ORIGINAL ARTICLE

NON COMMUNICABLE DISEASES AND ORAL HEALTH: INTROSPECTION

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ABSTRACT

Background: To find an association between presence of Chronic disease with Oral Health.

Methods: It was a cross sectional study conducted in the Dental OPD of LCMD Karachi in 2014. Three hundred participants were enrolled in this study through consecutive sample technique. Data was collected using the self administered questionnaire along with the assessment of oral health examination, which was carried out by the Researcher and data was analyzed on SPSS version 20.

Results: It was observed that 59% (n=176) suffered from chronic diseases and when oral examination was conducted, it was revealed that 39% (n=117) had mobile teeth (P value= 0.001), 39.3% (n=118) had missing teeth P value=(0.001) , 60.8% (n=115) had bleeding gums, 60.2% (n=112) had halitosis, 60.2% (n=71) had dry mouth, 61.3% (n=84) had oral ulcers,60.6% (n=117) had complain of food deposition and 60% (n=90) had tooth spacing due to periodontal diseases.

Conclusion: It was concluded from this study that majority of participants with chronic diseases had poor oral health which needs immediate attention by the medical practitioners during the treatment of chronic diseases and as well as dentists should counsel the patients for maintenance of oral health. It still remains a chicken egg dilemma regarding the temporal sequence of events as many oral pathogens share a common factor with NCDs.

KEY WORDS: Association Non communicable Diseases, Oral Health

INTRODUCTION

Worldwide, the primary reason of disability is raising burden of Non communicable diseases (NCDs) [1, 2]. According to WHO, 2005, 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 (including heart disease, raised blood pressure and stroke), diabetes mellitus (DM), cancers and chronic respiratory diseases (including chronic obstructive pulmonary disease and asthma) [3].NCDs reported cases from 194 countries in 2014 stated that more than 85% of global deaths mainly occurred in low and middle income countries.[4] Expected mortality globally will increase by 15% between 2010 and 2020 (to 44 million deaths) [5, 6]. Most of the NCDs are preventable.[1, 7] Currently NCDs are exigent a profound and emergent levy on the physical health and economic security of low and middle income countries[8]. A strong affiliation has been detected by studies between NCD and oral diseases [8, 9].The prevalence and severity of non communicable diseases share many common risk factors with periodontal diseases and are influenced by microbial infections[10]. Numerous risk factors like tobacco, unhealthy diet, particularly sugars, physical inactivity and alcohol which are analogous for NCDs and oral diseases [7,11,12]. Poor oral health reflects the general health, and several oral diseases are related to chronic diseases [13] like periodontal disease and diabetes[7].

Ample literature is available on the alliance between periodontal infection with CVD, DM, preterm low birth weight pregnancy, GERD, heart disease, stroke, osteoporosis, rheumatoid arthritis.

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Abundant studies were established for an elevated prevalence of periodontal disease among diabetic patients. Extensive literature from developed countries was reported vis-à-vis the 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[12].

The epidemiological transition in Pakistan has led to a double burden of communicable and NCDs posing a huge challenge to the health systems which are unprepared for NCDs[14, 15]. In Pakistan, NCDs reported for 56% of disease burden and are anticipated to be higher in Sindh which has large urban population compared to other provinces. The epidemic of oral diseases is among the most common NCDs and is a foremost obstacle to development and achievement of the Millennium Development Goals [2,7].

The substantial global mutual action is the need of the time [4].

In this study our aim is to find association between NCDs with oral disease. This study aims to provide evidence to health care providers regarding the significance of oral health while treating the patients for NCDs[2]. Predominantly in poor resource settings, there is a need to understand the fundamental gaps in our understanding of oral diseases [8].

METHODS

Subjects and Method

A cross sectional study design was conducted to examine the oral health status of patients with NCD from 35 to 65 years of age reporting to Dental OPD of a tertiary care hospital. The total sample size was 378 based on 56% prevalence of NCDs in Pakistan. Three hundred participants were inducted through consecutive sampling technique and fulfilled our inclusion criteria during the two months of data collection from June to July 2014.

