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RESEARCH ARTICLE

Impact of Oral Health Status on the Quality of Life of Adults with Cardiovascular Disease

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Abstract

The study was conducted on 385 adults, to assess the impact of oral health status on the quality of life of adults with cardiovascular disease. The WHO oral health assessment form was used for the oral examination and the OHIP-14 was used to assess the impact of oral health on the quality of life. The mean OHIP-14 score was 0.06 ± 0.13. Among the 385 subjects, 97.6% of them self-rated their oral health as fair and only 0.8% reported that their oral health status was poor. Although, 65.4% of them had healthy teeth in terms of dental caries, 78% had calculus on their teeth and less than 3 percent of the subjects had a healthy periodontium. A statistically significant positive correlation was seen between mean OHIP-14 and DMFT score as well as between the mean OHIP-14 score and highest Loss of Periodontal attachment score. The oral health impact experienced was also associated with increased age and self-rated oral health.

INTRODUCTION

The World Health Organization, has defined health as "a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity" [1] In the field of dentistry, this perspective on health suggested that the ultimate goal of dental care, namely good oral health, should no longer merely be seen as the absence of caries or periodontal disease; a patient's mental and social well-being should be considered as well. [2]

Oral Health Related Quality of life (OHRQoL) was originally conceptualized by Giddon[3] and is defined as that part of a person's quality of life that is affected by this person's oral health. Oral Health Related Quality of Life considers how oral health affects the person's functioning (biting, chewing, speaking), sensations of pain/discomfort, psychological aspects (appearance, self esteem) and social well being [3]

During the last two decades, there has been an increasing interest in the impact of oral health on atherosclerosis and subsequent cardiovascular disease (CVD). Results from several studies[4,5,6,7] have suggested that chronic dental infections (severe periodontal diseases, missing teeth) may be associated with coronary heart disease.

This study was undertaken to assess the impact of oral health status on the quality of life of adults with cardiovascular disease.

MATERIALS & METHOD

The study was conducted on adult patients with known cardiovascular disease reporting to the Medicine outpatient department of a reputed hospital in Mangalore. Ethical clearance was obtained from the Hospital Ethics Committee and written informed consent was taken from the study subjects prior to the study. Calibration of the examiner was done and intra-examiner reliability showed good agreement (Kappa statistics score = 0.8). Patients with any other acute or chronic infection other than dental infection like sinusitis, gastrointestinal infection or urinary tract infections, those reporting hospitalization in the last 6 months, those who required antimicrobial prophylaxis before clinical examination, those reporting antibiotic usage in the last 3 months and those who were pregnant were excluded from the study.

Information was recorded about their demographic data, medical history, and last dental visit. The socioeconomic status was recorded according to the Revised Kuppuswamy′s scale (2007).[8] The OHIP-14 was used to assess the impact of oral health on the quality of life. [9]

The WHO oral health assessment form 1997 [10] was used for the oral examination. Statistical analysis of data was done using Statistical Package for Social Sciences (SPSS) 11.5 version. Statistical evaluation included frequencies, percentages and Spearman's correlation analysis.

RESULTS

The study population consisted of 230 (59.7%) males and 155 (40.3%) females. The age range of the study population was 20-95 years. The mean age of the subjects was 58.63 ± 11.38. The subjects were stratified based on age into six age groups: <35 years, 35-44 years, 45-54 years, 55-64 years, 65-74 years and >75 years. Majority of the subjects (32.7%) were in the 55-64 years age group and only 2.6% were in the <34 years age group. A majority of subjects (65.2%) belonged to the middle socioeconomic class and 34.8% belonged to the lower socioeconomic class. (Table 1)

Although about 96% of the study subjects were hypertensive, 5% of the subjects had ischemic heart disease and 1% of the subjects had rheumatic heart disease (Table 2). More than half (55.6%) of the participants were suffering from hypertension for the past 1-5 years. Almost all of them were under medication and 20.3% had a positive family history of cardiovascular disease. Among the 385 subjects, a majority of them (97.6%) self-rated their oral health as fair, 1.6% felt that their oral health status was good and only 0.8% reported that their oral health status was poor. (Table 3)

