



ORIGINAL ARTICLE

Periodontal health and oral hygiene practice of elderly Saudis living at Riyadh Nursing Home

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Abstract Eighty-three Saudi elderly subjects (51 men and 32 women) living at Riyadh Nursing Home were interviewed regarding their oral hygiene practices, and were examined to assess their periodontal health status using the Community Periodontal Index of Treatment Needs (CPITN). Results showed that oral hygiene was practiced by 65% of the subjects and was performed more frequently by women. Less than 10% of the subjects had visited a dentist in the last three months, and only 24% perceived a need for periodontal treatment. Only 8.4% of the subjects had healthy periodontium. Calculus was the most prevalent finding among the subjects (48.2%), and was significantly more prevalent in men. Bleeding on probing and periodontal pockets was recorded in 24.1% and 19.3% of the subjects, respectively, with no statistically significant difference between men and women. In conclusion, the periodontal health status of elderly Saudi living at Riyadh Nursing Home is poor and their oral hygiene practices are inadequate. This category of the elderly needs a periodontal health promotion program in order to provide oral health necessary to improve their quality of life.

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1. Introduction

The proportion of elderly in the population continues to grow throughout the world, including the Middle East (Petersen and Yamamoto, 2005). In Saudi Arabia, the percentage of people

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aged 60 years and above is 4% (Hafez et al., 2000). Due to improvements in socio-economic standards and health care, this percentage is expected to reach 6.6% and 13% of the total population by years 2030 and 2050, respectively (UN, 2007). Most of the elderly Saudis live independently in the community; however, a considerable number live in 10 nursing homes (Ministry of Social Affairs, 2005). Nursing home in Riyadh, capital of Saudi Arabia, accommodates and provides health and rehabilitative care for Saudi residents aged 60 years and over, as well as those below 60 years of age with stable neuropsychiatric conditions. Almost all individuals living at this home are without family or financial support (Ministry of Social Affairs, 2005).

Among the many diseases and disabilities that the elderly suffer from, poor oral health is an important public health issue and a growing burden to countries worldwide (Petersen

and Yamamoto, 2005). In older people, poor oral health has particularly been manifested as high levels of dental caries, periodontal disease, tooth loss, xerostomia, and cancer (Schou, 1995).

Several studies from developed countries have reported high prevalence rates and severity of periodontal disease as well as unfavorable plaque control measures among nursing home residents (Martin and Martin, 1992; Strayer, 1993; Pajukoski et al., 1999; Ogawa et al., 2002; Stubbs and Riordan, 2002; Wyatt, 2002; Bitetti et al., 2004; Lo et al., 2004; Triantos, 2005). Such data are rare for developing countries (Petersen and Yamamoto, 2005) and are particularly scarce with regard to Saudi Arabia.

The aim of this study was to assess the periodontal health status of elderly subjects living at Riyadh Nursing Home using the Community Periodontal Index of Treatment Needs (CPITN), and to evaluate their oral hygiene practices.

2. Subjects and methods

All Saudi male and female residents of Riyadh Nursing Home who matched the WHO definition for older people (≥ 60 years old) (WHO, 1982) and met the criteria of CPITN (having at least one sextant with ≥ 2 functioning natural teeth) (Ainamo et al., 1982) were eligible for the study. Of the 129 residents, 83 met the inclusion criteria and constituted the study population. Voluntary participation was applied and written informed consent was obtained from all enrolled subjects.

The study included: (1) analysis of the patients' records to obtain data on age, medical status, time in the institution, general literacy level and smoking habit; (2) a structured interview using a pretested questionnaire to assess oral hygiene practices (such as frequency of oral hygiene, type of hygiene, and visits to dentists); and (3) clinical oral examination. Professional caregivers were interviewed when the older individual was physically or mentally unable to answer questions.

