

## Dental health status among a sample of elderly dental patients in Riyadh, Saudi Arabia

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الهدف من هذه الدراسة استقصاء صحة الفم عند كبار السن المراجعين لعيادات كلية طب الأسنان وتضمنت الدراسة ٥٤٠ مريضاً شكل الذكور ٣٢,٢٪ وتراوحت الاعمار من ٥٥ الى ٩٣ سنة. استخدمت المؤشرات المقترحة من قبل منظمة الصحة العالمية لدراسة مدى انتشار تسوس الأسنان وامراض اللثة. اظهرت النتائج ان ٥٠٪ من المرضى الذين لديهم اسنان مصابين بالتسوس خصوصاً تسوس الجذور اما السيدات فكانت نسبة تسوس الاسطح هي الاكبر. اما مؤشر DMFT فكان  $٤,٦ \pm ٢٤,٣$  كما هو الحال للمرضى الذكور ومن هو عمره ٧٠ سنة فاكثر و كانت النسبة الاكبر من المؤشر لفقدان الاسنان وذلك لكلا الجنسين وكذلك لكل الاعمار. اما امراض اللثة فقد انتشرت بنسب متفاوتة بين كل المرضى من الجنسين وبمختلف الاعمار (٥٥,٧٪) وذلك بعد اقضاء المرضى الذين كانت اسنانهم تستدعي القلع. اظهر مؤشر قياس مدى انحسار اللثة وفقدان الانسجة اللثوية ان الاعلبيه من المرضى تعاني من انحسار اللثة بمقدار ٤-٦ ملم يتقدم الى اكثر من ٩ ملم خصوصاً في ذوي الاعمار المتقدمه وفي اعداد اسنان قليله. اما مؤشر CPI فكان مرتفعاً نسبياً عند المسنين بعمر ٧٠ سنة فاكثر وشكل مدى الترسبات الكلسية والجيوب اللثوية بصنفيها ٣,٦ و ٣٨,٥ و ٢٦,٦ تبعاً اما نرف اللثة فسجل عند المؤشر ١,٣ ولم يظهر اى مريض بلته سليمه.

The aim of this study was to evaluate the oral health status in a consecutive sample of elderly Saudi dental patients. The survey involved 540 subjects, two thirds of whom were males and one third females with an age range of 55 to 93 years. The prevalence of caries and periodontal diseases was assessed using the WHO recommended procedures for DMFT and CPI. Caries was detected in 50% of dentate population and root caries scored the highest percentage (41.9%), particularly among male subjects while females showed surface caries. Root caries and to a lesser extent surface caries were encountered more frequently in younger and older age groups (24.9±2.7). The mean DMFT score was recorded as 24.3±4.6 for male subjects and those aged 70 years and older. The missing component was the highest for both genders and also for the different age groups. Periodontal condition assessment involved 301 subjects (55.7%). The severity of the disease was measured by the loss of attachment and gingival recession, which appeared to vary considerably between subjects, genders and age groups. The majority of subjects had loss of attachment at 4-6 mm threshold followed by >9 mm threshold. Likewise, the mean number of teeth with loss of attachment varied for gender and different age groups. In the older age group the prevalence of >9 mm threshold was the highest observed for a relatively small number of teeth. Evaluation of the periodontal status according to the CPI index indicated that none of the subjects assessed were periodontally healthy. The percentages of subjects with bleeding, calculus, shallow and deep pockets were 1.3, 33.6, 38.5 and 26.6, respectively. Both males and females showed a high tendency towards shallow pockets, recorded as the highest score. Similar observation was noted for all the age groups. Although the number of subjects aged 70+ were relatively low, the proportions of CPI scores were higher than those of the second age group.

### INTRODUCTION

With the steadily increasing percentage of the elderly population in Saudi Arabia as a result of improved quality of life, dental diseases are expected to increase, as more individuals will retain their teeth into an old age.<sup>1</sup> Nonetheless, the retention of teeth into old age increases the clinical exposure of root surface to oral bacteria and raises the possibility of developing root surface caries.<sup>2</sup> In addition, there is the likely risk of periodontal disease with subsequent gingival recession since the progress of periodontal disease in the elderly is associated with the retention of natural dentition.<sup>3</sup> It seems that the presence of natural teeth is the most significant predictor of oral health and

related behaviors in elderly population.

