Oral Health in Postmenopausal Turkish Women

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The most common condition affecting all women is menopause and most women spend one third of their lives after the menopause. Menopause is accompanied by a number of characteristic physical changes, some of which are manifested in the oral cavity.

Purpose: The objective of this study was to evaluate the oral health status of a group of menopausal women who visited a menopause clinic in Ankara, Turkey.

Materials and Methods: A total of 348 women, aged 44–65 (mean 52.17 ± 4.67), who spontaneously attended the menopause clinic at Hacettepe University Hospital, Ankara, Turkey, (between 1998 and 2000) were interviewed and examined by a trained dentist over a two-year period. Their oral status was determined by the same dentist by using the follwing indices on the basis of WHO criteria: Decayed, Missing and Filled Teeth (DMFT); Decayed, Missing and Filled Teeth Surfaces (DMFS); Root, Decayed, Filled (RDF); and Community Periodontal Index (CPI). Oral complaints and denture status was also assessed. The data were analysed by means of difference between groups.

Results: A total of 23% of the women were using hormones and 77% were not. The most significant symptom was oral dryness with 48.8% in the hormone users and 68.3% in the non-users ($p < 0.05$). A total of 36.3% of the hormone users and 39.5% of the non-users were edentulous ($p > 0.05$). DMFT, DMFS and CPI values of non-users were higher than the hormone users ($p < 0.001$). RDF values did not show any significant difference between hormone users and non users ($p > 0.05$).

Conclusions: These data suggest that menopause might play a role in the oral status of women. The use of hormones seemed to affect oral health positively.

Key words: menopause, oral health, Turkey

Oral Health Prev Dent 2006; 4: 227-233. *Submitted for publication: 28.02.05; accepted for publication: 20.12.05.*

Modern medicine has significantly increased the human lifespan and today most women live one third of their lives after the menopause. Menopause is a normal developmental stage in a woman's life, marking the permanent cessation of menstruation at about the age of 50 (Niessen, 1993; Zachariasen, 1993). It is characterised by lack of ovarian oestrogen production, which may cause several problems, such as hot flushes, sweating, osteoporosis, cardiovascular diseases, cognitive changes, urogenital infections and skin changes (Ben Aryeh et al, 1996). Although menopause has long been associated with certain physical changes, the exact aetiology and the mechanism involved in the onset of these symptoms remains unknown (Zachariasen, 1993). The use of hormone replacement therapy (HRT) in menopausal women has been recommended for decades for the relief of these symptoms (Volpe et al, 1990; Limouzin-Lamothe, 1996).

Although it has been shown that HRT has significantly positive effects on the quality of life of menopausal and postmenopausal women, only a small percentage of these women currently enjoy the benefits of such treatment (Steinberg, 2001). The experience of many women during menopause seems to differ markedly from their expectations, although these vary across cultures and countries.

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Table 1 Characteristics of the women in the study (n = 348)

		n	%	p
Educational status	< High school	99	28.4	< 0.001
	High school	197	56.7	
	> High school	52	14.9	
Systemic disorder	No	33	9.5	< 0.001
	Yes	315	90.5	
Smoking status	Non smokers	138	39.7	< 0.001
	Past	110	31.6	
	Current	100	28.7	
Duration of menopause	< 1	60	17.2	< 0.001
(years)	1–3	148	42.6	
	>3	140	40.2	
Menopause-related	Natural menopause	260	74.7	< 0.001
categories	Artificial menopause	88	25.3	
Hormone user (HRT)	Natural menopause	70	20.1	< 0.001
	Artificial menopause	10	2.9	
	No	268	77	
Type of HRT	Natural menopause	0.625 mg/day conjugated oestrogen + 5 mg/day medroxy progesterone		
	Artificial menopause	0.625 mg/day conjugated oestrogen		

Oral health affects people physically and psychologically and influences how they grow, enjoy life, look, speak, chew, taste food and socialise, as well as their feelings of social well-being (Sheiham, 2005). Unfortunately, the study of menopause has received limited attention, with only a few studies focusing on the influence of menopause on oral health (Kribbs, 1990; Norderyd et al, 1993; Paganini-Hill, 1995; Grodstein et al, 1996; Krall et al, 1997).