Oral health Impact Profile -14

The mean OHIP-14 score was 0.06 ± 0.13. A majority of the subjects (94.2%) never had any problem in pronouncing words due to oral problems. Similarly, a majority of the subjects (91.7%) never experienced alteration in taste due to oral health problems. However, 6.2% experienced occasional painful aching in the mouth. A total of 86.8% the subjects never had any difficulty while eating food, 99.2% never felt self-conscious in front of other people due to oral problems and 97.9% of the subjects never felt dissatisfaction in diet due to oral problems. Almost 99% of the subjects never faced any problem which interrupted their meals in between due to oral problems, 98.6% never had any difficulty in relaxing due to oral health problems and 98.7% of the subjects were never embarrassed due to any of their oral problems. About 99% of the participants never got irritated with surrounding people and had never felt that, life in general was less satisfying (Table 4).

Dentition status

Among the 385 subjects, 65.4% of them had healthy teeth, 6.6% had one or more decayed teeth, 23.2% had teeth missing due to caries and 3.1% had filled teeth. The mean decayed, missing and filled teeth are given in Table 5.

Periodontal status

Among the 385 participants, a majority of them (78%) had calculus on their teeth. Periodontal pockets of 4-5 mm and 6 mm or more was found in 6.5% and 13.2% of the subjects respectively. Less than 3 percent of the subjects had a healthy periodontium. (Table 6)

The mean number of healthy sextants per person was 0.8 and the mean number of sextants with calculus deposits on teeth was 3.51. When we calculated the loss of periodontal attachment, we found that a majority of the subjects (63.7%) had no loss of periodontal attachment (Table 7)

Correlation between mean OHIP-14 score, dental caries experience and periodontal status

A positive correlation was seen between mean OHIP-14 and DMFT score which was statistically significant. As the oral health impact increased, dental caries experience increased significantly (Table 8).

There was a negative correlation between mean OHIP-14 score and highest CPI score but it was not statistically significant. As the oral health impact increased, the CPI score decreased. However, a positive correlation was found between mean OHIP-14 score and highest LOA score and was statistically significant. It showed that, as the oral health impact increased, loss of attachment also increased (Table 8).

Table 1: Demographic details

Sex	Male	230
	Female	155
Age	<34 years	10
	35-44 years	33
	45-54 years	82
	55-64 years	126
	65-74 years	107
	>75 years	27
marital status	Married	383
	Unmarried	2
Socio-economic status	Middle class	251
	Lower class	134
Diet	Vegetarian	9
	Mixed	376
Previous dental visit	Never visited	62
	Within past 6 months	24
	6-12 months	85
	>1 year	214

Table 2: Distribution according to history of cardiovascular disease

Types of CVD	**Frequency**
Hypertension	369
Ischemic heart disease	18
Stroke	1
Rheumatic heart disease	5

Table 3: Distribution based on self-rated oral health status

	Frequency	**Percentage**
Good	6	1.6%
Fair	376	97.6%
Poor	3	0.8%
Total	385	100%

Table 4: Distribution based on the OHIP-14 scores

	OHIP-14	Very often	Often	Occasionally	Hardly ever	Never	Total
1	Trouble pronouncing words	0.3%	0.3%	0.8%	4.4%	94.2%	100%
2	Felt that your sense of taste has worsened	0%	0.3%	1.0%	7.0%	91.7%	100%
3	Had painful aching in your mouth	0%	0.8%	6.2%	20.3%	72.7%	100%
4	Found it uncomfortable to eat any foods	0%	0.8%	2.3%	10.1%	86.8%	100%
5	Been self-conscious	0%	0.3%	0%	0.5%	99.2%	100%
6	Felt tense	0%	0.3%	0%	0.8%	98.9%	100%
7	Had an unsatisfactory diet	0%	0.3%	0.5%	1.3%	97.9%	100%
8	Had to interrupt meals	0%	0.3%	0%	0.8%	98.9%	100%
9	Found it difficult to relax	0%	0.3%	0.3%	0.8%	98.6%	100%
10	Been embarrassed	0%	0.5%	0%	0.8%	98.7%	100%
11	Been a bit irritable with other people	0%	0.3%	0.3%	0.5%	98.9%	100%
12	Had difficulty doing your other jobs	0%	0.3%	0.3%	0.5%	98.9%	100%
13	Felt that life in general was less satisfying	0%	0.3%	0.3%	0.5%	98.9%	100%
14	Been totally unable to function	0%	0%	0%	0.8%	99.2%	100%
Mean OHIP-14 score= 0.06 ± 0.13							