Although, a large proportion of the elderly have been reported to need comprehensive dental treatment, there is only a low level of perceived need owing to belief of the elderly that dental problems are part of the normal process of growing old.<sup>4</sup> Elderly patients are also known to perceive many barriers to gaining access to dental treatment and many of them are prone to many functional impairments associated with systemic illnesses and medications prescribed for those conditions.<sup>5,6</sup> The promotion and protection of oral health of the elderly therefore become a challenging

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issue in order to improve the quality of life, physically and mentally. The first step in planning dental services is the collection of up-to-date information on the prevalence of oral and dental diseases in a given population in order to assess future treatment needs.<sup>7</sup>

Since no attempt has been made to determine the level of dental diseases in the elderly population in Saudi Arabia and because the results of a survey performed in one country can not be readily extrapolated to another as dental treatment needs vary considerably from one country to another. This study was designed to evaluate the oral health status of elderly Saudi population visiting the dental school. The study investigated the dental status of Saudi population aged 55 years and above.

## MATERIALS AND METHODS

The study population comprised five hundred and forty elderly Saudi dental patients 55 years and above in age who attended the dental clinics of the Dental College of King Saud University between 2000 and 2002.

The examination procedures, instruments and diagnostic criteria were consistent with those recommended by the World Health Organization.<sup>8</sup> Tooth status was recorded using the DMFT index and which represented dental caries, missing, and restored teeth, crowns or the roots. The conditions of the teeth were further assessed and caries was always recognized as unequivocal detectable discolored cavitations and identified as surface caries (crown), cervical root caries or gross caries. When the caries extended to involve the roots that superseded any other lesion, it was considered as severely decayed remaining roots and assessed to be non restorable, and judged as requiring dental extraction or clearance. The findings of different carious lesions

were presented in terms of percentages and the DMFT and its components were presented in their mean score and as a proportion within the DMFT scores.

The periodontal condition was assessed using the community periodontal index (CPI) for the presence of bleeding, calculus and periodontal pocket depth of indexed teeth or their substitutes at six sites (sextants). Light probing force consistent with that recommended with the use of CPI probe was used and the highest score among the sextants was recorded. Loss of attachment and gingival recession as indicators of oral health were also assessed and recognized in three different thresholds: 4-6 mm, 6-9 mm and >9 mm threshold and the loss of attachment was recorded from the cemento-enamel junction (CEJ) to the maximum penetration of the periodontal probe. Whenever measurement was not possible, due to calculus or margin restoration, attachment loss and recession were estimated and recorded in millimeters. The periodontal health status findings were presented as the percentage of subjects within the specific threshold for loss of attachment and recession, and within each code of CPI scores, the mean number of teeth involved and the mean number of sextants.

The examination was carried out in the dental clinic by two experienced and calibrated dentists. The intra-examiner and inter-examiner reliability were assessed for the two examiners using repeated examinations on 5% of the subjects (n=27) and the agreement was approximately 82% and 74%, respectively. The Kappa statistics showed fair to moderate agreement between examiners in scoring bleeding, calculus and depth probing, and substantial agreement in estimation of attachment loss and gingival recession. The age of the subjects was grouped as follow: 55-59 (group I), 60-69 (group II) and 70-93 (group III).

All the above information were gathered, analyzed and tested for differences between genders among different age groups employing the Chi-square test at the significance level of  $P < 0.05$ .

## RESULTS

Of the 540 patients investigated in this study, 366 (67.8%) were males and 147 (32.2%) were females and the age range was between 55 and 93 years with a mean age of 62.1 years. The largest age group was the 55-59 years category (group I), which accounted for more than 56% of the total number of patients (Table 1). The male subjects constituted the larger proportion of the study sample for all the three age groups, particularly age groups II and III. The difference between males and females in all the three age groups was significant ( $P < 0.05$ ).

Caries was observed in about 50% of all subjects and was recorded as surface caries, root caries and gross caries. For the majority, root caries was the most frequent (41.1%), and it was found more among elderly male subjects (70.3%). Surface caries was found to be higher in female subjects (52.3%). The difference between the prevalence of different types of caries in males and females were statistically significant ( $P < 0.05$ ). Similar results were observed when the prevalence of caries was contrasted among the different age groups ( $P < 0.05$ ).