Thus the purpose of this study was to evaluate menopause and oral health status, as well as oral health complaints, in a group of menopausal Turkish women.

MATERIALS AND METHODS

The study was carried out on patients who consecutively attended the Menopause Clinic at Hacettepe University Hospital, Department of Obstetrics and Gynecology, Ankara, Turkey, between 1998 and 2000.

A total of 348 women aged 44–65 (mean 52.17 ± 4.67) who agreed to participate had routine gynaecological examinations and tests. After recording detailed histories from all subjects concerning oral hygiene practices, educational status, systemic disorders, smoking habits and menopausal information via a questionnaire, they each underwent a dental examination. One examiner (FY) performed all clinical measurements in the dental clinic. A dental nurse assisted her to fill in the records. A standard form was designed and information obtained for each woman was recorded regularly. No radiographs were taken (Hämäläinen et al, 2003). Dental caries and caries-treatment indices were obtained using the WHO criteria (World Health Organization, 1997). The Decayed, Missing and Filled Teeth (DMFT), Decayed, Missing and Filled Teeth Surfaces (DMFS), and Root, Decayed, Filled (RDF) indices were estimated. The examination included calibrated recordings for all teeth, excluding third molars. Oral examinations were carried out using a dental mirror and a dental explorer. Periodontal health status was determined by Community Periodontal Index (CPI) with a dental mirror and WHO CPI probe (World Health Organization, 1997). The denture status was also assessed. The data were analysed by means of SPSS for Windows 11.5 program. Association between parameters was tested for significance using the Chi-square test and Mann-Whitney U test.

Table 2 Prevalence of oral complaints

	T (n = 348)		H (n = 70)		H_a (n = 10)		H_t (n = 80)		NH (n = 268)		
	n	%	n	%	n	%	n	%	n	%	p
Dry mouth	222	63.8	34	48.6	5	50	39	48.8	183	68.3	< 0.05
Unpleasant taste	56	16.1	10	14.3	1	10	11	13.8	45	16.8	ns
Burning mouth	99	28.4	18	25.7	3	30	21	26.3	78	29.1	ns
Halitosis	107	30.7	22	31.4	3	30	25	31.3	82	30.5	ns
Ulceration	84	24.1	17	24.2	2	20	19	23.8	65	24.3	ns
Discoloured tongue	115	33.1	22	31.4	3	30	25	31.3	90	33.5	ns

T, total women examined
H, hormone users (natural menopause)
H_a, hormone users (artificial menopause)
H_t, hormone users (total)
NH, non-users
ns, not significant

RESULTS

A total of 348 women were examined. The age range was 44 to 65 (mean 52.17 ± 4.67). The majority of the women had graduated from high school (56.7%) and 90.5% had systemic disorders. Only 39.7% were non-smokers, 31.6% were past smokers, whereas 28.7% were current smokers. The duration of menopause was not too long. A total of 40.2% of women had been menopausal for more than three years. A total of 74.7% of women had natural menopause, and 25.3% had artificial (surgical) menopause. Of the participants, 23% were receiving hormone replacement therapy, and 77% did not use any hormones (Table 1). The dental care behaviour and oral hygiene habits were recorded. A total of 46.0% of women reported brushing their teeth once a day; 30.5% reported occasional brushing; 21.3% brushed twice or more a day; and 2.3% never brushed their teeth ($p < 0.001$). Only a total of 19.5% of the women used dental floss and 25.3% used mouthrinses ($p < 0.001$). In terms of dental visits, 25% of the women visited the dentist regularly, 34.5% never visited, and 40.5% visited the dentist whenever they had complaints ($p < 0.001$).

