

# Oral health and treatment needs of institutionalized chronic psychiatric patients in Istanbul, Turkey.

O. Gurbuz<sup>1</sup>, G. Alatas<sup>2</sup>, E. Kurt<sup>2</sup>; H. Issever<sup>3</sup> and F. Dogan<sup>4</sup>

<sup>1</sup>PhD. Prosthodontist, Department of Dentistry; <sup>2</sup>M.D. Department of Psychiatry, Bakirkoy Research and Training Hospital for Psychiatry, Neurology and Neurosurgery. <sup>3</sup>Associated Professor of Public Health; <sup>4</sup>Professor of Dentistry, Department of Dental Public Health, Faculty of Dentistry, University of Istanbul

**Objective** To assess the oral health status and treatment needs in a group of hospitalized chronic psychiatric patients. **Method** The dental status was assessed using the DMFT index. Demographic and medical data were retrieved from the institutional clinical files. **Results** 491 patients were examined in the study. 258 (52.5%) of the patients were males. The mean age was  $52.3 \pm 12.3$  years and the average length of hospitalization was 17.5 years. The majority of the patients (69%) were diagnosed with schizophrenia. The mean DMFT was  $19.25 \pm 7.85$ . Missing teeth (81.4%) comprised the largest proportion of the DMFT while filled teeth (0.5%) the smallest. 18.1% of the DMFT consisted of decayed teeth. Stepwise logistic regression analysis showed that the DMFT significantly increased with age ( $p < 0.001$ ) and was significantly higher in schizophrenia patients than those with mental retardation ( $p < 0.01$ ). Males had significantly higher decayed teeth ( $p < 0.01$ ) and fewer missing teeth ( $p < 0.01$ ) than females. 58 dentate subjects (14.4%) were caries free. Two hundred and thirty five patients (58.5%) required restorative care, the mean number of treatments required per patient was  $1.42 \pm 1.82$ . Eighty-nine subjects (18.1%) were found to be completely edentulous with only 17 wearing complete dentures. 70.6% of dentate patients needed tooth extraction for caries and 36.1% for periodontal disease. **Conclusion** The findings of this study demonstrate poor oral health status with extensive unmet dental and prosthetic needs. These underline the urgent need for specific preventive oral health programme to improve the dental care of these chronic psychiatric inpatients.

*Key words:* Chronic psychiatric patients, dental health, DMFT, schizophrenia, treatment needs.

## Introduction

Oral health is one of the fundamental steps to overall health, well being and quality of life. A healthy mouth enables people to eat, speak and socialise without pain, discomfort or embarrassment. However, oral health is generally not a high priority for people with mental illness. This group is often neglected because of ignorance, fear, stigma, misconceptions and negative attitudes (Rekha *et al.*, 2002). On the other hand, people suffering from chronic mental illness constitutes a high risk group with respect to oral health, because of infrequent dental visits, irregular eating habits, poor oral hygiene, general self-neglect and the side effects of medications (Stiefel *et al.*, 1990).

The most common side effect of psychotropic medication is dry mouth (xerostomia) caused by reduced salivary flow. Xerostomia is very common among elderly patients, in particular, in the institutionalized patients (Pajukoski *et al.*, 2001). This condition has a significant impact on oral health and increases the risk of dental caries (Papas *et al.*, 1993), periodontal disease and oral infections such as glossitis, and stomatitis (Rundgren *et al.*, 1985). Other consequences of hyposalivation can include an increased incidence of yeast infections (Butt, 1991), fissuring of the corners of the mouth and lips, and difficulty in chewing, speaking and swallowing (Butt, 1991; Haveman and Redding, 1999). In addition to xerostomia, sialorrhoea, dysphagia, dysquesia, tongue edema, fissured tongue, oral

ulcers, sensation of burning in the oral cavity and bruxism are other reported side effects related with psychotropic medication (Friedlander and Marder, 2002).

