Original Article

Oral Health Status and Oral Health-Related Behaviors of Patients Visiting Tertiary Care Hospital in Quetta, Pakistan

Oral Health Associated to Oral Healthcare Practices

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ABSTRACT

Objective: To determine the oral health status and oral health practices among patients visiting a tertiary care hospital in Quetta, Pakistan.

Study Design: Cross-Sectional Study

Place and Duration of Study: This study was conducted at Sandeman Provincial Civil hospital Quetta, Pakistan in March 2021.

Materials and Methods: The target population of this study was patients aged 18 to 65 years visiting the dental OPD of the hospital. Four hundred patients, including 210 males and 190 females, participated in the study. According to WHO oral health survey methods (5th edition). The face-to-face interview was carried out to examine the socio-demographic factors, attitude, behavior, and oral health practices of the patients. Descriptive statistics were reported for participants' characteristics, oral health practice, and oral health status. Logistic regression was performed to analyze the association of multiple variables with a significance level of 0.05.

Results: Results of this study revealed that 77.0% of the participants had high DMFT scores (DMFT≥5), 95.5% had gingival bleeding, 52.5% had periodontal pocket (4-5mm or above), 85.5% had poor/fair oral hygiene, and 16.5% had some kind of oral lesions. Socio-economic factors, tooth brushing frequency, use of toothbrushes and toothpaste, dental visits, and tobacco use were significantly associated with patients' poor oral health status, including dental caries and periodontal diseases.

Conclusion: After adjusting for age and education, low tooth brushing frequency, no use of toothbrush and toothpaste, less frequent dental visits, and tobacco use were the contributing factors for the poor oral health status of the participants.

Key Words: Oral Health, Adults, Oral Hygiene Practices, Pakistan

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INTRODUCTION

Oral health is considered an essential element for people's overall well-being; despite its necessity, oral health is neglected and not given importance, especially in developing countries[1]. For good oral health, there is crucial to have good oral hygiene and freedom from oral disorders like tooth decay, tooth loss, periodontal diseases, oral cancer, and chronic facial pain[2]. The Global Burden of Disease Study 2017 has estimated that oral diseases have affected almost 3.5 billion people worldwide, with caries of permanent teeth being the most common condition.

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Globally, it is estimated that 2.3 billion people suffer from caries of permanent teeth and more than 530 million children suffer from caries of primary teeth[3]. This seems to be even more affected owing to the repercussions of the COVID-19 pandemic [4]. The factors to poor oral health may include inadequate oral hygiene, unhealthy eating habits, persistent use of tobacco, and poor access to oral healthcare facilities[5].

Oral health care is a missing component in Pakistan, where oropharyngeal cancer is the second most common cancer in country among women and third most common cancer in men[6]. A recent study revealed that 60% of Pakistani population at national level has dental caries[7]; a survey of Punjab province has shown the prevalence of periodontal disease as 34.5% among patients with CPI score≥3[8]. Maintaining good oral hygiene is also a missing link among Pakistani population; a study in Sindh province has released that 62.2% of males and 52.1% of females had poor oral hygiene, respectively [9].

Limited data is available at subnational level of Pakistan to assess oral health status of population, Balochistan in particular. The scarcity of available literature in the province has led to lacking knowledge and a poor attitude of healthcare practitioners. The

present study was designed to assess oral health status of people of Balochistan visiting a tertiary care hospital in Quetta City.

MATERIALS AND METHODS

The study is descriptive and cross-sectional, conducted in Sandeman Provincial Civil Hospital Quetta, Pakistan in March 2021. Four hundred patients aged 18 to 65 years visiting Dental OPD were recruited, and sample size was calculated using formula $\mathbf{n = [Z^2 P(1-P)]/ E^2}$. Patients either mentally or physically challenged or having any systemic disease were excluded. The participants only included people residing in the Balochistan province. A dental chair, mouth mirrors, and periodontal probes were used for oral examination of the patients by a trained dentist.

WHO Oral health assessment form and modified WHO Oral Health Questionnaire[10] were used for data collection. Values of all of the variables were transferred to SPSS version 24.0 for descriptive and statistical analysis of data. Bivariate analysis including Chi-square test, and Kruskal-Wallis test were used to analyse association between characteristics, oral health status, and oral health behaviours. The relationship between participants' oral health status and multiple variables including age, education, tobacco use, dental visits, and teeth cleaning frequency, were analysed by logistic regression.

This research followed the Declaration of Helsinki. The Ethical Review Board of Bolan Medical College approved and permitted the study protocol in Civil hospital Quetta, Pakistan (No. BUHMS/Reg/2020/424). Written informed consent was obtained from all the participants.