Clinical examination involved assessment of all surfaces of teeth for the presence or absence of healthy periodontium (Code 0), gingival bleeding on gentle probing (Code 1), calculus

(code 2), any 4- to 5-mm pockets (Code 3) and/or 6-mm or deeper periodontal pockets (Code 4) (Ainamo et al., 1982). Evaluations were recorded only for teeth in sextants that contained at least two functioning natural teeth. The sextants were scored based on the worst finding and each subject was classified according to the highest code number (codes 0–4) assigned to any sextant of his/her mouth. The number of missing teeth was also determined. All study subjects were examined in the dental clinic of the nursing home except those who were functionally dependent; they were examined in their rooms under an artificial light. Two experienced and calibrated dentists performed the interview and examination procedures according to the criteria of WHO oral health survey methods (WHO, 1997). The age of the participants was grouped as follows: < 74 years (group I) and ≥ 75 years (group II).

Data were collected and statistically analyzed using the Statistical Package for Social Sciences (SPSS Inc., USA) version 11.0. Frequency of periodontal conditions (as measured by CPITN) and oral hygiene practices were calculated. Percent differences between males and females were analyzed with the Chi-square test at the significance level of $p < 0.05$.

3. Results

Of the 83 residents included in the study, 51 (61.4%) were males and 32 (38.6%) were females. The mean age was 62.3 ± 6.8 years with a maximum age of 94 years. Age group I (< 74 years) accounted for more than 50% of the study subjects and included significantly greater number of males than females (69.8% versus 30.2%; $p < 0.02$) (Table 1). The mean time of living in the nursing home was 5.2 ± 2.3 years (3 month–8 years). Many were illiterate, with no significant differences between males and females. Approximately, 46% of the subjects were with different systemic diseases. Diabetes mellitus, hypertension and asthma were most commonly present.

Smokers constituted 34.9% of the study sample and most of them were males (Table 1). A total of 1336 missing teeth were recorded among the study subjects, with a mean number of 16.1 ± 13.1 teeth (range: 3–29 teeth). Among women, the

Table 1 Demographic and dental features of the study subjects ($N = 83$).

Feature	Total, N (%) ^a	Males, N (%) ^a	Females, N (%) ^a	p -Value
<i>Age groups</i>				
< 74	53 (63.9)	37 (69.8)	16 (30.2)	< 0.02
≥ 75	30 (36.1)	14 (46.7)	16 (53.3)	NS
<i>Literacy level</i>				
Literate	24 (28.9)	15 (62.5)	9 (37.5)	NS
Illiterate	59 (71.1)	36 (61.0)	23 (38.9)	NS
<i>Medical status</i>				
Healthy	45 (54.2)	20 (44.4)	25 (55.6)	NS
Not healthy	38 (45.8)	21 (55.3)	17 (44.7)	NS
<i>Smoking</i>				
Smokers	29 (34.9)	22 (75.9)	7 (24.1)	0.001
None	54 (65.1)	29 (53.7)	25 (46.3)	NS
Missing teeth ^b	16.1 (13.1)	11.9 (12.5)	22.8 (11.1)	0.005

NS = not significant.

^a % in "total" column are column percentages; % in "males" and "females" columns are row percentages. p -Value (Chi-square test): males versus females.

^b Mean (SD).

mean number of missing teeth was significantly higher than in men (22.8 ± 11.1 versus 11.9 ± 12.5 ; $p = 0.005$) (Table 1).

Oral hygiene practices of the study individuals are detailed in Table 2. 65.1% practiced oral hygiene; and most of them did not need the help of a professional caregiver. Less than half of the study subjects used toothbrush. Male subjects performed oral hygiene less frequently than females; 3.9% of males practiced oral hygiene once daily compared to 25% of females, whereas 5.9% and 31.3%, respectively, performed oral hygiene at least twice daily. The difference was statistically significant ($p < 0.001$). Only 9.6% of the group had visited a dentist in the past three months, most commonly for tooth extraction. Oral clinical examination revealed that all subjects needed dental treatments. However, only 24.1% perceived such a need and most of them were females ($p = 0.02$).

Table 3 illustrates the prevalence of various periodontal conditions of the study population. Healthy periodontium (code 0) was found in only 8.4% of the subjects with no significant difference between males and females. Gingival bleeding

Table 3 Periodontal conditions measured by CPITN among the study subjects ($N = 83$).