Table 5: Dental caries experience of the population

Mean DT	2.16 ± 2.63
Mean MT	7.76 ± 5.81
Mean FT	0.35 ± 1.02
Mean DMFT	10.29 ± 6.21

Table 6 : Distribution of subjects according to the highest periodontal scores

Score	Community Periodontal Index (CPI)	Loss of Attachment (LoA)
Score 0 (Healthy periodontium)	4	245
Score 1 (Gingival Bleeding / 4-5 mm LoA)	5	79
Score 2 (Calculus / 6-8 mm LoA)	300	47
Score 3 (Pocket 4-5 mm / 9-11 mm LoA)	25	9
Score 4 (Pocket ≥ 6 mm / ≥ 12 mm LoA)	51	5

Table 7: Mean number of sextants for Community Periodontal Index/ LoA

Mean number of sextants	CPI	LoA
Code 0	0.8	4.3
Code 1	0.42	0.5
Code 2	3.51	0.2
Code 3	0.19	0.04
Code 4	0.24	0.02
Code X	0.81	0.70
Code 9	0	0.24

Table 8: Correlation of mean OHIP-14 score with highest LOA score and DMFT score

N=385	Correlation of mean OHIP-14 score with	
	highest LOA score	DMFT score
r value	.123(*)	.281(**)
p value	.016	.0000

Correlation is significant at the *0.05 level and ** 0.01 level (2-tailed)

DISCUSSION

This study was an attempt to determine the impact of oral health status on the quality of life of cardiovascular patients. A total of 385 subjects who gave informed consent participated in the study. The gender distribution of the cardiovascular patients showed a male preponderance (male 59.7% and females 40.3%) and the age range of the study population was 20-95 years. The mean age of the subjects was 58.63±11.38 and 65.2% of the participants belonged to the middle socioeconomic class.

A majority of the study subjects (95.8%) were hypertensive and a positive family history of cardiovascular disease was found in 20.3% of the subjects.

Regarding responses to the OHIP-14 questionnaire, a majority of the subjects never had any problem due to oral problems in the past 1 year except for physical pain, for which the prevalence was 27.3% on the quality of life. A similar finding was reported by Luo Y and McGrath C [11], McMillan et al [12], Lawrence et al [13] and Nuttall et al [14] in which the impact on the quality of life due to pain was more than any other factors in the study population. Less than 1% of the subjects had an impact on their life often or very often due to the oral problems. Since the study was conducted among the known cardiovascular patients, their prime concern seemed to be for their general health rather than for oral health. A majority of them (97.6%) rated their oral health as fair. Similar result was

reported by Luo Y and McGrath C[11]. In contrast, a study by Kim et al [15] observed that more than half of the study subjects rated their oral health as poor.

A total of 6.6% of teeth were carious and 23.2% of teeth were missing due to caries. However, only 3.1% of the teeth was filled without decay and 0.2% of the teeth were restored with bridge abutment and special crown. It suggested that, subjects were not concerned much about the restoration of carious teeth. More number of missing teeth (23.2%) might suggest that the subjects were unaware of the importance of dentition or might not be able to afford the cost of dental treatment. The mean DMFT was 10.2 ±6.21 in this study. Bhat M[16] had also found a DMFT of 7.57±5.81 in his study. Whereas, a study by Kumar et al[17] had found a DMFT of 5.34±6.48 which was almost half of the present study. This was in disagreement with the results reported in a study by McMillan et al[12], where DMFT was much higher (21.35±0.56). The root status of the subjects revealed 3.06% of the roots were decayed and sound roots were only 1.75%.