Cormac and Jenkins (1999) have underlined the importance of understanding the oral health of psychiatric patients. However, the studies on the oral health and treatment needs of psychiatric inpatients mainly show that the oral health of these patients is poor, and there is a major need for dental treatment, depending on the length of institutionalization (Vigild *et al.*, 1993; Angelillo *et al.*, 1995; Thomas *et al.*, 1996; Velasco *et al.*, 1997; Ramon *et al.*, 2003).

In Turkey, there are a total of eight psychiatric hospitals, two in Istanbul and six in other cities. Four thousand two hundred of the 7400 psychiatric beds all throughout the country belong to psychiatric hospitals, and the remaining to general hospitals. Bakirkoy Research and Training Hospital for Psychiatry, Neurology and Neurosurgery, where the study was conducted, is the biggest and oldest mental health hospital in Turkey. It addresses a population of 15 million including the surrounding cities and official referrals and contains 1,550 psychiatric beds. Five hundred and five (nearly 70%) of the 750 chronic psychiatric patient beds in Turkey belong to this hospital. The hospital also offers a dental service. The other psychiatric hospital in Istanbul contains 350 beds and does not admit any chronic psychiatric patients and has no dental service.

So far, no study has been conducted that focuses on the oral health status of chronic psychiatric patients in Turkey. Therefore, the purpose of the present study was to determine the oral health and treatment needs in a group of chronic psychiatric patients and to study the possible relationship between DMFT and different variables. Another aim of the study was to record the oral health status of all the chronic psychiatric patients in the hospital.

### Methods

The population of this study comprised of psychiatric inpatients of chronic psychiatry clinics at the Bakirkoy Research and Training Hospital for Psychiatry, Neurology and Neurosurgery in Istanbul. After obtaining permission from the relevant authorities, clinical examination were conducted in the hospital wards. The surveys were conducted in 10 adult psychiatric wards. All the 505 chronic psychiatric patients in this hospital were included in the study. However, subjects with severe mental retardation and those with aggressive behaviour and lack of cooperation were excluded. A total of 491 chronic psychiatric patients were examined.

During the study, examinations were conducted by one dental professional. The data was recorded by a trained assistant. The oral examinations were conducted in the hospital wards while the patients were sitting on a chair under natural light. For those individuals who were partially/totally helpless the examinations were conducted while the patients were lying on the bed. A partially or totally helpless patient was defined as a subject who was partly or totally unable to perform basic self-care activities such as eating, washing and dressing.

The dental examinations were undertaken using the procedures recommended by World Health Organization (WHO, 1999). The decayed, missing and filled teeth (DMFT) score was used for the assessment of the patients' dental status. Third molars were excluded from the study. Meanwhile, dental and prosthetic needs of the patients were recorded.

The presence of oral dryness was also assessed during the clinical examination. The evidence of dry lips, dryness of buccal mucosa and lack of saliva upon palpation was accepted as determinants of oral dryness.

Information concerning the subjects' demographic and medical variables was obtained from institutional clinical files. The demographic variables were age, gender and length of hospitalization. The medical variables

included diagnosis of mental illness, medication used and degree of helplessness. In addition, the head nurses were consulted about the patients' smoking and daily oral hygiene practices.

The data was analyzed by using Kruskal-Wallis test, Chi-Square test, Mann-Whitney U test and Stepwise Logistic Regression Analysis. In order to explore the predictive ability of the different variables for DMFT values, stepwise logistic regression analysis was used. Six predictor variables were selected to predict the objective variable (DMFT). They were age, gender, diagnosis of psychiatric disorder, length of hospitalization, oral dryness and degree of helplessness. The groups diagnosed with atypical psychoses and organic mental disorders were not included in this logistic model, since they did not meet the entry requirements for regression analysis. The statistical analysis was performed using SPSS for Windows Statistical Software Package Version 13.0.  $p < 0.05$  was defined as statistically significant.

### Results

Of the total sample of 505 subjects, 14 patients were excluded because eight subjects had severe mental retardation or were uncooperative, four refused to participate, and two were not present in the ward at the time of examination. Table 1 shows sample distribution by age and gender. A total of 491 chronic patients were examined, 258 of which were males (52.5%) 233 females (47.5%). The ages of the subjects ranged between 22 and 84 years (mean age  $52.84 \pm 12.37$ ).