More than 55% of the age group I affected by carious, mainly surface and root caries, which accounted for 33.8% and 47%, respectively. The prevalence of gross caries was recorded among 37% of age group II while root caries was found in the majority of age group III. The distribution of caries in age group III had a similarity to that of age group II but the proportion of surface and root caries was relatively high (Table 2).

The experience of caries in the study population is indicated by a mean DMFT score ( $24.3 \pm 4.6$ ). The mean value for missing teeth was recorded as the highest ( $19.9 \pm 11.2$ ) compared to that of decayed ( $3.3 \pm 2.5$ ) and filled teeth ( $1.1 \pm 0.4$ ). The mean values for all parameters of the DMFT was higher for male subjects compared to females except for the filling component but the difference was not statistically significant ( $P > 0.05$ ). The overall DMFT score for age group III ( $24.2 \pm 3.1$ ) was higher than those recorded for age groups I and II, ( $22.1 \pm 4.7$  and  $19.7 \pm 4.5$ , respectively). Similar observations were noted for the different DMFT components, with the exception of the decayed component for age group I ( $2.5 \pm 1.6$ ). The missing component for all three groups was the largest. The difference between DMFT values for the different age groups was statistically significant (Table 3).

After the exclusion of the edentulous patients and those who had decayed teeth

**Table 1.** Gender and age groups of the study subjects

		Age group I	Age group II	Age group III	Total
Gender	<b>Males</b> (% within gender)	184 (50.3)	96 (26.2)	86 (23.5)	366 (67.8)
	Mean    Min    Max    SD 62.8    55    93    7.1				
	<b>Females</b> (% within gender)	123 (70.6)	32 (18.4)	19 (10.9)	174 (32.2)
	Mean    Min    Max    SD 60.1    55    90    5.8				
<b>Total</b>		307 (56.9%)	128 (23.7%)	105 (19.4%)	540 (100)

**Table 2.** Prevalence of caries according to type of lesions, gender and age groups in 264 subjects (48.9%)

	All subjects	Males <i>n</i> = 168 (63.6%)	Females <i>n</i> = 96 (36.4%)	Age group I (55-59) <i>n</i> = 172	Age group II (60-69) <i>n</i> = 63	Age group III (70+) <i>n</i> = 29
<b>No. surface caries (%)</b> % within gender/ age group	172 (32.5)	82 47.7	90 52.3	104 33.8	43 29.3	25 32.9
<b>No. root caries (%)</b> % within gender/ age group	222 (41.9)	156 70.3	66 29.7	145 47	49 33.3	28 36.8
<b>No. gross caries (%)</b> % within gender/ age group	136 (25.7)	92 67.6	44 32.4	58 18.9	55 37	23 30.2

that were assessed as requiring extraction due to extensive loss of tooth substance (*n*=239), the survey of periodontal diseases involved 301 subjects, 209 (69%) males and 92 (30.6%) females, respectively. Loss of attachment of 4-6 mm at one or more teeth was detected in 14.3%, of which the majority (76.7%) were males. The extent of loss of attachment at this threshold affected a mean of 12.2±5.3 teeth. An increase in the severity of loss of attachment at 6-9 mm and > 9 mm thresholds respectively were observed in approximately 43% of the affected individuals with a mean of 10±4.2 and 8.2±6.3 teeth, respectively. Although there was an even distribution among the three thresholds of loss of attachment among males and females, there was a tendency for a steady increase in the mean value of affected teeth in females but the difference between males and females was not statistically significant (*P* > 0.05).

When the severity of loss of attachment was examined between the different age groups, statistically significant differences were found (*P* < 0.05). Loss of attachment at 6-9 mm threshold was detected in 42% in age group I with the highest mean of 8.2±2.1 teeth. In age group II, the majority (50%) demonstrated loss of attachment of 6-9 mm followed by threshold >9 mm in about 40% with the highest mean of 4.2±1.8 and 1.6±1.1 teeth, respectively. A mean of 1.8±1.2 teeth was scored for the highest percentage (67%) of age group III which increased to 14.8 for 4-6 mm for 27 subjects (22%) of age group I (Table 4).