The most common oral complaint of the women was a feeling of dryness in the mouth (63.8%). A total of 48.8% of women using hormones and 68.3% of non-users suffered from dry mouth ($p < 0.05$) (Table 2). The prevalence of oral dryness was significantly increased by the duration of menopause, whether the women used hormones or not ($p < 0.05$) ($\chi^2 = 10.17$, odds ratio = 0.44) (Table 3). Risk of oral dryness was decreased in the group who had used HRT for several years. A total of 36.5% of the women were edentulous. A total of 55.2% of women were having partial prostheses, 73% were having crowns and 48% were having bridges placed in their mouth. There were no significant differences in the use of complete, partial prostheses, crowns or bridges between women with and without HRT ($p > 0.05$) (Table 4).

Table 5 shows the caries prevalence and periodontal status of the menopausal women. The mean DMTF for hormone users was 7.75 ± 3.25 compared with 10.54 ± 3.68 for non-users ($p < 0.001$). The DMFT score for the total women examined was 9.89 ± 3.77. The mean DMFS score of hormone users was 25.39 ± 12.88 and 35.99 ± 16.55 for non-users ($p < 0.001$). The mean root caries values are shown in Table 5.

There was no significant difference in the prevalence of root caries between hormone users and non-users ($p > 0.05$). CPI values showed a significant difference between hormone users and non-users. Women who did not use hormones had higher CPI val-

Table 3 Prevalence of oral complaints due to the duration of menopause in the hormone users and non-users

	<1 year				1–3 years				> 3 years				
	H (n = 19)		NH (n = 41)		H (n = 17)		NH (n = 131)		H (n = 44)		NH (n = 96)		
	n	%	n	%	n	%	n	%	n	%	n	%	p
Dry mouth	6	31.6	23	56.1	6	35.3	85	64.9	27	61.4	75	78.1	< 0.05
Unpleasant taste	2	10.5	6	14.7	2	11.8	21	16.1	7	15.9	18	18.8	ns
Burning mouth	4	21.1	11	26.8	4	23.5	37	28.3	13	29.6	30	31.3	ns
Halitosis	5	26.3	12	29.2	5	29.4	40	30.5	15	34.1	30	31.3	ns
Ulceration	4	21.1	8	19.5	4	23.5	31	23.7	11	25	26	27.1	ns
Discoloured tongue	5	26.3	13	31.7	5	29.4	44	33.6	15	34.1	33	34.4	ns

H, hormone users
NH, non-users
ns, not significant

Table 4 The distribution of prostheses among menopausal women

	T (n = 348)						H (n = 80)						NH (n = 248)						
	Mandible		Maxilla		Total		Mandible		Maxilla		Total		Mandible		Maxilla		Total		
	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	p
No use	95	27.3	101	29.0	196	56.3	21	26.3	23	28.7	44	55.0	74	27.6	78	29.1	152	56.7	ns
Complete prosthesis	49	14.1	78	22.4	127	36.5	11	13.8	18	22.4	29	36.3	38	14.2	60	22.4	98	39.5	ns
Partial prosthesis	92	26.4	100	28.7	192	55.2	17	21.3	22	27.5	39	48.8	75	27.9	78	29.1	153	57.1	ns
Crown	118	33.9	136	39.1	254	73.0	26	32.5	31	38.7	57	71.3	92	34.3	105	39.2	197	73.5	ns
Bridge	73	21.0	94	27.0	167	48.0	16	20.0	21	26.3	37	46.3	57	21.3	73	27.3	130	48.5	ns

T, total women examined
H, hormone users (natural menopause and artificial menopause)
NH, non-users
ns, not significant