Ethical Consideration:

The study protocol was approved by the Ethics Committee and Institutional review board based on the declaration of Helsinki.

Inclusion Criteria: All those patients who were reported to Dental OPD between 35-65 years old age and presented with diagnosed NCDs (cancers, cardiovascular disease, chronic respiratory diseases and diabetes)

Exclusion Criteria: All pregnant females, those with history of psychiatric visits and neurological problems were excluded from this study. (The Global Economic Burden of Non-communicable Diseases- A report by the World Economic Forum and the Harvard School of Public Health September 2011)

The questionnaire was formulated by the help of validated questionnaire partially and remaining was constructed through literature search. The questionnaire was pretested, comprised of quantitative and qualitative component, written in English language and divided into three parts. The first part of questionnaire used to collect the demographic details of the subjects participated in this study such as age, sex, occupation, address, education level etc. The 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. 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.

A written consent form was signed after the explanation provided to the voluntarily agreed participants about the purpose of the study. The questionnaire was filled and oral health examination was carried out by a single dental surgeon who is the principle investigator of this study.

Statistical Analysis

The data was entered manually on Microsoft excel, checked for possible data entry errors and then analyzed on statistical package SPSS version 20. Frequencies and percentages were taken out for categorical variables. Associations between different variables were assessed through application of χ^2. P value less than 0.05 was taken as significant.

RESULTS

Our study focused on 300 participants who fulfilled the inclusion criteria and were recruited through consecutive sampling technique. Male to female ratio was 2:3. Mean age of the participants was 44.6 years. When inquired about their educational status majority participants were literate having second-

ary level 33% (n=99) and graduate level 40% (n=119) education. Out of the total participants, 48% (n=144) were working. 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.

It was observed that out of the total patients who visited the dentist, 59% (n=176) suffered from some chronic disease. Hypertension was prevalent in 31% (n=93), diabetics were 21% (n=64) and remaining suffered from arthritis and gastrointestinal disorders. When intake of medication was inquired it was found that 61.3% (n=184) were taking medicines regularly for management of their chronic diseases. Majority were taking anti hypertensive's 29.7% (n=89) and oral hypoglycemic drugs 21% (n=63).

When ideas were conceived regarding significance of dental health, 30% (n=90) were oblivious of the importance of dental health. When inquired if oral health affects general health 20.7% (n= 62) negated this idea whereas 58.7% (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 rampant {78.3% (n=235)}, tooth powder was used by 16% (n= 48). Regarding frequency of tooth brushing, 79% (n=237) were doing it once a day while 17% (n=51) were brushing twice.

When oral examination was conducted to assess the number of missing teeth the findings illustrated that two teeth were missing in 154 participants at mean age of 41.29 years, (P Value 0.000) due to tooth decay. At mean age of 37.42 years, no tooth was missing excluding all four third molars in 19 participants (P Value of 0.000).At the mean age of 55.50, there were 62 participants who lost more than three teeth (P Value of 0.000) the main reason for tooth loss was periodontal inflammation which leads to tooth mobility which was seen in 60% (=180). When symptoms related to poor oral hygiene were assessed 63% (n=189) respondents presented with bleeding gums, 64.3% (n=193) with food deposition, 62% (n=186) had halitosis, 45.7 %(n= 137) had oral ulceration, 39% (n=118) had dry mouth, 50% (n=150) had spacing in their teeth.

Table 1: Association between Prevalence of Chronic Disease with Oral Health

		Chronic Disease Present		Chronic Disease Absent		P-Value
		n	%	n	%	
Teeth Mobility	No teeth Mobile	59	49.2	61	50.8	0.001
	1 tooth Mobile	24	37.5	40	62.5	
	2 tooth Mobile	39	68.4	18	31.6	
	3 tooth Mobile	31	88.6	4	11.4	
	4 tooth Mobile	23	95.8	1	4.2	
Missing teeth	No teeth Missing	5	26.3	14	73.7	0.001
	1 tooth Missing	14	58.3	10	41.7	
	2 tooth Missing	74	48.1	80	51.9	
	3 tooth Missing	30	73.2	11	26.8	