Evaluation of the periodontal condition using the CPI is presented in Table 5 which indicates that no subjects were assessed as periodontally healthy. The prevalence of bleeding during probing was minimal and accounted for <1.5%, a percentage that increased to 1.8% for male subjects. Nearly 33% of the subjects had calculus

**Table 3.** DMFT-scores and DMFT-components by gender and age group in a total of 264 patients

	All subjects <i>n</i> = 264	Males <i>n</i> = 168	Females <i>n</i> = 96	Age group I (55-59)	Age group II (60-69)	Age group III (70+)
<b>D</b> % within DMFT	3.3 ± 2.5	3.6 ± 3.1 (14.5)	2.4 ± 2.0 (10.8)	2.5 ± 1.6 (42.9)	1.5 ± 1.2 (28.6)	2.3 ± 2.1 (28.6)
<b>M</b> % within DMFT	19.9 ± 11.2	20.8 ± 10.9 (83.5)	17.5 ± 9.7 (78.8)	19.1 ± 9.8 (32.8)	18.0 ± 10.3 (31)	20.7 ± 7.6 (36.2)
<b>F</b> % within DMFT	1.1 ± 0.4	0.5 ± 0.1 (2.0)	1.3 ± 1.1 (5.9)	0.5 ± 0.3 (50)	0.2 ± 0.1 (0.0)	1.2 ± 0.6 (50)
<b>DMFT</b>	24.3 ± 4.6	24.9 ± 2.7	22.2 ± 4.9	22.1 ± 4.7	19.7 ± 4.5	24.2 ± 3.1

**Table 4.** Prevalence and severity of periodontal diseases in 301 patients\* according to attachment loss and recession for both gender and age groups

Threshold		All subjects	Males n = 209	Females n = 92	Age group I n = 122	Age group II n = 134	Age group III n = 45
Mild 4- 6 mm	n (% within lesion)	43 (14.3)	33 (15.8)	10 (10.9)	27	13	3
	% within gender/age group		76.7	23.3	62.7	30.2	6.9
	Mean no. teeth $\pm$ SD	12.2 $\pm$ 5.3	9.6 $\pm$ 5.2	10 $\pm$ 6.4	14.1 $\pm$ 4.8	8.2 $\pm$ 3.1	2.5 $\pm$ 1.6
Moderate 6-9 mm	n (% within lesion)	130 (43.2)	90 (43.1)	40 (43.5)	51	67	12
	% within gender/age group		69.2	30.8	39.2	51.1	9.2
	Mean no. teeth $\pm$ SD	10.0 $\pm$ 4.2	9.4 $\pm$ 5.1	12.0 $\pm$ 3.2	8.2 $\pm$ 2.1	4.2 $\pm$ 1.8	2.1 $\pm$ 1.1
Severe >9 mm	n (% within lesion)	128 (42.5)	86(41.1)	42 (45.7)	44	54	30
	% within gender/age group		67.2	34.3	34.3	42.1	23.4
	Mean no. teeth $\pm$ SD	8.2 $\pm$ 6.3	6.4 $\pm$ 5.2	8.9 $\pm$ 5.1	8.3 $\pm$ 2.4	1.6 $\pm$ 1.1	1.8 $\pm$ 1.2

Edentulous patients (141) and those with remaining roots (98) and 3<sup>rd</sup> molars were excluded.

as they scored the highest mean value of 2.6 sextants which was almost similar among males and females. Shallow pocket recorded the highest score in 38.5% with a mean value of 0.9 sextants of the sample with a higher mean value (1.3) noted among female subjects. More than one-quarter (26.6%) of the subjects had deep periodontal pockets and the mean value of sextants was 0.3. The percentages for males and females were almost equal but the mean value of sextants was 0.2 and 0.6, respectively. According to the different age groups, the highest score in bleeding was recorded in 2 subjects only in the second age group. The highest score for calculus was recorded around 33% for all age groups and the mean sextants dropped from 3.4 to 1.9 from age group I to III. The percentage of subjects

who had shallow periodontal pockets with the highest score was observed among age group II (41.9%) while the first and third age groups showed the same value around 35%. The mean number of sextants for shallow pocket scoring was recorded as 1.6, 1.1 and 1.2 for age groups I, II and III, respectively. Unlike shallow pockets, the deep pockets were recorded as 22.6% for age group II and 30% for age group I and III each while the mean number of sextants was 0.3 and less in all age groups.