Table 5 Dental caries and periodontal health status

	T (n = 348)		H (n = 70)		H_a (n = 10)		H_t (n = 80)		NH (n = 268)		
	Mean ± SD	%	Mean ± SD	%	Mean ± SD	%	Mean ± SD	%	Mean ± SD	%	p
DMFT	9.89 ± 3.77	100.0	7.74 ± 3.32	100.0	7.80 ± 2.94	100.0	7.75 ± 3.25	100	10.54 ± 3.68*	100.0	< 0.001
DMFS	33.97 ± 19.23	100.0	24.47 ± 15.79	100.0	24.30 ± 15.20	100.0	25.39 ± 12.88	100	35.99 ±16.55*	100.0	< 0.001
RDF	0.36 ± 1.33	100.0	0.30 ± 0.95	100.0	0.66 ± 0.95	100.0	0.29 ± 1.26	100	0.61 ± 1.51	100.0	ns
CPI	1.27 ± 0.57		1.02 ± 0.20*		1.05 ± 0.20		1.03 ± 0.18		1.34 ± 0.62*		< 0.001

*, different from all of the other groups ($p < 0.05$)
T, total women examined
H, hormone users (natural menopause)
H_a, hormone users (artificial menopause)
H_t, hormone users (total)
NH, non-users
ns, not significant

ues than the women who used hormones ($p < 0.001$). DMFT and DMFS values showed no significant difference with the duration of menopause between the women using hormones and non-users ($p > 0.001$) (Table 6). There was no significant difference in root caries and CPI values with duration of menopause ($p > 0.05$) (Table 6).

DISCUSSION

Menopause usually begins at approximately 45–55 years of age, unless accelerated by hysterectomy and/or ovariectomy. At this stage, there is a dramatic decrease in oestrogen production, a decrease in the absorption of dietary calcium and an increase in urinary calcium (Zachariasen, 1993). Oral discomfort is a common complaint among menopausal women. Occurrence of pain, burning sensation, bad taste and dryness of the mouth have been reported in approximately 20–90% of menopausal women (Ferguson et al, 1981; Wardrop et al, 1989; Volpe et al, 1990; Ben Aryeh et al, 1996).

Ben Aryeh et al (1996) reported a high prevalence of oral discomfort in the women attending a menopause clinic. A total of 45–60% of the women had complaints of dry mouth, which may be due to as-yet-undetermined qualitative changes in the salivary composition, imbalance between salivary glands or changes in the mucosal sensory receptors.

The high prevalence of oral discomfort in the women at menopause was also reported by Ferguson et al (1981) and Wardrop et al (1989). These complaints might be due to the hormonal alterations taking place at menopause causing vasomotor and neurological changes.

The most common oral complaint in our study was also a feeling of dry mouth (63.8%), and women using hormones showed less discomfort from dry mouth (48.8%) than the women who were not using hormones (68.3%). There are reports that menopausal women who complained of oral discomfort were relieved after the administration of oestrogens (Wardrop et al, 1989; Forabosco et al, 1992), while others did not detect any effect of hormone supplementation on oral discomfort (Ben Aryeh et al, 1996; Laine and Leimola-Virtanen, 1996).

The most significant problem that develops during this period is osteoporosis (Chohayeb, 2004). Osteoporosis is a skeletal disorder involving the reduction of bone density. Age is the strongest correlate to bone loss and all individuals lose bone after the age of 35–40 years (Grodstein et al, 1996; Krall et al, 1997).

Table 6 Dental caries and periodontal health status related to the duration of menopause in the hormone users and non-users

	<1 year		1–3 years		> 3 years		
	H (n = 19) Mean ± SD	NH (n = 41) Mean ± SD	H (n = 17) Mean ± SD	NH (n = 131) Mean ± SD	H (n = 44) Mean ± SD	NH (n = 96) Mean ± SD	p
DMFT	7.97 ± 3.26	10.09 ± 3.67	7.63 ± 3.67	10.24 ± 3.62	7.29 ± 2.87	11.13 ± 3.72	ns
DMFS	26.58 ± 18.39	34.48 ± 20.07	24.04 ± 14.59	36.81 ± 19.42	23.11 ± 15.54	37.81 ± 18.96	ns
RDF	0.68 ± 1.87	0.18 ± 0.83	0.61 ± 1.60	0.23 ± 1.20	0.53 ± 1.50	0.68 ± 2.01	ns
CPI	1.07 ± 0.24	1.08 ± 0.49	1.05 ± 0.20	1.39 ± 0.67	0.99 ± 0.15	1.49 ± 0.45	ns

