PREVALENCE OF ROOT CARIES AMONG ELDERS LIVING IN RESIDENTIAL HOMES OF RAJAHMUNDRY CITY, INDIA

Dental Science

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ABSTRACT

Background: Among the various oral ailments which have been observed in elderly, root caries is a significant one. Tooth loss is chief oral health-related negative variable to the quality of life in elderly and root caries is the major cause of tooth loss in them. It has been reported about a third of older population bears most of the root caries burden. So the present study aimed to assess the prevalence of root caries among older individuals residing in residential homes of Rajahmundry city India.

Material and Methods: Elderly individuals aged 60 and above, residing in residential homes of Rajahmundry city, were included in the study. The study participants filled a questionnaire regarding their demographic details and oral health habits. Root surface caries was recorded according to criteria described by Banting et al. and root caries was expressed in terms of the root caries index (RCI). The statistical analysis was performed using descriptive statistics and chi-square test. P < 0.05 was considered as statistically significant.

Results: The prevalence of root caries was 8.8%. Statistically significant differences (P < 0.05) observed across gender, socio-economic status, medication, method of cleaning and that were identified as significant risk factors for root caries.

Conclusions: The prevalence of root caries among institutionalized older people was high. Oral health policies and preventive measures are needed focusing on the special needs of this neglected and socioeconomically deprived population to improve their quality of life.

KEYWORDS

Elders, residential home, root caries.

INTRODUCTION

In recent decades there has been increased attention towards root caries. Research has shown that root caries affects middle-aged as well as older adults[1]. Demographically the proportion of old age people is increasing day by day. According to Population Census 2011 there are nearly 104 million elderly persons (aged 60 years or above) in India; 53 million females and 51 million males. A report released by the United Nations Population Fund and Help Age India suggests that the number of elderly persons is expected to grow to 173 million by 2026.[3]

Root caries is a debilitating dental disease among older adults. Exposed root surfaces are more susceptible to root caries. Root caries is the major cause of tooth loss in older people. And the oral health quality in older people is greatly reduced by root caries. The focus of dental treatment will have to shift to treat the specific diseases of this age group, including their predominant form of dental caries, i.e., root caries.[4]

Hazen et al., defined root caries as "a soft, irregular progressive lesion that is found anywhere on the root surface that has lost connective tissue attachment and is exposed to the oral environment".[2]

The type of dental caries that selectively destroys the tissues of the anatomical root, cementum and dentine, is commonly known as root caries. It usually commences in exposed tissue immediately apical to the cemento-enamel junction (CEJ) and, while it may spread laterally around the tooth. It rarely involves the adjacent enamel [Banting and Courtright, 1975]. Root caries is a serious oral health problem because of its high prevalence and difficulty in treatment.[5]

Studies regarding prevalence of root caries in Indian population are sparse. Hence, there is a need to have a baseline data for understanding problem of root caries in elderly population and factors which affects its prevalence. Therefore, the present study aimed to assess the prevalence of root caries among elderly population residing in residential homes of Rajahmundry city, India.

MATERIALSAND METHODS

The study included 10 old age homes which are registered under maintenance and welfare of parents and senior citizens act 2007, among which One was run by government, 7 are under trust, 2 by society situated in Rajahmundry, East Godavari District. The age of the study group ranged from 60-100 years. Total population in the 10 old age was 160 and the total population was included in the study.Demographic and health behavior data were collected through a structured and validated questionnaire.

The subjects were examined for root caries using mouth mirror and exploratory probe on dental chair by a single examiner. Intra examiner reliability was tested for the index and the kappa value obtained was 0.89. Presence of root caries lesions was recorded in a full mouth design, excluding the third molars. Root caries was assessed using Root caries index (RCI) by Katz.[6]

Root caries index (RCI) was calculated for each subject according to Katz[6]

RCI = {(R–D) + (R–F)} / {(R–D) + (R–F) + (R–N)} x 100
Root caries index (RCI).
Where: R–D: Recession with decayed root surface R–F: Recession with filled root surface R–N: Recession with sound root surface.