The characteristics of the study population are shown in Table 2. The most common psychiatric disorder was schizophrenia, and the majority of the schizophrenia patients (33.6%) belonged to the 45-54 year age group. The mean length of hospitalization was  $17.48 \pm 11.08$  years.

Most of the patients (94.4 %) were on psychotropic medications with an average of two (mean:  $2.34 \pm 1.21$ ); and the maximum number per person was six. 29.9% of the subjects received general medications including hematologic (3.7%), endocrinologic (6.5%), neurologic (8.1%), cardiovascular (13.2%) and respiratory drugs (2.6%).

Mucosal lesions were not frequent among the study population. Upon examination, 5.5% of the patients were detected with lesions on the oral mucosa and 3 (0.6%) patients had tongue lesions. The most frequently encountered oral lesions were herpes, stomatitis and denture related oral mucosal lesions. 67.2% of the patients never cleaned their teeth.

**Table 1.** Age and gender distribution of the study population.

Age(Years)	Male		Female		Total	
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%
22-34	17	6.6	19	8.2	36	7.3
35-44	47	18.2	33	14.2	80	16.3
45-54	96	37.2	68	29.2	164	33.4
55-64	53	20.5	65	27.9	118	24.0
≥ 65	45	17.4	48	20.6	93	18.9
Total	258	52.5	233	47.5	491	100

Oral dryness was recorded in 39.9% of all subjects. 290 patients (59.9 %) were smokers. Schizophrenia patients which comprised one of the two groups with the highest patient percentages had signs of oral dryness significantly more than those with mental retardation ( $\chi^2=11.06$ ,  $p<0.001$ ). Furthermore; smoking was significantly more common among schizophrenia patients compared to mentally retarded patients ( $\chi^2=11.67$ ,  $p<0.001$ ).

DMFT by age, gender, length of hospitalization and diagnosis are shown in Table 3. The DMFT was  $19.25\pm 7.85$  and largely associated with missing teeth (81.4%). Tooth decay constituted 18.1% of the total DMFT, and the percentage of teeth with fillings was very low (0.5%). The mean DMFT significantly increased with age ( $p<0.001$ ) and length of hospitalization ( $p<0.001$ ) (Table 3).

Decayed teeth were found in 70.1% of all subjects as decay, root remnants or secondary decay. Nearly 59 percent of the overall sample had one or more root remnants (mean  $2.19\pm 2.86$ ). Division of the sample by gender showed a significantly higher number of root remnants in males compared to females (Male:  $2.58\pm 3.05$ , Female:  $1.77\pm 2.57$ ) ( $p<0.001$ ).

The filled component of DMFT remained consistently low for all ages and no filling was observed in the 22-34 and over 65 age groups. None of the groups differed by treatment levels (F component) ( $p>0.05$ ).

Table 3 also presents the DMFT by type of mental disorder. Patients with schizophrenia had the highest

**Table 2.** Characteristics of the sample studied.

	%	n
Psychiatric Diagnosis		
Schizophrenia	69	339
Mental Retardation	24	118
Organic Mental Disorder	2.9	14
Atypical Psychosis	4.1	20
Length of hospitalization		
1-9	30.2	148
10-19	25	123
20-29	30.5	150
30≤	14.3	70
Psychotropic medication		
Classic antipsychotic	64.8	336
New antipsychotic	36.3	178
Benzodiazepines	20.2	99
Anti-cholinergic drugs	66.6	327
Anticonvulsants	16.7	82
Antidepressants	3.5	17
Oral Dryness		
Absent	60.3	296
Present	39.7	195
Degree of helplessness		
Self sufficient	93.5	459
Partially- totally helpless	6.5	32
Smoking		
No	40.9	201
Yes	59.1	290