H, hormone users
NH, non-users
ns, not significant

In the present study, of the 348 women between the ages of 44 and 65 years, only 23% of the women examined used hormone therapy. The exact mechanism of the oestrogen effect on bone metabolism is not known. A proposed mechanism by which oestrogen promotes tooth retention includes its effect on inflammation, pathogen growth and salivary function (Norderyd et al, 1993).

History of hormone replacement therapy was associated with a greater number of teeth remaining and a lower prevalence of edentulism (Paganini-Hill, 1995), but there was no consensus on the effect of duration of oestrogen use on tooth retention (Krall et al, 1997). In the present study, hormone users had significantly lower DMFT (7.74 ± 3.32) and DMFS (24.47 ± 15.79) values than non-users (10.54 ± 3.68, 35.99 ± 16.55). The DMFT value of the total women was 9.89 ± 3.77. This value seems to be low, but the participants of the study were living in the capital, 56% had graduated from high school, and also the women had attended a menopause clinic for medical care. The prevalence of root caries was small and did not show any significant difference between hormone users and non-users. This may be due to the young age of the women, on average 52 years old. Also root caries scores did not exhibit any significant difference with the duration of menopause.

Hormone replacement was rarely instituted in women before they reached their late 40's. In this study, although majority of the women were around 50 (mean: 52.17 ± 4.67), only 23% were undergoing oestrogen therapy and 36.3% were edentulous.

In the National Institute of Dental Research survey (NIDR, 1987), 9% of women aged 45–49 years, 14% of women aged 50–54 years and 14% of those aged 55–59 were edentulous.

Krall et al (1997) evaluated 488 women aged 72–95 and also showed oestrogen users had more teeth than non-users.

Norderyd et al (1993) reported slightly less tooth loss among oestrogen users. In a large prospective study, Paganini-Hill (1995) found that oestrogen users had a 36% decrease in the risk of tooth loss compared with non-users.

Grodstein et al (1996) examined the risk of tooth loss in relation to hormone use in a large prospective study of 42171 postmenopausal women. The risk of tooth loss was lower in women who currently used hormones. However, our study group contained a much smaller group, and younger women, than these studies and we found lower DMFT values in the non-users than in those using hormone therapy.

Although some evidence suggests that use of oestrogen could increase the risk of periodontal disease by promoting the growth of periodontal pathogens (Vittek et al, 1982), our results showed that the women using hormones had CPI values significantly lower than the non-users and this did not change with the duration of menopause. Oestrogen has anti-inflammatory properties in gingival tissue and oestrogen in supraphysiological doses leads to a decrease in prostaglandin synthesis. Such a reduction in gingival inflammation could protect against tooth loss resulting from periodontitis (Knight and Wade, 1974; Sooriyamoorthy and Gower, 1989).

CONCLUSION

The most common oral complaint among our study subjects was a feeling of dry mouth. Women using hormones showed less discomfort of dry mouth than the

women who were not using hormones. The prevalence of oral dryness was significantly increased by the duration of menopause.

Hormone users had significantly lower DMFT and DMFS values than non-users. No significant difference was seen with the duration of menopause.

There was no significant difference in the prevalence of root caries between hormone users and non-users or with the duration of menopause.

Hormone users had significantly lower CPI values and this did not change with the duration of menopause.

Women seem to undergo changes in oral health because of hormonal changes. For this reason, early diagnosis, treatment planning and teaching the importance of daily care is extremely important. It is hoped that with an understanding of oral considerations specific to women, dentists will examine their female patients with a more discerning eye.

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