RESULTS

Participants' characteristics are shown in table 1. Total population of Quetta city is 2.276 million[11]; so the sample size was 400 participants. Male-to-female ratio of district Quetta is 1.09[11]; therefore, 210 males and 190 females were selected. 49% participants were middle-aged (35-50 years). Only 29% had completed high school and 93% had yearly income (>$10,000). Only 11.8% of respondents cleaned their teeth once a day; 91.2% cleaned their teeth less frequently, 15.3% never received dental care, and 67.7% were current tobacco users.

Table 2 shows oral health status of participants with respect to their socio-economic status. The results showed that 77% of participants had high DMFT scores (DMFT≥5), with mean values 8.40 and 9.02 among males and females. Location, age, and education were significantly associated with dental caries status ($p<0.001$). 95% males and 96% females had gingival bleeding; 57.5% males and 47% females had periodontal pocket 4mm-or-more. Presence of periodontal pocket and gingival bleeding was significantly associated with patients' socio-economic status ($p<0.001$), with pre-aging group (55%) being highly susceptible to it. Participants with no or less-education had high DMFT mean values (12.63) and periodontal disease. Overall, 16.5% of respondents had oral lesions; with high prevalence among males (20%) and low-income group (25%).

Table No.1: Characteristics of the participants (N = 400)

Participant's Details	Numbers	%
Gender		
Male	210	52.5
Female	190	47.5
Age (Years)		
Young(18-34)	103	25.7
Middle-aged(35-50)	196	49.0
Pre-ageing(51-65)	101	25.3
Educational level		
No education	84	21.0
Primary school	114	28.5
Secondary school	86	21.5
High school or above	116	29.0
Annual income		
Low(<$1,000)	24	6.0
Middle($1,000-10,000)	348	87.0
High(>$10,000)	28	7.0
Tobacco use		
Yes	271	67.7
No	129	32.3
Tooth cleaning		
Never	56	14.0
Sometime	297	74.3
Once a day	47	11.7
Last dental visit		
Less than 2-year	252	63.0
2-year or more	87	21.7
Never received dental care	61	15.3

Table 3 shows oral health-related behaviour of participants including tuse of toothbrushes, toothpaste, tooth-brushing frequency, dental visit, and tobacco use by participants' characteristics. Toothbrush use and brushing frequency were associated with living location, age, education, and income ($p<0.01$). The report of using toothbrushes and brushing at least once a day was high among city residents, young-age group, high education and high income. 30% of participants with no education used toothbrushes with toothpaste for teeth cleaning compared to 98% with high education. Overall, 37% of participants had not visited dentist in last two years, with high response among low-income group (42%). Gender, age and socio-economic status were associated with tobacco use ($p<0.001$). More than two-thirds (67.7%) of participants reported using tobacco, where 91% were outside city residents. The prevalence was high among participants with no education (89.0%), and low income (100%).

Table No.2: Oral health status of participants

Characteristics	N	DMFT (mean±S.D)	CPI- Frequency (%)					OHI-S (mean±S.D)	Oral lesions
			Bleeding		Pocket				
			Yes	No	Pocket 4-5mm	6mm or more	No		
Gender									
Male	210	8.40±4.4	199(95%)	11(5%)	100(48%)	20(9.5%)	90(42.5%)	2.22±0.78	42(20%)
Female	190	9.02±4.7	183(96%)	7(4%)	69(36%)	21(11%)	100(53%)	2.27±0.76	24(13%)
p-value		0.221[a]	0.454[b]		0.072[b]			0.512[a]	0.047[b]
Location									
Quetta City	291	7.65±3.9	278(96%)	13(4%)	112(38%)	17(6%)	162(56%)	2.13±0.77	47(16%)
Out of Quetta City	109	11.50±4.9	104(95%)	5(5%)	57(52%)	24(22%)	28(26%)	2.54±0.69	19(17%)
p-value		<0.001[a]	0.959[b]		<0.001[b]			<0.001[a]	0.759[b]
Age Group									
Young (18-34)	103	7.11±4.5	94(91%)	9(9%)	35(34%)	7(7%)	61(59%)	2.01±0.87	9(9%)
Middle Aged (35-50)	196	8.19±4.2	190(97%)	6(3%)	78(39.5%)	15(7.5%)	103(53%)	2.22±0.73	32(16%)
Pre-Aging (51-65)	101	11.32±4.3	98(97%)	3(3%)	56(55%)	19(19%)	26(26%)	2.54±0.64	25(25%)
p-value		<0.001[c]	0.055[b]		<0.001[b]			<0.001[c]	0.009[b]
Education									
No Education	84	12.63±4.1	84(100%)	0(0%)	54(64%)	21(25%)	9(11%)	2.62±0.55	16(19%)
Primary School	114	9.62±4.4	110(96%)	4(4.0%)	57(50%)	13(11%)	44(39%)	2.51±0.78	16(14%)
Secondary School	86	6.87±4.0	78(91%)	8(9%)	21(24%)	4(5%)	61(71%)	1.97±0.84	25(29%)
High School or Above	116	6.3±3.0	110(95%)	6(5%)	37(32%)	3(2.5%)	76(65.5%)	1.92±0.71	9(8%)
p-value		<0.001[c]	0.01[b]		<0.001[b]			<0.001[C]	<0.001[b]
Income									
Low (<$1,000)	24	10.17±4.2	24(100%)	0(0%)	21(88%)	1(4%)	2(8%)	2.80±0.57	6(25%)
Middle ($1,000-10,000)	348	8.68±4.6	330(95%)	18(5%)	138(40%)	34(9.5%)	176(50.5%)	2.19±0.78	56(16%)
High (> $10,000)	28	7.64±3.7	28(100%)	0(0%)	10(36%)	6(21%)	12(43%)	2.44±0.62	4(14%)
p-value		0.353[c]	0.245[b]		<0.001[b]			0.006[C]	0.497[b]

