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# **Original Research Article**

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# A cross-sectional study on effect of non-communicable diseases on prevalent oral health conditions

Aasim Farooq Shah<sup>1</sup>\*, Irfan Ashraf Baba<sup>2</sup>, Subha Soumya Dany<sup>3</sup>, Manu Batra<sup>4</sup>

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# \*Correspondence:

Dr. Aasim Farooq Shah,

E-mail: dr\_aasimshah@yahoo.com

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### **ABSTRACT**

**Background:** Non communicable diseases (NCDs) are defined as diseases of long duration, generally progress slowly and are the major cause of adult mortality and morbidity worldwide. NCDs mainly lead by four diseases which include: cardiovascular diseases, diabetes mellitus (DM), cancers and chronic respiratory diseases. Poor oral health reflects the general health, and several oral diseases are related to chronic diseases. The aim and objectives was to find casual association between NCDs with oral disease and further aims to provide evidence to health care providers regarding the significance of oral health while treating the patients for NCDs.

Methods: The present cross sectional study was conducted to examine the oral health status of patients with NCD reporting to Dental OPD of Government Dental College and Hospital, Srinagar. This hospital based study done through a convenience sampling technique, using a questionnaire and oral examination. A self-administered questionnaire was written in English language and was also translated in local language, first part of questionnaire was used to collect the demographic details, second part was designed regarding the medication history, oral habits such as smoking and consumption of betel nuts, medical history and earlier visit to dentist, cleaning of teeth, significance of dental health and its effect on general health and the third part of questionnaire was completely based on dental examination. The data was entered manually on Microsoft excel and then analyzed on statistical package SPSS version 20. Associations between different variables were assessed through application of  $\chi 2$ . The Data was analyzed using SPSS Statistics 20.0.

**Results:** The present study was established with a sample of 300 participants. Male to female ratio was 2:3. Mean age of the participants was 46.6 years. It was observed that out of the total patients who visited the dentist, 42% (n=126) suffered from some chronic disease. 61% (n=183) were oblivious of the importance of dental health. When inquired if oral health affects general health 58.6% (n=176) acknowledged its importance. 59 participants who lost more than three teeth who had chronic disease, 58.6% (n=176) respondents presented with bleeding gums, 66.3% (n=199) with food deposition, 52% (n=158) had halitosis, 26% (n=78) had oral ulceration, 22.3% (n=67).

**Conclusions:** It was concluded from this study that majority of participants with chronic diseases had poor oral health which requires immediate attention from the medical practitioners as well as dentists should counsel patients for maintenance and promotion of oral health.

Keywords: General health, Non communicable diseases, Oral health, Personal habits, Tooth mobility

<sup>&</sup>lt;sup>1</sup>Department of Public Health Dentistry, Government Dental College & Hospital, Shreen Bagh, Srinagar, Kashmir, India

<sup>&</sup>lt;sup>2</sup>Department of Oral Medicine and Radiology, Government Dental College and Hospital, Shireen Bagh, Srinagar, Jammu and Kashmir, India

<sup>&</sup>lt;sup>3</sup>Department of Public Health Dentistry, Kothiwal Dental College & Research Centre, Kanth Road, Moradabad-244001, Uttar Pradesh, India

<sup>&</sup>lt;sup>4</sup>Department of Community and Preventive Dentistry, UCMS College of Dental Surgery, Nepal

#### INTRODUCTION

The primary reason of disability worldwide is the raising burden of Non communicable diseases (NCDs). NCDs are defined as diseases of long duration, generally progress slowly and are the major cause of adult mortality and morbidity worldwide. NCDs mainly lead by four diseases which include: cardiovascular diseases, diabetes mellitus (DM), cancers and chronic respiratory diseases.<sup>2</sup> NCDs reported cases from 194 countries in the year 2014. It was also stated that that more than 85% of global deaths mainly occur in low and middle income countries.<sup>3</sup> Expected mortality globally is thought to increase by 15% between 2010 and 2020 with more than 44 million deaths due to NCDs. <sup>4</sup> As perceived most of the NCDs are preventable.<sup>1,5</sup> Currently NCDs are pressing a profound and emergent toll on the physical health and economic security of low and middle income countries.<sup>6</sup> A strong association has been noticed by studies between NCD and oral diseases.6