## DISCUSSION

With the continuous expansion of the aging population, it becomes obligatory for professionals to focus on the identification of intra-oral health

**Table 5.** Percentage distribution of subjects with highest CPI score and mean number of sextant (x) according to gender and age groups

CPI Code		All subjects	Males (54.5%)	Females (45.5%)	Age group I n = 102	Age group II n = 150	Age group III n = 49
Bleeding	n (% CPI)	4 (1.3)	3 (1.8)	1 (0.7)	1 (0.9)	2 (1.4)	1 (1.9)
	Mean x	2.9 $\pm$ 1.8	3.5 $\pm$ 1.1	4.2 $\pm$ 1.0	4.1 $\pm$ 2.4	3.6 $\pm$ 2.0	3.4 $\pm$ 0.5
Calculus	n (% CPI)	101 (33.6)	54 (32.9)	47 (34.3)	34 (33.3)	50 (34.2)	17 (32.1)
	Mean x	2.6 $\pm$ 2.2	2.2 $\pm$ 1.6	2.7 $\pm$ 2.1	3.4 $\pm$ 0.9	2.5 $\pm$ 0.35	1.9 $\pm$ 0.95
Shallow pocket	n (% CPI)	116 (38.5)	62 (37.8)	54 (39.4)	36 (35.3)	61 (41.9)	19 (35.8)
	Mean x	0.9 $\pm$ 0.5	0.8 $\pm$ 0.2	1.3 $\pm$ 0.1	1.6 $\pm$ 1.5	1.1 $\pm$ 1.0	1.2 $\pm$ 0.72
Deep pocket	n (% CPI)	80 (26.6)	45 (27.4)	35 (25.5)	31 (30.3)	33 (22.6)	16 (30.2)
	Mean x	0.3 $\pm$ 0.12	0.2 $\pm$ 0.1	0.6 $\pm$ 0.25	0.2 $\pm$ 0.1	0.3 $\pm$ 0.21	0.3 $\pm$ 0.09
Excluded x (fewer than 2 teeth)		0.6	0.1	0.1	1.1	1.6	2.4

Mean x: mean sextants

treatment requirements and sequelae brought upon by aging. The oral health status of the elderly is believed to be characterized by dramatic changes and a lack of adequate understanding of the causes of these alterations making it difficult to project practically the estimates of the future treatment need.<sup>9</sup> Although, the group surveyed in this study was not presumed to be representative of the senior adult Saudi population, the aim was to investigate and report oral health status and its indicators in a convenient sample of Saudi elderly dental patients attending the dental clinics of King Saud University, Riyadh, Saudi Arabia. The Dental College was established to serve the community with the needed and qualified dentists. It is also the largest specialized dental center in Riyadh city providing dental care to the elderly as well as adolescent and children free of charge. Many of the elderly populations are attracted to dental college for dental treatment because of the good reputation of the dental services provided and many of the elderly have also a big belief in the academic schools when it concerns their health care. The present study is presumed to offer an opportunity to examine the oral health of a relatively large group of elderly population within rapidly changing lifestyles. The large proportion of this study was composed of male subjects. This neither indicated that men constitute the larger proportion of the Saudi population, nor necessary deterioration of oral health among this group. Access to dental treatment is nevertheless more convenient to males than to females owing to the social restricted culture of Saudi Arabia and this may explain the larger number of males in the study subjects.

In spite of relatively common use of oral hygiene measures among Saudi elderly<sup>10</sup>, the prevalence of root caries in this study was recorded in the majority of

subjects, a phenomenon observed among elderly population worldwide.<sup>1,11-15</sup> The prevalence of root caries in male subjects however was higher than that in females who showed more surface caries and this difference might be due to variation in oral health habit and predisposing factors. Interestingly, elderly women in some parts of Saudi Arabia use *Derium*, a natural chewing stick obtained from the plant *Juglans regia* as a tooth brush to maintain healthy gum and teeth (personal observation). Another finding in this study was the relatively high percentage of filled teeth observed among female subjects presuming that women have a positive attitude towards oral health well-being. This observation was supported by the fact that women retained more teeth than men although there was an increase in the prevalence of surface caries. Nevertheless, there was a decline in the prevalence of surface caries in older age groups. The root caries was observed to have a progressive trend where they increased significantly with aging. Elderly individuals have been reported in a study in Saudi Arabia to be prone to anxiety and stress<sup>16</sup> and therefore become more susceptible to dental diseases. This relationship between anxiety and deterioration of the oral health has also been demonstrated in aged population by Locker and Liddell.<sup>17</sup> Anxious individuals had more missing teeth and fewer restorations due to avoidance or delayed treatment which often times lead to extraction to relieve pain.