[a]Mann-Whitney U test, [b]Chi-square test, [c] Kruskal-Wallis test

Table No.3: Oral health-related behaviors and patients' characteristics

Characteristics		Use of tooth-cleaning product	Brushing frequency		Dental visit		Tobacco use	
	N	Toothbrush with toothpaste	< once a day	once a day	2 years or more	Less than 2-year	Yes	No
Gender								
Male	210	157(75%)	188(90%)	22(10%)	81(39%)	129(61%)	158(75%)	52(25%)
Female	190	139(73%)	165(87%)	25(13%)	67(35%)	123(65%)	113(59%)	77(41%)
p-value		0.715	0.226		0.494		<0.001	
Location								
Quetta City	291	240(82%)	249(86%)	42(14%)	112(38%)	179(62%)	172(59%)	119(41%)
Other	109	56(51%)	104(95%)	5(5%)	36(33%)	73(67%)	99(91%)	10(9%)
p-value		<0.001	<0.001		0.314		<0.001	
Age Group								
Young (18-34)	103	84(81%)	86(83%)	17(17%)	51(50%)	52(50%)	64(62%)	39(38%)
Middle Aged (35-50)	196	156(79%)	172(88%)	24(12%)	74(38%)	122(62%)	122(62%)	74(38%)
Pre-Ageing(51-65)	101	56(55%)	95(94%)	6(6%)	23(23%)	78(77%)	85(84%)	16(16%)

p-value		<0.001	0.027		<0.001		<0.001	
Education								
No Education	84	25(30%)	83(99%)	1(1%)	16(19%)	68(81%)	75(89%)	9(11%)
Primary School	114	75(66%)	112(98%)	2(2%)	22(19%)	92(81%)	89(78%)	25(22%)
Secondary School	86	82(95%)	83(97%)	3(3%)	47(55%)	39(45%)	48(56%)	38(44%)
High School or above	116	114(98%)	75(65%)	41(35%)	63(54%)	53(46%)	59(51%)	57(49%)
p-value		<0.001	<0.001		<0.001		<0.001	
Income								
Low(<$1,000)	24	7(29%)	24(100%)	0(0%)	10(42%)	14(58%)	24(100%)	0(0%)
Middle($1,000-10,000)	348	264(76%)	304(87%)	44(13%)	128(37%)	220(63%)	223(64%)	125(36%)
High(>$10,000)	28	25(89%)	25(89%)	3(11%)	10(36%)	18(64%)	24(86%)	4(14%)
p-value		<0.001	<0.001		0.882		<0.001	