Numerous risk factors like tobacco, unhealthy diet, particularly sugars, physical inactivity and alcohol which are analogous for NCDs and oral diseases.<sup>5,7</sup> Poor oral health reflects the general health, and several oral diseases are related to chronic diseases like periodontal disease and diabetes.<sup>5,8</sup> Sufficient literature is available on the association between periodontal infection with CVD, DM, preterm low birth weight pregnancy, GERD, heart disease, stroke, osteoporosis, rheumatoid arthritis. Many studies were have shown the elevated prevalence of periodontal disease among diabetic patients.

Widespread literature from developed countries has reported association of oral diseases with non-communicable diseases such as diabetes, cardiovascular diseases, chronic respiratory diseases, osteoporosis and chronic renal failure. Commonality of risk factors, changes in systemic inflammatory mediators and body metabolism have been showed to play an important role in this association.<sup>7</sup>

The poor epidemiological transition in Jammu and Kashmir has led to a double burden of communicable and NCDs posing a huge challenge to the health systems which are unprepared for such challenges. In Asian Region it has been reported that NCDs contribute for 56% of disease burden. The widespread oral diseases is among the most common NCDs and is a leading difficulty to development and achievement of the Millennium Development Goals. The substantial global mutual action is the need of the time. Predominantly in poor resource settings, there is a need to understand the fundamental gaps in our understanding of oral diseases and NCDs.

The aim of this study was to find casual association between NCDs with oral disease. This study further aims to provide evidence to health care providers regarding the significance of oral health while treating the patients for NCDs.

#### **METHODS**

The present cross sectional study was conducted to examine the oral health status of patients with NCD reporting to Dental OPD of Government Dental College and Hospital, Srinagar. Three hundred participants were inducted through a convenience sampling technique and fulfilled our inclusion criteria during the two months of data collection from May to June 2016. The study protocol was approved by the Ethics Committee. All those patients who reported to Dental OPD between 40-65 years old age and were diagnosed with NCDs (cancers, cardiovascular disease, chronic respiratory diseases and diabetes) were included in the study. An informed consent was taken from the patients willing to participate in the study. While all pregnant females and those patients who had history of psychiatric visits and neurological problems were excluded from this study. The self-administered questionnaire was constructed after a thorough literature search. The questionnaire was pretested, comprised of quantitative and qualitative component which was written in English language and was also translated in local language. The questionnaire was divided into three parts, first part of questionnaire was used to collect the demographic details such as age, sex, occupation, address, education level while second part was designed regarding the medication history, oral habits such as smoking and consumption of betel nuts, medical history and earlier visit to dentist, cleaning of teeth, significance of dental health and its effect on general health and the third part of questionnaire was completely based on dental examination related to bleeding gums, dry mouth, mobile teeth, missing teeth, oral ulceration, food deposition and spaces in teeth to assess the present status of oral health of the participants. The questionnaire was filled and oral health examination was carried out by a single principle examiner.

## Statistics

The data was entered manually on Microsoft excel (MS Office Excel 2000; Microsoft Corporation, Redmond, WA, USA), checked for possible data entry errors. Frequencies and percentages were taken out for categorical variables. Associations between different variables were assessed through application of  $\chi 2$ . The Data was analyzed using SPSS Statistics 20.0.The significance of differences within the groups (gender and age) was sought using Mann Whitney U tests with significance level set at  $\leq 0.05$ .

# **RESULTS**

The present study was established with a sample of 300 participants. Male to female ratio was 2:3. Mean age of the participants was 46.6 years. When inquired about their educational status majority participants were literate

having secondary level 46% (n=138) and graduate level 37.3% (n=112) education. Out of the total participants, 48% (n=144) were working. Out of the total participants, 19% (n=57) were smokers and another 32% (n=98) were in the habit of chewing betel nut pans.