The prevalence of dental caries as indicated by the DMFT score in this study was relatively higher compared to the previous survey of Saudi elderly population.<sup>18</sup> High DMFT scores observed in this study could be explained by the fact that the sample of this study was derived from patients who had increased demand for dental treatment, in particular for dental caries. Nevertheless,

the mean DMFT score was closely similar to that reported internationally and in agreement with all previous studies.<sup>19-24</sup> The missing component of the DMFT score of the current study was the highest for all ages and genders, and higher than that reported previously for the same age group.<sup>25</sup> This might have contributed to the overall increase of DMFT score. The increase in missing component of the DMFT score for elderly could be related to a belief in some communities that extraction of teeth is considered by many elderly as the most accepted treatment for dental disease.<sup>15,17,26</sup> It is presumed that increase in edentulism and denture demands implies that all preventive measures were inadequate and that secondary restorative measures have also failed which represents a major weakness in the dental care system.<sup>4</sup> The decay component was particularly higher for age group (55-59 years) since many of those subjects retained more teeth, unlike the oldest age group who had more missing teeth hence the majority of older subjects appeared to be edentulous. The proportion of filling component on the other hand was relatively higher in women than men indicating the awareness of females towards their dental problems.

Since none of the subjects appeared to be periodontally healthy in this study, the periodontal status was accepted to be generally poor. Although the prevalence of periodontal disease of the Saudi elderly in the present study was similar to that reported in several Asian countries,<sup>27</sup> it appeared to be less than what have been reported previously in a study of Saudi elderly population.<sup>28</sup> The difference between the two studies might be related to the characteristic of the current study sample which was consistent with extreme need of dental care, unlike a random selected study group. The findings indicated that oral hygiene was less than satisfactory in

spite of common use of oral hygiene measures among Saudi elderly,<sup>10</sup> which appeared to be ineffective in reducing plaque accumulation and the prevention of periodontal disease. The regular use of Miswak, for example, on periodontal health is reported to be consistent with negative effects and pocket development results in a significant deterioration of periodontal tissue.<sup>29</sup> High prevalence of deep pocket with less frequent bleeding, calculus and shallow pocket was observed in this study among male subjects in particular unlike females who had shallow pockets. The difference between genders is likely due to the differences in individual's perception towards oral hygiene. Although few subjects of the 55-59 year age group had high bleeding score, gingival bleeding was more frequently observed around mutilated teeth, in particular those teeth with deep extensive caries below the gingival margins. It was also noted that bleeding was detected in association with poor-fitting restorations and in association with poor oral hygiene.

Another indicator of the periodontal health was loss of attachment and gingival recession which have been observed as a very common finding within the majority of subjects in this study. The percentage of male subjects who suffered loss of attachment was greater than females and the highest prevalence was recorded in the older age group. It seems that the periodontal destruction was the end result of the progression of the periodontal disease, as seen in association with calculus deposition.<sup>30</sup> Miswak users who more frequently are men, were more susceptible to developing significant attachment loss and gingival recession.<sup>28</sup> However, similar observations were noted among regular users of other practices of oral hygiene such as tooth brushing and tooth picks.<sup>27</sup> Subjects in the most elderly group in particular showed the maximum attachment loss which was greater

than the maximum pocket depth. This might suggest that loss of attachment accompanied by gingival recession was a major feature of periodontal disease in older individuals. The small value of the mean number of sextants with less affected teeth observed in this study for the older age group is thought to be a parameter for aging as many subjects tended to lose teeth and become edentulous and this might be explained by the long term effect of poor oral hygiene. Thus, slow deterioration of periodontal conditions with increasing age possibly leads to full blown periodontal diseases which threaten the tooth life. Another reason for fewer numbers of teeth in sextants was attributed to the fact that the prevalence of caries in elderly population was high. Therefore the need for extraction renders many of them partially edentulous.

Within the limitation of this study, the present data will serve as a baseline for further epidemiological studies of senior adult Saudi population. Overall the oral health status is generally poor and caries and periodontal diseases are common in dentate Saudi elderly subjects which necessitate a nationwide health promotion program to improve the oral condition of this group of population.

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