**Table 3.** DMFT by age, gender, psychiatric diagnosis and length of hospitalization among the study population.

	DT m(sd)	FT m(sd)	MT m(sd)	DMFT m(sd)
Age	*( p<0.001)	ns(p:0.38)	*( p<0.001)	* (p<0.001)
22-34	4.94(4.00) <sup>a</sup>	0.00(0.00)	4.16(4.89)	9.11(5.51)
35-44	5.43(4.97) <sup>a</sup>	0.15(1.12)	9.10(7.26)	14.68(7.34)
45-54	3.73(3.75)	0.09(0.38)	15.34(8.25)	19.17(7.20)
55-64	2.41(2.95) <sup>b</sup>	0.11(0.53)	19.84(7.68) <sup>a</sup>	22.37(6.21) <sup>a</sup>
≥ 65	2.19(3.19) <sup>b</sup>	0.00(0.00)	21.10(8.16) <sup>a</sup>	23.30(6.49) <sup>a</sup>
Gender	††(p:0.01)	ns (p:0.07)	†† (p:0.009)	† (p:0.049)
Male	3.88(4.11)	0.07(0.65)	14.67(9.32)	18.61(8.04)
Female	3.06(3.62)	0.10(0.47)	16.80(9.12)	19.97(7.60)
Diagnosis	ns (p:0.07)	ns (0.43)	*( p<0.001)	* (p<0.001)
SCH <sup>1</sup>	3.30(3.91)	0.11(0.68)	17.36(9.04) <sup>b</sup>	20.77(7.31) <sup>b</sup>
MR <sup>2</sup>	4.10(3.95)	0.02(0.13)	11.19(8.70) <sup>a</sup>	15.31(7.99) <sup>a</sup>
OMD <sup>3</sup>	3.07(2.67)	0.07(0.27)	12.57(9.10) <sup>a</sup>	15.71(8.42) <sup>a</sup>
AP <sup>4</sup>	3.35(3.99)	0.05(0.22)	15.85(7.88) <sup>b</sup>	19.25 (7.14) <sup>b a</sup>
Length of hospitalization	* (p<0.001)	ns (p:0.32)	* (p<0.001)	* (p<0.001)
1-9	4.70(4.64) <sup>a</sup>	0.14(0.87)	12.43(9.43)	17.27(8.12)
10-19	3.67(3.78) <sup>a</sup>	0.07(0.33)	14.77(8.91)	18.50(7.69)
20-29	2.35(3.08) <sup>b</sup>	0.06(0.45)	18.54(8.77) <sup>a</sup>	20.95(7.68) <sup>a</sup>
≥30	3.07(3.19) <sup>b</sup>	0.03(0.17)	18.04(8.23) <sup>a</sup>	21.14 (6.83) <sup>a</sup>
Total	3.49(3.89)	0.08(0.56)	15.68(9.28)	19.25(7.85)

m(sd): mean(standard deviation), ns: non-significant ( $p>0.05$  for all comparisons)

\*  $p<0.001$  Significant difference between more than two groups by Kruskal-Wallis Test.

†  $p<0.05$ , ††  $p<0.01$  Significant difference between gender by Mann-Whitney U test.

a Data with the same letter within the same column are not significantly different (Kruskal-Wallis Test;  $p>0.05$ )

b Data with the same letter within the same column are not significantly different (Kruskal-Wallis Test;  $p>0.05$ ).

SCH<sup>1</sup> (schizophrenia); MR<sup>2</sup> (mental retardation); OMD<sup>3</sup> (organic mental disorder);

AP<sup>4</sup> (atypical psychosis)

score ( $20.77 \pm 7.31$ ), and patients with mental retardation had the lowest score ( $15.31 \pm 7.99$ ).

Bivariate analysis between DMFT and six variables including age, gender, psychiatric diagnosis, length of hospitalization, oral dryness, degree of helplessness, using the chi-square test, are shown at Table 4. The subjects were separated into two categories according to the DMFT: 19 or less, and more than 19. There were 232 subjects in the former category and 259 in the latter. A cut off point of 19.0 was chosen based on the mean DMFT ( $19.25 \pm 7.85$ ).