It was observed that out of the total patients who visited the dentist, 42% (n=126) suffered from some chronic disease (Table 1). Hypertension was prevalent in 43% (n=53), diabetics were 22.3% (n=28) and remaining suffered from arthritis and gastrointestinal disorders. When intake of medication was inquired it was found that 69.8.3% (n=88) were taking medicines regularly for management of their chronic diseases. Majority were

taking anti-hypertensive drugs 34.9% (n=44) and oral hypoglycemic drugs 24.6% (n=34). When ideas were conceived regarding significance of dental health, 61% (n=183) were oblivious of the importance of dental health. When inquired if oral health affects general health 58.6% (n= 176) acknowledged its importance. Majority 68% (n=204) of the participants already had an encounter with the dentist. When inquired if dental treatment elicit nervousness 59% (n=177) agreed to it. When different methods of maintenance of oral hygiene was assessed, the use of toothpaste was found to be most common (78.3% (n=235). Regarding frequency of tooth brushing, 70.33% (n=211) were doing it once or more in a day.

Table 1: Attitude of participants towards oral health in regard to gender.

	M		Males Female		Chronic disease	P		
		N	<b>%</b>	N	%	present	Value	
Do you think dental health is important?	Yes	70	23.3	113	37.7	105	0.041*	
	No	45	15	72	24	77		
Does oral health effects general health?	Yes	89	29.6	87	29	106	0.727	
	No	54	18	70	23.4	67	0.727	
Have you been to dentist earlier?	Yes	88	29.4	116	38.6	126	0.654	
	No	30	10	66	22	50		
Does dental treatment make you nervous?	Yes	69	23	108	36	107	0.552	
	No	45	15	78	26	69	0.553	
How frequently you brush your teeth?	No brushing	51	17	38	12.6	69	0.657	
	1 or more than once daily	89	29.7	122	40.7	6	0.657	

Table 2: Frequency distribution of oral health conditions in regard to presence of chronic disease.

		Chronic diseas					
		Present		Absent	P Value		
		N	%	N	%		
Missing teeth	None	5	1.67	14	4.67	_	
	$\leq$ 2 teeth	88	29.33	90	30	0.001*	
	≥4teeth	28	9.34	13	4.33	- 0.001	
Bleeding Gums	Present	120	40	69	23	0.719	
	Absent	59	19.64	52	17.34		
Halitosis	Present	120	40	66	22	0.041*	
	Absent	60	20	54	18	0.041	
Dry Mouth	Present	112	37.4	51	17	0.392	
	Absent	79	26.4	58	19.34	0.392	
Oral Ulcers	Present	110	36.7	73	24.34	0.392	
	Absent	55	18.4	62	20.67	0.392	
Teeth Mobility	Present	107	35.7	86	28.67	0.001*	
	Absent	62	20.6	45	15	0.001*	
Tooth Spacing	Present	116	38.67	57	19	0.412	
	Absent	76	25.34	51	17	0.412	

<sup>\*</sup>Significant ≤0.05.

When oral examination was conducted to assess the number of missing teeth the findings illustrated that two teeth were missing in 120 (Table 2) there were 59 participants who lost more than three teeth who had Chronic Disease, the main reason for tooth loss was periodontal inflammation which leads to tooth mobility which was seen in 64% (=193). When symptoms related to poor oral hygiene were assessed 58.6% (n=176) respondents presented with bleeding gums, 66.3% (n=199) with food deposition, 52% (n=158) had halitosis, 26 % (n=78) had oral ulceration, 22.3% (n=67) had dry mouth, 55% (n=165) had spacing in their teeth.

#### **DISCUSSION**

Significance of oral health is equally vital as general health. However; knowledge, attitude, behavior, awareness and education play essential role to determine the importance of overall health. There are some studies carried to assess the knowledge, attitude and behavior of people about importance of oral health and general health. According to a previous study, behavior of the people, knowledge and attitude is best described by the level of education.