CPITN	Total, N (%)	Males, N (%)	Females, N (%)	p -Value
Healthy	7 (8.4)	4 (7.8)	3 (9.4)	NS
Bleeding	20 (24.1)	7 (13.7)	13 (40.6)	NS
Calculus	40 (48.2)	29 (56.9)	11 (34.4)	0.04
4–5 mm pocket	15 (18.1)	10 (19.6)	5 (15.6)	NS
≥ 6 mm pocket	1 (1.2)	1 (2.0)	0 (0.0)	NS

% are column percentages; p -value (Chi-square test): males versus females; NS = not significant.

(code 1) was recorded in 24.1% of the subjects, a prevalence that increased to 40.6% in female subjects. Calculus was the most prevalent finding, as recorded in 48.2% of the subjects and was significantly more prevalent among males than females (56.9% versus 34.4%; $p = 0.04$). 19.3% of the subjects

Table 2 Oral hygiene practices of the study subjects ($N = 83$).

Oral hygiene practices	Total, N (%)	Males, N (%)	Females, N (%)	p -Value
<i>Practicing oral hygiene</i>				
Self performance	39 (47.0)	21 (41.2)	18 (56.3)	NS
By a caregiver	15 (18.1)	11 (21.6)	4 (12.5)	
Never	29 (34.9)	19 (37.3)	10 (31.3)	
<i>Use of toothbrush</i>				
Yes	36 (43.4)	17 (33.3)	19 (59.4)	NS
Never	47 (56.6)	34 (66.7)	13 (40.6)	
<i>Interdental cleaning</i>				
Yes	9 (10.8)	3 (5.9)	6 (18.8)	NS
No	74 (89.2)	48 (94.1)	26 (81.3)	
<i>Use of miswak</i>				
Yes	54 (65.1)	43 (84.3)	11 (34.4)	NS
No	29 (34.9)	8 (15.7)	21 (65.6)	
<i>Cleaning the tongue</i>				
Yes	31 (37.3)	23 (45.1)	8 (25.0)	NS
No	52 (62.7)	28 (54.9)	24 (75.0)	
<i>Frequency of daily oral hygiene</i>				
\geq Twice/day	13 (15.7)	3 (5.9)	10 (31.3)	<0.001
Once/day	10 (12.0)	2 (3.9)	8 (25.0)	
Irregularly	31 (37.3)	27 (52.9)	4 (12.5)	
Never	29 (34.9)	19 (37.3)	10 (31.3)	
<i>Received education on oral hygiene</i>				
Yes	46 (55.4)	33 (64.7)	13 (40.6)	NS
No	37 (44.6)	18 (35.3)	19 (59.4)	
<i>Dental visits in the last 3 months</i>				
Yes	8 (9.6)	3 (5.9)	5 (15.6)	NS
No	75 (90.4)	48 (94.1)	27 (84.4)	
<i>Reason for the last dental visit</i>				
Toothache	7 (8.4)	5 (9.8)	2 (6.3)	NS
Routine examination	5 (6.0)	1 (2.0)	4 (12.5)	
Tooth extraction	40 (48.2)	23 (45.1)	17 (53.1)	
Need of prosthesis	31 (37.3)	22 (43.1)	9 (28.1)	
<i>Perceived need for periodontal treatment</i>				
Yes	20 (24.1)	2 (11.8)	18 (37.5)	0.02
No	63 (75.9)	49 (88.2)	14 (62.5)	

% are column percentage; p -value (Chi-square test): males versus females; NS = not significant.

had deep 4–5 mm periodontal pockets (code 3) and 18.1% had recorded ≥ 6 mm periodontal pockets (code 4) in 1.2%. The percentages of deep periodontal pockets for males and females were not significantly different.

4. Discussion

The present study was designed to assess the periodontal health status and oral hygiene practice of the elderly Saudis living at Riyadh Nursing Home.