Variables that were significant in the bivariate analysis were subjected to stepwise logistic regression analysis to adjust for the influence of confounding variables. Finally, age and psychiatric diagnosis were identified as significant explanatory variable for DMFT. The odds ratios with confidence intervals were calculated by the logistic regression model (Table 5).

In subjects less than 50 years old, schizophrenia patients were nearly twice as likely to have a DMFT of 19 or more (age group <50; OR=1.94, 95%CI 1.01-3.73;  $p=0.05$ ) and among the subjects of 50 years and older, schizophrenics were more than almost three times more likely to have DMFT of 19 or higher compared to the subjects with mental retardation (age group  $\geq 50$ ; OR: 2.53, 95% CI 1.22-5.26,  $p=0.01$ ).

Table 6 presents the treatment needs among dentate psychiatric patients. Two hundred and thirty five patients (58.5%) required restorative care; the mean number of treatment required per patient was  $1.42 \pm 1.82$ . Also, 58 patients (14.4%) were caries free. 284 patients (70.6%) needed dental extraction for caries; the mean number of extractions required per patient was  $2.77 \pm 3.04$  and 146 patients (36.3%) needed dental extraction for caries; the mean number of extractions required per patient was  $0.81 \pm 1.44$ . The need for restorative care decreased with increasing age ( $p < 0.001$ ), and the mean number of tooth extraction for periodontal disease was significantly increased with age ( $p < 0.001$ ), while the number of tooth extraction for decay didn't differ ( $p > 0.05$ ) in any of the age groups.

With respect to psychiatric diagnosis, the mean number of tooth extraction for periodontal disease of schizophrenia patients ( $0.92 \pm 1.61$ ) was significantly higher ( $p < 0.01$ ) than that of patients with mental retardation ( $0.45 \pm 0.97$ ). However there was no significant difference ( $p > 0.05$ ) among the two groups in terms of extraction needs for caries.

In Table 7, the prevalence of edentulousness and denture need by age are presented. 18.1% (89 patients) of the overall sample were completely edentulous. 35.8% of the study population were in need of upper/lower partial dentures and 17.1% were in need upper/lower complete dentures. Only 17 of the completely edentulous patients had a full set of complete dentures and five had denture in one jaw, all at the upper ridge. Denture hygiene was poor and 62% of all removable dentures had moderate to large amounts of plaque.

## Discussion

This is the first study that assesses the oral health status and treatment needs of chronic psychiatric patients in Turkey. The evaluated mental health hospital serves the

largest population of psychiatric patients in Turkey. In view of this, it seems likely that the findings provide the baseline data of the oral health status of chronic psychiatric inpatients. The principle findings of this study are high caries and missing teeth prevalence, neglected restorative care with extensive unmet dental treatment needs in the population studied.

The mean DMFT was 19.25 and this value is comparable to those found between 15.5 and 26.7 by the other studies concerning psychiatric inpatients. (Vigild *et al.*, 1993; Angelillo *et al.*, 1995; Velasco *et al.*, 1997; Lewis *et al.*, 2001; Ramon *et al.*, 2003). The magnitude of this score was not due to the decayed (3.49) or filled teeth (0.08), but to the missing (15.68). This figure is supported by the other studies, conducted on psychiatric patients which generally reported an unusually high proportion of the DMFT are decayed or missing teeth and unusually low proportion of the DMFT are filled teeth (Angelillo *et al.*, 1995; Velasco *et al.*, 1997; Rekha *et al.*, 2002; Ramon *et al.*, 2003).

The study group showed a steady age related increase in DMFT with a corresponding increase in the missing component and decrease in the decayed component. The mean DMFT value in the 45-54 year age group was over twice of that seen in the youngest age group (22-34 year age group). The stepwise logistic regression analysis confirmed that age, not surprisingly, was a significant explanatory variable for the DMFT. Age has been consistently reported to be an important determinant of poor oral health (Vigild *et al.*, 1993; Angelillo *et al.*, 1995; Velasco *et al.*, 1997; Kenkre and Spadigam, 2000; Lewis *et al.*, 2001; Rekha *et al.*, 2002; Ramon *et al.*, 2003).