A total of 300 dentate subjects (160 females and 140 males) were included in this study. In present study, 46% (n=138) of participants had secondary level of education and 37.3% (n=112) participants were having graduate level of education. These results were identical with a previous study from Jordan. <sup>10</sup>

In this study, significance of oral health was assessed with the help of knowledge and awareness of the patients by asking about five issues; importance of dental health, oral health effects on general health, previous visit to dentist, any feeling of fear while visiting dentist and frequency of brushing. When ideas were conceived regarding significance of oral health, 30% (n=183) were oblivious of the importance of oral health and females were responded more (n=113) than (n=70) male, knowledge about oral health effects general health was better in female male. These findings are similar to the study conducted in Japan which resulted in 92% women were sentient with the positive effects of oral health to entire general health.<sup>11</sup> This study revealed that 68% (n=204) of the participants already had an encounter with the dentist due to bleeding gums and extraction which is in agreement to the results obtained from several other studies. When inquired, if dental treatment elicit nervousness 59% (n=177) agreed to it and the study results were similar with the study brought out by some authors. Both male and female other knowledgeable that daily tooth brushing minimizes the risk and severity of dental problem. Regarding frequency of tooth brushing, 70% (n=211) were brushing the teeth once or more a day. These results were stronger than the inference of the study conducted in other places. 9,12 On the other hand, these findings are in congruence with the

results of the study conducted in North India which indicated that 74% subjects brush their teeth twice a day.<sup>9</sup>

Personal habits that could influence oral hygiene like smoking and paan gutka chewing was also investigated. Out of the total participants, 19% (n=57) were smokers and another 27% (n=80) were in the habit of chewing betel nut paans. According to the International Agency for Cancer Research (IARC), betel nut is classified as a Group 1 arcinogen (carcinogenic to humans). <sup>13</sup>

This study was conducted to assess the increasing burden of non-communicable disease with special focus on oral health. Several authors have investigated the effects of periodontitis on deaths from cardiovascular diseases and diabetic nephropathy. Periodontitis is most neglected predictor of deaths from Ischaemic heart diseases and diabetic nephropathy.[9,14] According to Mesa Aguado, chronic periodontitis is an inflammatory gum disease results in gradual teeth loss and is closely associated with the development and severity of myocardial infarction, and must be included in the risk stratification scores of NCDs.<sup>14</sup>

Jammu and Kashmir has an exceedingly high prevalence of NCDs and tooth loss due to periodontitis. In this study, when oral examination was conducted to assess the oral health by number of missing teeth, the findings illustrated that two teeth were missing in 120 participants due to tooth decay. There were 59 participants who lost more than three teeth The main reason for tooth loss was periodontal inflammation which leads to tooth mobility which was seen in 64.3% (=193) and these results were analogous with study carried in Japan.<sup>15</sup> Gingival bleeding is considered as a main clinical feature of Periodontitis. 16 When features related to periodontitis were assessed 63% (n=189) subjects presented with bleeding gums, 64.3% (n=193) with food deposition, 63% (n=186) had halitosis, 57.6% (n=173) had spacing in their teeth. Halitosis (bad breath) has been reported in many stroke patients. 17 When intake of medication was inquired it was found that 69.8.3% (n=88) were taking medicines regularly for management of their chronic diseases. Majority were taking anti-hypertensive drugs 34.9% (n=44) and oral hypoglycemic drugs 24.6% (n=34). Dry mouth is induced by certain medicines which may be the cause why some participants might have had complain of dry mouth.

This study revealed some limitations that must be addressed. The cross sectional nature of the study limits the information gleamed to study participants and prevents us from making strong conclusions regarding causality.

## CONCLUSION

It was concluded from this study that majority of participants with chronic diseases had poor oral health which requires immediate attention from the medical practitioners as well as dentists should counsel patients for maintenance and promotion of oral health. It still remains a hypothesis un-answered regarding the temporal sequence of events as many oral pathogens share a common factor with NCDs.

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Ethical approval: The study was approved by the

Institutional Ethics Committee

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