According to the [United Nations Report \(2010\)](#), the ratio of the Saudi elderly males to females is 1.03. However, a large proportion of this study is constituted of male subjects. This can be attributed to the fact that the residents in this nursing home were 88 men and 41 women. Accordingly the number of missing teeth was considered in the conclusion criteria. Women had significantly greater mean number of missing teeth than men. A similar observation was reported in other studies ([Ahlqwist, 1989](#); [Takala et al., 1994](#); [Nordström et al., 1995](#); [Hiidenkari et al., 1996](#)). The mean tooth loss per study subject was about 16 teeth. This indicated that the residents had 12–16 remaining natural teeth, well below the WHO target of 20 natural teeth ([WHO, 1982](#)). Similar results were reported in a number of Asian countries ([Corbet et al., 2002](#); [Sriyono, 2005](#)).

In spite of common use of oral hygiene measures among Saudi elderly ([Almas et al., 2003](#)), oral hygiene practice of subjects in the study was inadequate and their access to dental health care was poor. Furthermore, all residents needed dental treatments; however, only 24% had perceived that need and most of them were females. This is in agreement with other studies ([Sriyono, 2005](#); [Gaião et al., 2009](#)).

Oral hygiene practices of the enrolled subjects in the present study seemed ineffective in reducing dental plaque accumulation and preventing periodontal disease. Epidemiological studies showed that poor oral hygiene and high level of dental plaque are associated with high prevalence rates and severity of periodontal disease ([Løe et al., 1965](#); [Axelsson et al., 1991](#); [Schou, 1995](#)). Furthermore, low educational level, irregular dental visits, number of teeth present and smoking habit have independent effects on the periodontal disease progression in older subjects ([Locker and Leake, 1993](#); [Tomar and Asma, 2000](#); [Ogawa et al., 2002](#)). In the present study, the prevalence of periodontal disease as indicated by CPITN was high. Almost 80% of subjects had either gingivitis, supra/sub gingival calculus or periodontal pockets (> 4 mm) and only a few of them (8.4%) were periodontally healthy. This evidence supports earlier findings of poor periodontal health in elderly Saudis ([Zahrani, 2005](#)) and elderly population worldwide ([Schou, 1995](#); [King and Kapadia, 2003](#); [Lo et al., 2004](#); [Triantos, 2005](#)). However the prevalence of healthy periodontium in this study was high compared to that reported by [Zahrani \(2005\)](#) (0%). This difference might be related to the characteristics of the study samples. In [Zahrani study \(2005\)](#), the subjects were those who visited the dental school seeking dental treatment. Nevertheless, the CPITN score for periodontal pockets (19.3%) was closely similar to that reported in other developing countries. At ages 65–74, 17.1% of persons in Madagascar had shallow or deep periodontal pockets ([Petersen et al., 2004](#)) and similar conditions were found in 22.2% of Chinese elderly ([Wang et al., 2002](#)).

The percentage of male subjects with calculus was significantly higher than females ($p = 0.04$). In addition, men showed a tendency toward more frequent periodontal pockets and less frequent bleeding than women. The difference between genders is likely related to the frequency of the oral hygiene practices and dental visits. Several epidemiological studies had reported greater periodontal breakdown among men than women ([Miller et al., 1987](#); [Papapanou et al., 1988](#); [Fox et al., 1994](#); [Diamanti-Kipiotti et al., 1995](#); [Brown et al., 1996](#)).

A possible limitation of the study was that it was conducted in a single nursing home, although it was the largest in Saudi Arabia. Further studies including the other nursing homes in the country are needed in order to bring out a precise data of the periodontal health status of this vulnerable group of people.

5. Conclusion

Within the limitations of the study, it is concluded that elderly Saudis living at Riyadh Nursing Home have poor periodontal health and inadequate oral hygiene practice; which indicate the necessity to develop oral health care services into their general health care program. Such services should include periodic dental examination of elderly residents of this nursing home or of those living with families. Periodic examination should also provide screening for oral cancer and oral hygiene instruction to elderly and caregiver.

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