Periodontal status of study subjects showed 78% had calculus, periodontal pockets of 4-5 mm and 6mm or more was found in 6.5% and 13.2% of the subjects respectively. Less than 2% of the subjects had a healthy periodontium. The mean number of sextants per person with calculus was higher than for other periodontal findings. A study by Kumar et al[17] found lower scores for periodontal pockets of 6mm or more. A study by Holmgren et al[18] found high scores for all the codes except for healthy periodontium. On the other hand, in a study conducted by Bhat M [16] there was a higher mean number of sextant with pockets.

A majority of the subjects (63.7%) had 0-3 mm of loss of attachment and only 3% of the population had 12 mm or more loss of periodontal attachment. On the other hand, a study by Holmgren et al [18] and Baelum et al [19] reported much higher loss of attachment than the present study. The mean number of sextants per person was higher for 0-3 mm of loss of attachment (Code 0= 4.3) than for other codes.

A positive correlation was observed between the highest CPI score with duration of hypertension but it was not statistically significant. It indicated that, as the CPI score increased the duration of hypertension also seemed to be of longer duration. This study also showed that as the CPI score increased, the LOA score also increased significantly. Similar findings were reported in studies by Holmgren et al [18] and Baelum et al[19].

The overall prevalence of oral health impact on quality of life was 66.5%. However the findings by Luo Y and McGrath C[11] showed that the impact of oral health on the quality of life was 88% . Results reported in a study by Pallegedara et al [20] showed that the impact was 35.3%, Kim et al [15] found 36.4% and Nuttall et al [14] reported 51% in which they have considered those who endorsed the frequency of impact on one or more of the OHIP-14 as occurring “occasionally” to “very often” within the past year.

The mean OHIP-14 score in this study was 0.06±0.13. Luo Y and McGrath C[11] had reported the mean OHIP-14 score to be 2.01±1.09 which was higher than the present study. Similarly, there were studies which had shown higher mean OHIP-14 score such as a study by McMillan et al [12] who reported mean OHIP-14 score of 3.05±0.26, Locker et al [21] had found 5.9± 8.4, Lawrence et al [13] found 8±8.08, Bery et al [24] found 8.6 ±8.0 and Kim et al[19] reported 10.5±10.5.

While correlating mean OHIP-14 score with age category, it showed that, with increased age the mean OHIP-14 score also increased, indicating a reduction in quality of life. Similar result was reported in a study conducted by Bery et al [22] where the mean OHIP-14 score increased from 6.4±6.1 to 10±10.4 with increasing age, whereas another study by Sanders AE and Spencer AJ [23] reported that, low self-rated oral health was not related to increased age.

As the impact score increased, the self rated oral health status also increased. Higher scores identified poor oral health which was positively correlated with poor ratings of oral health by the subjects themselves, though it was not statistically significant. In contrast, a significant association was observed between OHIP-14 score and self rated oral health in a study by Luo Y and McGrath C[11]. The study showed that, as the oral health impact increased the CPI score decreased. It could be due to the fact that more number of subjects had calculus compared to periodontal pockets and the severity of symptoms was less for calculus than for periodontal pockets. This could be a reason for the negative correlation.

However, this study showed a significant positive correlation between mean OHIP-14 score and LOA score. It suggested that, as the oral health impact increased, loss of attachment also increased and loss of attachment score had always been a better predictor for determining periodontal condition than CPI score.

While correlating mean OHIP-14 score with DMFT score, it showed a highly significant positive correlation which suggested that, as the oral health impact increased the DMFT score also increased. This was in agreement with a study by Luo Y and McGrath C[11] in which the subjects who had higher DMFT scores experienced more oral health burden on life quality.

The results of this study provides baseline information regarding the oral health impact on the quality of life among cardiovascular patients. It was observed that increased prevalence of periodontal disease and dental caries experience were found to have a significant impact on the oral health related quality of life of patients with cardiovascular disease. Furthermore, the oral health impact experienced was also associated with increased age

and self-rated oral health. The present study demonstrated that obtaining data on oral health related quality of life can be combined with a dental evaluation among cardiovascular patients so as to improve their overall quality of life.

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