12-15] and in disagreement with others.[6,16-17]

This difference between genders could be attributed relatively to the fact that females visit dental practices more than males and that they have their periodontally involved teeth extracted at an earlier stage for aesthetic reasons, and/ or due to previous treatment principles that encouraged extractions. It is demonstrated from our results that males have a significantly higher mean tooth loss than females in age group 55-64, this may be ascribed to the inferior oral hygiene status, which is attributed to the fact that oral care is given low priority or may be neglected by this age group a causative factor in the exceptionally high rates of periodontal disease in Yemenite males. The results of this study have illustrated that females have higher mean upper teeth loss compared to males and this difference is significant, women may reflect a tendency on the part of older women who have already lost several teeth to have the remaining standing teeth, which may be sound but aesthetically disfiguring, extracted prematurely.[12-15] While males in age group 55-64 represent higher mean tooth loss than females, this is in agreement with some earlier studies.[6,16,17] Similarly the result for the lower teeth reflect the same picture except in the 45-54 and 55-65 age groups, the mean teeth loss is higher in male compared to females.

This study showed that both upper and lower and total mean teeth loss in all age groups were approximately equally distributed among different age group and the mean teeth loss increases steadily with age. This sharp increase in tooth mortality in the present study is in consistent with the Loe et al. the differences are statistically significant.

The mean number of lost permanent teeth at different age groups on this study, in comparison to those recorded for corresponding age groups in other populations, was approximately equal to Australia,[5] and more than the China,[10] and lower than the United Kingdom,[4] Denmark,[15] Ger-many, USA,[3] the Netherlands. the results also showed that the mean number of lost teeth increased from 0.5 at 15-24 years to 7.4 at 55-65 years, it was less than that found in W.Somoa 0.6 at 15-19 years to 10.4 at 50-59 years and higher than that in Tonga 0.1 for15-19 years to only 3.6 by age 50-59.[6] While the mean number of tooth loss in the whole samples per subject was 2.7 which is less than that reported in Srilanka for subjects aged 15-75 years 6.7.

These differences could be explained by the fact that the majority of people in developing countries do not demand any kind of dental treatment unless there is a need to relieve severe pain due to the lack of oral health services, knowledge and priority. However, these observed differences do not conform with the traditional generalization that developing countries are more severely affected by tooth loss than developed countries.

The teeth most commonly missing in the selected population examined in the present study were the first molars and second molars in both upper and lower jaws in males and females, this finding is in accordance with that reported by MacGregor.

The most interesting finding in the present study is the high number of lost central, lateral incisors and canines in both genders (Table 6, Figure 1). Males represent a significantly higher mean teeth loss compared to females, this may be due to better oral health in women to keep their anterior teeth for aesthetic purposes, these results was in agreement with that reported.[6,16,17] As expected the pattern of lost posterior teeth differ from that of the anterior teeth, females represent a significantly higher mean tooth loss for premolars and molars, these finding are in accordance with the study carried by several researchers.[18] Comparison between male and female mean tooth loss in upper and lower jaws represent that the pattern of tooth loss in our sample differ demonstrably from those of studies in Britain and North America. Lost upper and lower incisors are most common in Yemenite than British, North American population and have a significantly higher mean tooth loss than females (Table 7,8, Figure 2,3).

Reference

1. Lo EMC, Corbet EF, Holmgren CJ. Oral health care needs among middle-aged and the elderly in Hong Kong. Community Dent Oral Epidemiol 1994; 22: 403-7.
2. Taipale SAL, Alanen P, Helenius H, Nordblad A, Uutela A. Edentulism among Finnish adults of working age, 1978-1997. Community Dent Oral Epidemiol 1999; 27: 353-65.
3. Meskin LH, Brown LJ. Prevalence and patterns of tooth loss in U.S. employed adult and senior populations, 1985-86. J Dent Education 1988; 52: 686-91.
4. Reich E, Hiller KA. Reasons for tooth extraction In the western states of Germany. Community Dent Oral Epidemiol 1993; 21: 379-83.

5. Brennan DS, Spencer AJ, Szuster FSP. Provision of extractions by main diagnoses. Int Dent J 2001; 51: 1-6
6. Cutress TW, Powell RN, Ball ME. Differing profiles of periodontal disease in two similar south pacific island populations. Community Dent Oral Epidemiol 1982; 10: 193-203.
7. Lin HC, Corbet EF, Lo ECM, Zhang HG. Tooth loss, occluding pairs, and prosthetic status of Chinese adults. J Dent Res 2001; 80: 1491-14.
8. Karikiski A, Murtomaa H, Parikka PI. Assessment of periodontal treatment needs among adults with diabetes in Finland. Int Dent J 2002; 52: 75-80.
9. Kalsbeek H, Truin GJ, Burgersdijk RCW, Hof MA. Tooth loss and dental caries in Dutch adults. Community Dent Oral Epidemiol 1991; 201-04.
10. Kalsbeek H, Truin GJ, Rossum GM, Rijkom HM, Poorterman JT, Verrips GH. Trends in caries prevalence in Dutch adults between 1983 and 1995. Caries Res 1998; 32: 160-5.
11. Warren JJ, Watkins CA, Cowen HJ, Hand JS, Levy SM, Kuthy RA. Tooth loss in the very old: 13-15-year incidence among elderly lowans. Community Dent Oral Epidemiol 2002; 30: 29-37.
12. Gjermo P, Beldi MI, Bellini HT, Martins CR. Study of tooth loss in an adolescent Brazilian population. Community Dent Oral Epidemiol 1983; 11: 371-4.
13. Tseng CC, Huang CC, Hung CH, Tseng WH, Chang CJ. Oral health conditions among people visiting a medical center for health checkups. J Formos Med Assoc 1993; 92: 563-8.
14. Hiidenkari T, Parvinen T, Helenius H. missing teeth and lost teeth of adults aged 30 years and over in south-western Finland. Community Dent Hlth 1996; 13: 215-22.
15. Petersen PE, Kaka M. oral health status of children and adults in republic of Niger. Africa Int Dent J 1999; 49: 159-64.
16. Hunt RJ, Hand JS, Kohout FJ, Beck JD. Incidence of tooth loss among elderly lowans. AJPH 1988; 78: 1330-2.
17. Ghali R. Oral health status and treatment needs among students of Baghdad University. Thesis. University of Baghdad, 1989.
18. Al-Adimi AA. Use of oral social habits in Yemen. J of the College Dentistry-University of Baghdad 1998; 3: 41-59.