Gender was not a statistically significant explanatory factor for DMFT, while males exhibited a higher number of decayed teeth than females. On the other hand, missing teeth contributed to females' higher DMFT compared to males. These findings are consistent with those observed in a similar population in Israel (Ramon *et al.*, 2003).

Longer hospitalization was correlated with fewer teeth and a smaller number of decayed teeth which is consistent with that reported in the literature (Angelillo *et al.*, 1995; Thomas *et al.*, 1996; Velasco *et al.*, 1997). The association between poor oral health and longer hospitalization may be explained by the accumulated effects of dental problems involving more teeth as age advances, and also influence of long hospitalization on patients' behaviour, negligence towards oral hygiene practices and xerostomia among chronic psychiatric patients.

The logistic regression analysis also revealed that the psychiatric diagnosis was significantly associated with DMFT. The higher DMFT among schizophrenia patients compared to those with mental retardation had no correlation with decayed or filled teeth. Another result of the study was the higher prevalence of oral dryness among schizophrenia patients compared to subjects with mental retardation. Hypo-salivation causes intensification of periodontal diseases and rapid tooth decay progression because of the adverse changes in the oral environment (Gupta *et al.*, 1993). In the present study, it was not possible to gather information about the individual reasons for missing teeth. The relatively higher number of missing teeth and the higher incidence of edentulous in patients with schizophrenia could partially be related to

**Table 4.** Number (%) of the chronic psychiatric patients for the DMFT (19 or less and more than 19) according to six variables.

Variables	n	DMFT		$\chi^2$ p value
		19 $\geq$ n (%)	19< n (%)	
Age				
Less than 50 years	200	141(60.8)	59(22.8)	$\chi^2= 73.18$ *p<0.001
50 years or more	291	91(39.2)	200(77.2)	
Gender				
Male	258	130(56.0)	128(49.4)	$\chi^2= 2.14$ p=0.14
Female	233	102(44.0)	131(50.6)	
Psychiatric Diagnosis				
Mental Retardation	118	82(38.3)	36(14.8)	$\chi^2 = 32.81$ * p<0.001
Schizophrenia	339	132(61.7)	207(85.2)	
Length of Hospitalization				
20 years or less	283	152(65.5)	131(50.6)	$\chi^2 =11.18$ * p<0.001
More than 20	208	80(34.5)	128(49.4)	
Helplessness				
Self sufficient	459	214(92.2)	245(94.6)	$\chi^2 =1.11$ p=0.29
Partially-totally helpless	32	18(7.8)	14(5.4)	
Oral dryness				
Absent	296	152(65.5)	144(55.6)	$\chi^2 =5.02$ *p=0.02
Present	195	80(34.5)	115(44.4)	

\*Significant difference between two groups by chi-square test.

**Table 5.** Results of stepwise logistic regression analysis for DMFT. Odds ratios with 95% confidence intervals (C.I.)

Dependent Variable: DMFT	$\beta$	SE	OR (95 % CI)	p value
Independent Variables				
Age	1.478	0.217	5.16 (2.72-6.37)	p<0.001
Psychiatric Diagnosis	0.785	0.249	2.19 (1.34-3.57)	p=0.002
Constant	1.303	0.226		

**Table 6.** Treatment needs of dentate patients by age groups (n=402).

Age Groups	Restorative care* n=235		Extraction for Caries(ns) n=284		Extraction for Periodontal* n=146	
	m(sd)	%	m(sd)	%	m(sd)	%
22-34	2.05(2.08)	71.4	3.09(2.92)	77.1	0.31(0.99)	11.4
35-44	2.07(2.38)	71.8	3.35(3.52)	78.2	0.49(1.02)	26.9
45-54	1.44(1.71)	61.1	2.76(3.04)	68.7	0.73(1.29)	34.7
55-64	1.01(1.25)	54.7	2.30(2.64)	65.4	1.08(1.80)	46.4
$\geq 65$	0.72(1.36)	33.8	2.56(2.91)	71.1	1.32(1.68)	54.2
Total	1.42 (1.82)	58.5	2.77 (3.04)	70.6	0.81(1.44)	36.3

m(sd): mean (standard deviation), n: number

\* p<0.001 Significant difference between more than two groups by Kruskal-Wallis Test.