Table No.4: Relationships between oral health behaviors and oral health status

Oral health behaviors	N	DMFT		Periodontal Pocket		OHI-S	
		High (DMFT≥5)	Low (DMFT<5)	Yes	No	Poor	Good/Fair
Use of toothpaste and toothbrush							
No toothpaste and toothbrush used	104	102(98.1%)	2(1.9%)	94(90.4%)	10(9.6%)	103(99%)	1(1.0%)
Using toothbrush with toothpaste[a]	296	206(69.6%)	90(30.4%)	116(39.2%)	180(68.8%)	239(80.7%)	57(19.3%)
Adjusted Odds ratio[b] (95% CI)		9.30(2.12-40.76)		7.57(3.59-15.97)		5.77(0.72-46.48)	
p-value		0.003		<0.001		0.100	
Brushing frequency							
Less than once a day	353	284(80.5%)	69(19.5%)	209(59.2%)	144(40.8%)	315(89.2%)	38(10.8%)
Once a day [a]	47	24(51.1%)	23(48.9%)	1(2.1%)	46(97.9%)	27(57.4%)	20(42.6%)
Adjusted Odds ratio[b] (95% CI)		2.06 (1.05-4.04)		38.89 (5.18-292.09)		3.02(1.49-6.16)	
p-value		0.036		<0.001		0.002	
Last Dental visit							
2 years or more	252	241(95.6%)	11(4.4%)	176(69.8%)	76(30.2%)	243(96.4%)	9(3.6%)
Less than 2 years [a]	148	67(45.3%)	81(54.7%)	34(23.0%)	114(77.0%)	99(66.9%)	49(33.1%)
Adjusted Odds ratio[b] (95% CI)		19.72(9.73-39.94)		5.32(3.23-8.76)		8.14(3.75-17.70)	
p-value		<0.001		<0.001		<0.001	
Tobacco use							
Yes	271	236(87.1%)	35(12.9%)	185(68.3%)	86(31.7%)	254(93.7%)	17(6.3%)
No[a]	129	72(55.8%)	57(44.2%)	25(19.4%)	104(80.6%)	88(68.2%)	41(31.8%)
Adjusted Odds ratio[b] (95% CI)		3.44(2.03-5.53)		6.26(3.67-10.68)		4.14(2.16-7.93)	
p-value		<0.001		<0.001		<0.001	

[a] Reference group [b] Adjusted for age and education

Table 4 shows relationship between oral health behaviours of participants and their oral health status after adjusting for education and income. Participants not using toothbrush were 9.3 times more likely having high DMFT scores and 7.5 times more likely having periodontal pockets (p<0.001). Participants not cleaning their teeth daily were 38.8 times at higher risk of having periodontal pockets (p<0.001). Tobacco users were 6.2 times more susceptible to having periodontal pockets and 4.4 times more at risk of having poor oral hygiene status (p<0.001).

DISCUSSION

This study showed significantly poor oral health status of patients of Balochistan, Pakistan. 77% of participants were having DMFT score ≥5. The common responsible factors for poor oral health of patients were low education and income level, low frequency of brushing, use of tobacco, and less frequent dental visits. The study showed that 88.2% of patients did not clean their teeth daily, and 67.7% were active tobacco users.

Studies held in different parts of Pakistan have recorded other DMFT scores among Pakistani population. A systemic-review study of existing literature showed prevalence of dental caries as 60% at national level in Pakistan [(7)]; another study in Punjab hospital showed 19.13% prevalence of dental caries [(12)].

A global analysis of periodontal disease released that nearly 100% of adults had periodontal disease among adults and older persons in India and China[(13)]; compared to our study, which showed 95.5% and 52% of gingival bleeding and pocket 4mm or more among participants. A meta-analysis study of India showed prevalence of periodontal disease as 51% and gingivitis as 46.6% among adults with older persons having a higher proportion of periodontitis (32.7%)[(14)]. A study

in Karachi hospital considered poor oral hygiene and low education levels as common risk factors for periodontitis among the adult population[15].

In our study, oral healthcare practices such as less frequency of teeth cleaning, dental visits, and tobacco use are related factors affecting oral health. The participants who used tobacco and had fewer dental visits greatly influenced the high DMFT score, poor oral hygiene, and presence of periodontal disease. The incidence is quite similar to the previous studies[16, 17], which show tobacco use as a responsible parameter for poor oral health. A study in Peshawer revealed that regular dental checkups are uncommon among participants (65%), and 73% used toothbrushes and toothpaste to clean teeth, similar to our study (74%)[18].

CONCLUSION

The prevalence of dental caries, periodontal disease, poor oral hygiene status, and oral lesions among patients of Balochistan in Civil hospital, Quetta, was significantly associated with patients' oral healthcare practices, behaviors, and socio-demographic characteristics. Low education and income levels, low frequency of brushing and tobacco use were contributing factors for poor oral health conditions of the patients.

Author's Contribution:

Concept & Design of Study:	Muhammad Azad Khan, Tippanart Vichayanrat, Yaowaluk Ngoenwiwatkul
Drafting:	Muhammad Azad Khan
Data Analysis:	Muhammad Azad Khan, Tippanart Vichayanrat
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