Bleeding Gums	Yes	115	60.8	74	39.2	0.333
	No	61	55	50	45	
Halitosis	Yes	112	60.2	74	39.8	0.456
	No	64	56.1	50	43.9	
Dry Mouth	Yes	71	60.2	47	39.8	0.719
	No	105	57.7	77	42.3	
Oral Ulcers	Yes	84	61.3	53	38.7	0.412
	No	92	56.4	71	43.6	
Teeth Mobility	Yes	117	60.6	76	39.4	0.392
	No	59	55.1	48	44.9	
Tooth Spacing	Yes	90	60	60	40	0.896
	No	51	57.3	38	42.7	

Table 2: Association of Gender with attitude towards Oral Health

		Male		Female		P-value
		n	%	n	%	
Do you think dental health is important	Yes	75	41	108	59	0.919
	No	48	23.4	69	76.6	
Does Oral Health effects general health	Yes	79	45	97	55	0.05
	No	44	35.5	80	64.5	
Have you been to dentist earlier	Yes	91	44.6	113	55.4	0.064
	No	32	33.3	64	66.7	
Does dental treatment makes you nervous?	Yes	75	42.4	102	57.6	0.562
	No	48	39	75	61	

How frequently you brush your teeth?	No brushing	5	41.7	7	58.3	0.661
	1 or more than once daily	118	41	170	59	
	No	51	57.36	38	42.7	

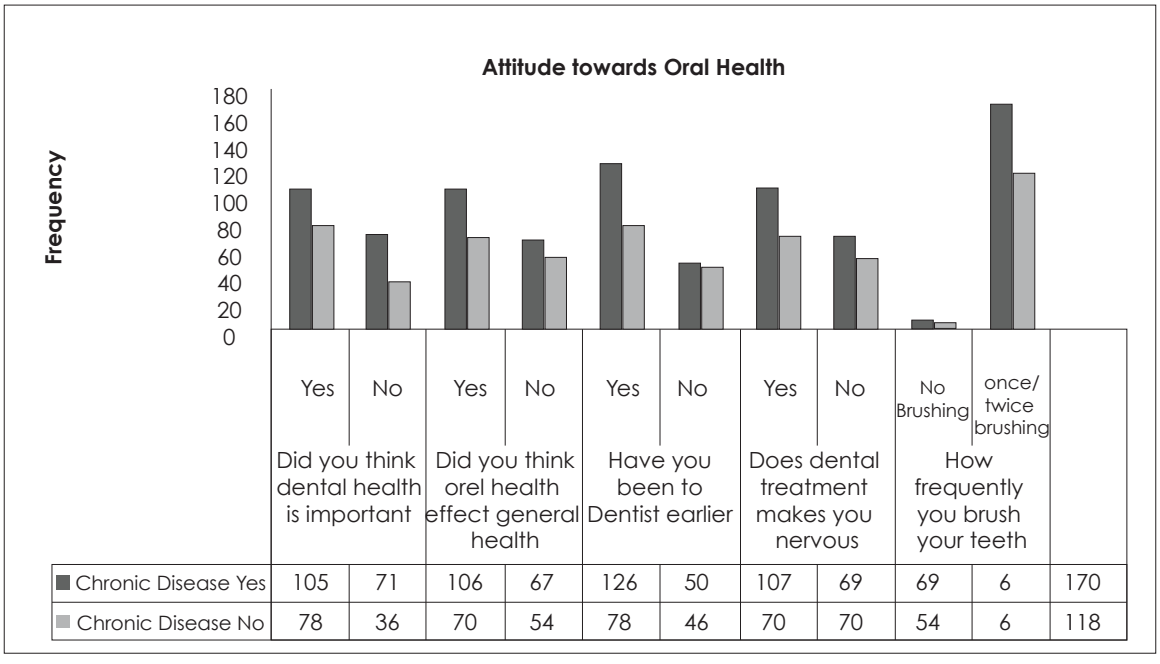

Figure 1: Association of Presence of Chronic Disease with attitude towards Oral Health

DISCUSSION

Significance of Oral health is equally imperative as general health. However; knowledge, attitude, behavior, awareness and education play pivotal role to determine the importance of overall health. There were numerous studies carried nation wise to assess the knowledge, attitude and behavior of people about importance of oral health and general health. According to Agiapal Singh, behavior of the people, knowledge and attitude is best described by the level of education[16]. A total of 300 dentate subjects (177 females and 123 males) were included in this study. In present study, 33% (n=99) of participants had secondary level of education and 40% (n=119) participants were having graduate level of education. These results were identical with the study conducted in Jordan which revealed that 59.9% participants had less than twelve years of education and 40.1% were having more than 12 years of education[17].