ns: non-significant (p>0.05 for all comparisons)

**Table 7.** Distribution (%) of edentulous and prosthetic needs by age groups.

Age	n	Edentulous			Complete denture need			Partial Denture Need		
		Maxilla only	Mandible only	Completely	Upper	Lower	Both	Upper	Lower	Both
22-34	36	.0	.0	2.8	.0	.0	.0	2.8	5.6	19.4
35-44	80	1.3	2.5	2.5	1.3	2.5	2.5	12.5	7.5	40.0
45-54	164	6.1	3.0	12.2	12.8	3.7	7.9	9.0	20.7	43.9
55-64	118	9.3	5.1	27.1	14.4	3.7	28	11.0	19.5	33.1
$\geq 65$	93	12.9	5.4	36.6	16.1	6.5	38.7	5.4	18.3	28.0
Total	491	6.9	3.7	18.1	11.0	4.5	17.1	9.2	16.7	35.8

periodontal disease. This may be supported by the result that schizophrenia patients required significantly higher tooth extractions for periodontal disease compared with subjects with mental retardation. Meanwhile; there was no significant difference among the two groups in terms of extraction needs for caries. It should be emphasized that the schizophrenia patients smoked more than the patients with mental retardation. It is known that cigarette smoking is one of the important risk factors for moderate to advanced periodontitis (Calsina *et al.*, 2002).

The majority of this population take psychotropic medications on a regular basis. Hospitalized patients mostly complained of dry mouth, which was associated with the type and number of their concomitant medications. In this respect, psychotropic drugs and cardiovascular drugs are the most significant (Pajukoski *et al.*, 2001). The high rate of oral dryness (39.9 %) observed in the present study may be correlated with the administration of these medications. This frequency is supported by other reports, in the literature (Vigild *et al.*, 1993; Rekha *et al.*, 2002; Ramon *et al.*, 2003).

Dental caries were found in 70.1% of patients; the mean number of caries teeth per patient was  $3.49 \pm 3.89$ . These findings are consistent with those of studies which have noted an increased prevalence of dental caries among psychiatric patients (Stiefel *et al.*, 1990; Thomas *et al.*, 1996; Velasco *et al.*, 1997; Ramon *et al.*, 2003). In contrast, several studies reported fewer decayed rates; Lewis *et al.* (2001) reported an average of only 0.9 decayed teeth, Vigild *et al.* (1993) reported 1.3 and Angelillo *et al.* (1995) reported 1.7. High caries prevalence in the hospitalized psychiatric patients could be attributed to irregular eating habits and improper oral hygiene practices (Stiefel *et al.*, 1990; Thomas *et al.*, 1996; Vigild *et al.*, 1993) in combination with complete or partial xerostomia (Rundgren *et al.*, 1985). Other factors contributing to the prevalence of dental caries might be that these people are unable or unwilling to cooperate with treatment (Velasco *et al.*, 1997).

In this study, the mean number of the decayed teeth in psychiatric patients (35-44-year age group, mean=5.43; over 65 years age, mean= 2.19) (Table3) was higher than those of the general Turkish population (35-44-year age group, mean=2.9; 65-74- year age group, mean=1.0) (Gökalp *et al.*, 2004). This corresponds with previous studies in other countries (Velasco *et al.*, 1997; Rekha *et al.*, 2002; Ramon *et al.*, 2003) except Italy, where Angelillo *et al.* (1995) reported that the mean number of caries in psychiatric population was similar to that observed for the general population.