The following criteria were used for diagnosis of recession and root caries
- Recession was considered to be present when the cemento-enamel junction was visible.

- Root surface was considered carious when it was well defined, darkened, discolored and allowed easy penetration with an explorer.

The data entry was done by using excel sheet 2007.Statistical analyses of the data were done using chi- square test in SPSS 20. For categorical variables chi-square test was used, multiple logistic regression analysis was done to determine the independent effect of each variable.

RESULTS
A total of 160 elderly persons (108-females, 52-males) with age range from 60 years to 100 years were examined to assess the prevalence of root caries. Among them, 18(8.8%) had gingival recession in one or more teeth exposing root surface. The prevalence of root caries among the elderly population was 8.8% (18 people), out of which 9(5.7%) were females and 9(5.7%) were males. In the study group 152 are married (95%) and 8 are unmarried (5%); 87(54.3%) of them were illiterate, 59(36.8%) of them had education upto college level, 13(8.1%) of them had education upto school level and none of the elders had a professional degree.

In the present study Kuppuswamy's socioeconomic status scale was used in which 52(32.5%) belonged to lower class, 94(58.7%) belong to Lower upper class,11(6.9%) belong to lower middle class, 2(1.3%) belong to Upper middle class, none of the elder belongs to Upper class.Medications were used by 105(65.6%) of study participants and 103(64.3%) had a mixed diet. In the study group, 139(86.8%) brushed with toothbrush and 20(1.25%) brushed with finger, in which 147(91.8%) subjects brushed once daily, 12(7.5%) brushed twice daily. Majority of the subjects 145(90.6%) brushed in horizontal method, and 0(0%) subjects had a habit of mouth rinsing after every meal, 90(56.6%) occasionally rinsed their mouth and 62(39%) had no habit of mouth rinsing.Regarding oral health habits, 41(25.6%), 20(12.5%) and 8(5%) had a habit of smoking, pan chewing and alcohol consumption, respectively The mean Root caries score for 60-70 years is 25.5±14.8 (mean±SD). The mean RC score for 71-80 Years is 27.9±18.0 (mean±SD) .The mean RC score for 81-90 years is 24.70±24.30 (mean±SD). The mean RC score for 91-100 is 36.07±14.52 (mean±SD).

1 TOTAL STUDY PARTICIPANTS ACCORDING TO AGE,GENDER
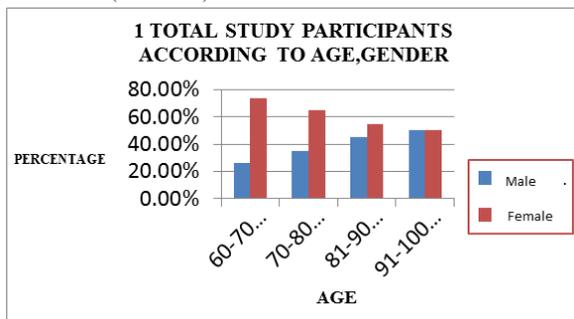
Table 1. Root caries according to demographic characteristics

Characteristics	Root caries present	Root caries absent	P value#
AGE			
60 – 70 Years	12(7.5%)	95(59.7%)	
71 – 80 Years	3(1.9%)	32(20.1%)	.813
81 – 90 Years	2(1.3%)	9(5.7%)	
91 – 100 Years	1(0.6%)	5(3.1%)	
Gender			
Male	9(5.7%)	39(24.5%)	0.05*
Female	9(5.7%)	102(64.2%)	
Marital status			
Married	18(11.3%)	134(84.3%)	.334
Unmarried	0(0%)	7(4.4%)	
Diet			
Veg	7(4.4%)	49(30.8%)	.729
Mixed	11(6.9)	92(57.9%)	
Education			
Illiterate	7(4.4%)	80(50.3%)	.227
School	10(6.3%)	49(30.8%)	
College	1(0.6%)	12(7.5%)	
Professional	00(00.0%)	00(00.0%)\	
Socioeconomic status			
Lower class	10(6.3%)	42(26.4%)	
Lower upper class	8(5.0%)	86(54.1%)	0.03*
Lower middle class	0(0.0%)	11(6.9%)	
Upper middle class	0(0.00%)	2(1.3%)	
Upper class	00(0.00%)	00(0.00%)	
Medications			0.03*
Yes	10(6.3%)	95(59.7%)	
No	8(5.0%)	46(28.9%)	