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=90) were oblivious of the importance of oral health and females were responded more 36 % (n=108) than 25 %(n=75) male, knowledge about oral health effects general health was better in female 32.3% (n=97) than 26.33% (n=79) 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 compare to 89% of men[18].

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 16.. 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 other authors[16]. Both male and female were knowledgeable that daily tooth brushing minimizes the risk and severity of dental problem. Regarding frequency of tooth brushing, 79% (n=237) were brushing the teeth once a day. These results were stronger than the inference of the study conducted in other nations.[16, 19]. On the other hand, 17% (n=51) subjects were brushing twice a day , these findings are not in congruence with the results of the study conducted in North India which indicated that 74% subjects brush their teeth twice a day [16].

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 carcinogen (carcinogenic to humans) [20].

This study was conducted to assess the increasing burden of non communicable disease with special focus on Oral Health. The theme of this research was to find out the relationship between periodontitis and chronic medical history. 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 (P=0.04) and diabetic nephropathy (P<0.01)[16,21,22,23].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[22]. Pakistan has an exceedingly high prevalence of NCDs and tooth loss due to periodontitis placed an accrue burden all over life[9,24].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 154 participants at mean age of 41.29 years, (P Value 0.000) due to tooth decay. At mean age of 37.42 years, no tooth was missing excluding all four third molars in 19 participants (P Value of 0.000).At the mean age of 55.50, there were 62 participants who lost more than three teeth (P Value of 0.000) The main reason for tooth loss was periodontal inflammation which leads to tooth mobility which was seen in 60% (=180) and these results were analogous with study carried in Japan, where tooth loss found in 42% in subjects over 45 years old[25]. Up till now, gingival bleeding is considered as a main clinical feature of Periodontitis[26]. When features related to periodontitis were assessed 63% (n=189) subjects presented with bleeding gums, 64.3% (n=193) with food deposition, 62% (n=186) had halitosis, 50% (n=150) had spacing in their teeth. Halitosis (bad breath) has been reported in many stroke patients[27].

When intake of medication was inquired it was found that 61.3% (n=184) were taking medicines regularly for management of their chronic diseases. Majority were taking anti hypertensive drugs 29.7% (n=89) and oral hypoglycemic drugs 21% (n=63).Dry mouth is induced by certain medicines [28].Due to these medications, 39% (n=118) participants had complain of dry mouth and 45.7 %(n= 137) had oral ulceration in this study.

There were few strengths of this study as questionnaire was developed with the help of validated tools available on net, the questionnaire was filled and oral examination was carried out by the principle investigator a dental surgeon so all parameters of this study were assessed by single examiner. 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 firm 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 chicken egg dilemma regarding the temporal sequence of events as many oral pathogens share a common factor with NCDs.

ACKNOWLEDGEMENT

The authors would like to thank Professor Navid Rashid Qureshi for his expert advice and support received from the Liaquat College of Medicine and Dentistry Karachi research centre.
Conflict of Interest: None declared

REFERENCES

1. Reynolds MA. Modifiable risk factors in Periodontitis at the intersection of aging and disease. Periodontology 2000.2014; 64:7–19.