The filled component of DMFT was almost non existent (mean=0.08). This finding appears to be lower than that of the national population in Turkey (Gökalp *et al.*, 2004) and of psychiatric populations in other countries (Angelillo *et al.*, 1995; Ramon *et al.*, 2003), except Spain, where Velasco *et al.* (1997) reported fewer number of filled teeth (mean=0.01) in psychiatric patients.

Of note, the missing component dominating the overall dental caries experience suggests that the dental extraction is the prior treatment modality for carious teeth among chronic psychiatric patients. These patients who cannot express a desire for dental treatment or complain about oral symptoms, rarely receive comprehensive dental care

and the majority take dental help only when they suffer from dental pain and the treatment is mostly in the form of extraction. On the other hand, symptoms associated with psychotic illness may severely interfere with the acceptance for dental treatment, delaying treatment until tooth loss is inevitable. In addition, the tendency of dentists to extract painful teeth in psychiatric patients instead of treating them has been noted in a number of studies (Vigild *et al.*, 1993; Angelillo *et al.*, 1995).

It was found that 18.1% of the study population in the present study was completely edentulous and the average was 16 missing teeth per patient. Angelillo *et al.* (1995) reported that 11.1% of psychiatric patients were edentulous. Ramon *et al.* (2003) found an average of 19 missing teeth, and 17 missing teeth were reported by Velasco *et al.* (1997). A number of studies conducted among psychiatric patients reported a higher prevalence of completely edentulous subjects probably due to the relatively higher mean age; Vigild *et al.* (1993) found that two third of the adult psychiatric population were edentulous and Lewis *et al.* (2001) reported that 63% of hospitalized psychiatric patients were edentulous.

The missing component of DMFT among our psychiatric patients at the 35-44 year age group (61% of DMFT) was surprisingly similar compared to those of the general population at the same age groups (66% of DMFT) in Turkey. In addition, the proportion of the missing teeth (91% of DMFT) for the psychiatric patients more than 65 years old was similar to the general population (95% of DMFT) at the same age groups. As for edentulousness, a comparison with the general Turkish population also reveals a similar picture. The prevalence of edentulous psychiatric patients was 2.5 % in the 35-44 year age group and 36.6 % in the  $\geq 65$  year age group. This value was 2.6 % for the 35-44 age group and 48 % for the 65-74 year age group in the general Turkish population (Gökalp *et al.*, 2004). These findings may be explained by the fact that even if dental health was poor, many psychiatric patients were satisfied with not wearing dentures or with root remnants or non-functional teeth and therefore, they retained them longer in the mouth than general people (Angelillo *et al.*, 1995). This is also supported by the findings that a high proportion in all age groups of this sample required dental extractions. The most common reason for tooth extraction needs was dental caries or root remnants (70.6 %) and also over one third (33.6 %) of our sample having teeth with excessive mobility required extraction reflecting the generally poor periodontal health status. This is consistent with the other studies concerning psychiatric patients; Angelillo *et al.* (1995) reported 80.7 % tooth extraction needs and Kenkre and Spadigam (2000) reported 75.6 %.

In conclusion, the findings of the study demonstrate poor oral health and extensive unmet dental treatment needs of institutionalized chronic psychiatric patients in Istanbul. These underline the need of special preventive oral health program aimed at hospitalized psychiatric patients. This study may provide baseline data for planning dental services and the establishment of appropriate oral health promotion strategies that address to individual needs. Taking these points into consideration, the following suggestions can be made to improve oral health status of chronic psychiatric patients.

Prevention should be the main objective, and focus on caries prevention and improvement of oral hygiene. Mental health professionals should ensure that oral hygiene is part of routine care and should be incorporated into individual care plans. The role of nursing staff in preventing dental diseases should be further enhanced, by providing training on proper oral hygiene techniques. Suitable dental services should be provided for psychiatric patients, taking into account their special needs.

The findings of this study demonstrate poor oral health status with extensive unmet dental and prosthetic needs. These underline the urgent need for specific preventive oral health programmes to improve the dental care of these chronic psychiatric inpatients

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