Table 2. Root caries and oral hygiene habits

Characteristics	Root caries Present	Root caries Absent	P value#
Material used for brushing			
Tooth brush	15(9.4%)	124(78%)	.579
Fingers	3(1.9%)	17(10.7%)	
Method of cleaning			
Horizontal	17(10.7%)	128(80.5%)	
Vertical	1(0.6%)	12(7.5%)	0.05*
Circular	0(0.0%)	1(0.6%)	
Frequency of brushing			
Once	17(10.7%)	130(81.8%)	
Twice	1(0.6%)	11(6.9%)	.734
Thrice	00(00.0%)	00(00.0%)	
Mouth rinsing			
Never	8(5%)	54(34%)	
Sometimes	10(6.3%)	80(50.3%)	.591
Always	00(00.0%)		
Tongue cleaning			
Yes	15(9.4%)	99(62.3%)	.245
No	3(1.9%)	42(26.4%)	

Table 3. Root caries and oral health behaviours.

Characteristics	Root caries present	Root caries absent	P value#
Smoking status			
Yes	7(4.4%)	34(21.4%)	.177
No	11(6.9%)	107(67.3%)	
Betel chewing			
Yes	3(1.9%)	17(10.7%)	.579
No	15(9.4%)	124(78%)	
Alcohol consumption			.
Yes	2(1.3%)	6(3.8%)	.210
No	16(10.1%)	135(84.9%)	

TABLE 4:-Mean root caries among different age groups

AGE	Mean±Std. Deviation
60-70YRS	25.5253±14.85567
71-80YRS	27.9003±18.08291
81-90YRS	24.7036±24.30679
91-100YRS	36.0700±14.52994

TABLE 5:-Mean root caries among different genders

GENDER	Mean±Std. Deviation
MALE	30.2998±19.43835
FEMALE	24.6981±14.59068
Total	26.3892±16.34828

Table 6. Associations of demographic factors, oral hygiene habits, and oral health behaviour with root caries.

Variables	OR (95% CI)	Pvalue
Diet	0[Ref]	.641
Vegetarian diet	.746(.215-2.590	
Mixed diet		
Education		
Illiterate	.710(.051-9.869)	.204
School	2.213(.164-29.826)	
College		
Socio economic status	1.28(3.87-4.23)	0.03*
Lower class	4.81(4.81-4.81)	
Lower upper class	1.88	
Lower middle class		
Upper middle class		
Upper class		

Medications Yes No	.887(.241-3.266)	0.03*
Material of Brushing Tooth brush Fingers	.809(.181-3.615)	.783
Method of cleaning Horizontal Vertical Circular	1.38(9.01-2.12) 3.93(3.93-3.93)	0.05*
Frequency of brushing Once Twice Thrice	.416(0.26-6.7)	.553
Mouth rinsing Never Sometimes Always	3.59(1.07-1.19) 2.66(2.66-2.66)	.445
Smoking status Yes No	2.05(.577-7.29)	.267

Discussion

The present study provides demographic data for elderly individuals in Rajahmundry. Root surface decay prevalence and RCI scores were all used to evaluate the survey results. The prevalence of root caries was found to be 8.8% in the present study.