2. Minino AM. Death in the United States 2009.NCHS Data Brief 2011; 64:1–8
3. Kazem B. Kuwait National Program for Healthy Living: First 5-Year Plan .Med Princ Pract. 2014;23:32–42
4. A call for global research on Non communicable disease 2014. Ansai T, Soh I, Awano S. Problems and future approaches for assessment of periodontal disease. Front Public Health .2014; 2(54):385
5. The global burden of disease Geneva, World Health Organization. 2004-2009
6. Anand P, Kunnumakkara AB, Sundaram C, Harikumar KB, Tharakan ST, Lai OS et al., Cancer is a preventable disease that requires major lifestyle changes. Pharm Res. 2008; 25: 2097–2116
7. Hujoel PP, Drangsholt M, Spiekerman C, DeRouen TA. Periodontal disease and Coronary heart disease risk. JAMA.2000; 284(11): 1406-1410
8. Health Sector Strategy Sind 2012 – 2020
9. Enwonwu CO, Salako N. The periodontal disease-systemic health infectious disease axis in developing countries.2012; 60(1):64-77
10. FDI World Dental Federation.FDI policy statement on non-communicable diseases. Adopted by the FDI General Assembly: 30 August 2013 - Istanbul, Turkey. 2013 ;63(6):285-6
11. Abdesslam B, Saber B, Wiam B. Multi-morbidity of non communicable diseases and equity in WHO Eastern Mediterranean countries. International Journal for Equity in Health. 2013; 12:60
12. Poul Erik Petersen et al., Policy and Practice The global burden of oral diseases and risks to oral health. Bulletin of the World Health Organization. 2005; 83 (9):661-669
13. Lopez AD, Mathers CD, Ezzati M, Jamison DT ,Murray CJ .Global and regional burden of disease and risk factors 2001. Systematic analysis of population health data. Lancet 2006;367: 1747-57
14. Tazeen HJ, Benjamin AH, Atif R, Junaid R, Marcel B, Mohsen N, et al. Health transition in Pakistan Non-communicable disease and injuries in Pakistan strategic priorities. Lancet 2013; 381:2281-2290
15. Agipal S, Ramandeep SG, Simapreet S,Vinod K, Jagjit S. Oral health: how much do you know?- A study on knowledge, attitude and practices of patients visiting a North Indian dental school. European Journal of Dentistry 2014; 8(1):63-67
16. Khader Y, Alhabashneh R, Alhersh F. Validity of self reported Periodontal Disease questionnaire among Jordanians. Dentistry. 2014;4 (2):1000201
17. Hiroshi U, The General Public's Awareness of the Importance of Oral Health: Findings from a Community Survey in Japan: 1-7
18. Zhu L, Peterson PE, Wang HY, Bian JY, Zang BX. Oral health knowledge, attitude and behavior of adults in China. Int Dent J. 2005; (55):231-41
19. Garg A, Chaturvedi P, and Gupta PC .Review of Areca (betal) nut ant tobacco use in the pacific. A technical report: WHO Library Cataloguing in Publication. Indian J Med Paediatr Oncol. 2014; 35(1): 3–9
20. Dagli RJ, Tadakamadla S, Dhanni C, Duraiswamy P, Kulkarni S. Self-reported dental health attitude and behavior of dental students in India. J Oral Sci. 2008; (50): 267-272
21. Marfil AR, Mesa F, Arrebola MA, Ramirez HJ, A. Magan FA, O'Valle F, et al. Acute Myocardial Infarct Size Is Related to Periodontitis Extent and Severity. Journal of Dental Research.2014; 93 (10): 993
22. Preshaw PM, Alba AL, Herrera D, et al., Periodontitis and diabetes: A two way relationship. Diabetologia 2012; 55(1):21-31
23. Tu YK, Gilthrope MS. Commentary: Is tooth loss good or bad for general health? Int J Epidemiol.2005; 34: 475-476
24. Aida J, Ando Y, Akhter R, et al., Reasons for permanent tooth extractions in Japan. J Epidemiol. 2006; 16: 214-219
25. Ryan T, Moïse D. Periodontal infections and cardiovascular Disease The heart of the matter. JADA. 2006; 137
26. Wei-ST. Halitosis: Could it be a predictor of stroke? Medical Hypothesis.2014; 82(3):335-337
27. Villa A, Connell CL, Abati S. Diagnosis and management of Xerostomia and Hyposalivation. Dove Press. 2014; 2015(11):45-51