In the present study the root caries lesions are equal in proportion between males(5.7%) and females(5.7%) ,a statistically significant difference (p<0.05) was observed. Similar results are observed in the study done by heinrich r etal[8] found that the root caries lesions are equal in proportion between males(40.2%) and females(40.2%) a statistically significant difference (p<0.03) was observed. Dissimilar results are observed in the study done by kumar raja etal[15] found that prevalence of root caries is highest among males(71.8%) and lowest among females(28.2%).

In the present study highest prevalence of root caries is seen in lower socio-economic class(10%) A statistically significant difference (p<0.05) was observed. Similar results are observed in the study done by kumar raja et al[15]. reported that highest prevalence of root caries prevalence is seen in lower socio-economic class(73.8%). A statistically significant difference (p<0.019) was observed. A wide range of factors have been implicated in caries initiation and progression, but these are dominated by the social determinants of health and a low socioeconomic status has been reported to be a risk factor for root caries.

In the present study highest prevalence of root caries is seen in the persons using medication(6.3%).A statistically significant difference (p<0.05) was observed. Similar results are observed in the study done by singh.m etal[10] found that highest prevalence of root caries is seen in persons using medicaton(8.3%).A statistically significant difference (p<0.05) was observed. The stimulated salivary flow rate was significantly lower for subjects who are under medication than not under medications.

In the present study highest Prevalence of root caries is seen in persons without regular smoking(6.9%) and there was no significant relation between root caries and tobacco chewers and smokers. Similar results are observed in the study done by avila etal[16]found that highest prevalence of root caries is seen in persons without regular smoking(9.5%).Dissimilar results are observed in the study done by bharateesh etal[2] found that highest Prevalence of root caries is seen in persons with Regular smoking(62.8%).The main reasons seems to be the presence of high amount of various sugars and sweeteners added during the commercial manufacture of smokeless tobacco products, the same may hold good for smoking tobacco since many cigarette manufacturers use sugar as a flavoring, casing and humectants to enhance the taste and make it less harsh on the throat.

In the present study root caries prevalence is highest among 91-100yrs age group people. Similar results are observed in the study done by du mq etal [17] found that middle-aged group had 13.1% prevalence rate while the elderly reported a 43.9% occurrence rate.Dissimilar results are observed in the study done by donald.l.chi etal [18]found that root

caries prevalence is highest among middle-aged adults. As we age our immune system weakens and fewer antimicrobial immunoglobulins are produced and found in saliva.

Hence, prevention of occurrence of root caries may be difficult because root caries often arises in older people who are otherwise also having problems in maintaining good levels of oral hygiene. In addition, older people frequently take medication which depresses salivary flow and this xerostomia makes dental caries more likely to occur. The feeling of a dry mouth may be alleviated by sucking sweets or taking frequent drinks, many of which are cariogenic.

Maintenance or improvement of oral hygiene is the first step towards prevention. Specific measures like the use of powered toothbrushes and chemical plaque control may be advocated. Addition of fluorides to the daily use oral hygiene aids like toothpastes and the use of chlorhexidine gluconate have also shown promising results. Finally primary prevention of root caries lies in the prevention of gingival and periodontal disease.

Limitations
Limited sample size. Dental care utilization which was not analyzed in this study may pose a major contributing risk factor for root caries and future studies are needed to address this relationship.

Recommendations
1. In view of depressingly low levels of oral health in residents, it is important to integrate the preventive measures and appropriate actions can be implemented.
2. Oral health should be incorporated into routine assessment by care staff, and the continuing dental care should be available to the residents.
3. There should be an easy access and timely approach to general and specialist dental services.

Conclusion
In conclusion, results of this oral epidemiological survey showed that the prevalence of root caries among institutionalized older people in Rajahmundry city, India was high. Oral health policies and preventive measures are needed focusing on the special needs of this neglected and socioeconomically deprived population to improve their quality of life. Gender,socio-economic status, medication, method of cleaning and that were identified as significant risk factors for root caries.

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