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A Cross-Sectional Epidemiological Study To Assess TheDental Caries Status, Periodontal Status And Its Association With OHRQoL Among The Elderly Residents Of Aged Care Homes In Punjab.

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Abstract

Objectives: Owing to advanced therapeutic modalities, the life expectancy has increased to 67.9 years leading to an alarming rise in the number of residents with general and oral morbidity.

Methods: A cross-sectional epidemiological study was carried out to assess the dental caries status,periodontal status and its association with OHRQoL among the elderly residents of aged care homes in punjab.

Results: The mean Add-GOHAI score of the study population was found to be 33.78±5.27 and SC-GOHAI score was 7.01±2.01. The mean GOHAI scores were significantly lower among men(32.79±5.84) as compared with women (35.23±5.28) indicating a better quality of life among males. The mean GOHAI scores (ADD-GOHAI and SC-GOHAI scores) had trend towards a risewith increase in age and were found to be highest among 80 years and older age group. The meanAdd-GOHAI and SC-GOHAI- scores corresponded to the deterioration of the oral health status with higher scores proportional to the dental caries and periodontal status.

Conclusion: This study demonstrates that there is significant oral health deterioration withincreasing age and a proportional effect on the quality of life. Most of them get treatment for the dental emergencies only.

Keywords: Dental caries, OHRQoL, Periodontal status, Quality of life

INTRODUCTION

Even though oral disorders occur far less often than the other conditions listed here, they arenonetheless an important contributor to comorbidity. [1] These diseases have an influence on the pathophysiological, and when combined with the psychological changes that come with being older, it may have a significant negative effect on a person's quality of life. Because there are already more than 77 million people aged 65 and over in India, the countryhas earned the reputation of being an ageing nation. The rapid increase in the percentage of elderlypeople in the population brings with it a host of challenges, particularly in terms of general and dental health. Those aged people who are unable to continue living independently include those who are confined to their homes and those who live in nursing homes. They are thought to be weakand disabled, and they may be suffering from at least one chronic medical condition. [2] The average life expectancy of residents has grown to 67.9 years as a direct result of the development of more effective treatment modalities, which has led to an alarming rise in the number of residents who suffer from general and oral morbidity.[3] It is anticipated that by the year 2020, the number of people aged 65 and older in emerging nations would reach 470 million.[4] By the year 2050, one-third of the population of the globe will be over the age of 60 years.[5] Public health

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strategies need to take into account the oral health status and requirements of the senior population [6]. The older population as a whole will benefit from this by being inspiredto have more active and healthier lives as they age. The requirements of the elderly in terms of dental health are always evolving and changing. Although ageing affects other factors such as ambulation, independent living, socialisation, and sensory function, the management of patients who are older requires an understanding of the medical and dental aspects of the ageing process. This is because these aspects are directly related to patient care. [7] One of the research[8] has revealed that persons of senior age who have lost their teeth use dental services at a lower rate than those of other age groups who have lost their teeth. To a largeextent, the utilisation of dental services by patients is a consequence of the patients' own self- perceived need for this kind of treatment. For this reason, patients' own perceptions of their own needs are regarded as an accurate predictor of the patients' own utilisation of dental services. A number of past studies have shown that an alarmingly high percentage of the Indian population suffers from oral illnesses. Thukral et al.[9] found that among the elderly population living in urban institutions in Delhi, there was a 39.2 percent edentulous subject population, with decayed teeth among 44.9 percent and 57.9 percent with deep periodontal pockets, and 78.5 percent having requirement of dentures and 38.3 percent requiring extraction or pulpal care. Another study that found a significant prevalence of dental caries in the senior population (63.8 percent) was conducted by Shah et al. [10]. Because there is very little information available on this topic, the purpose of this research was to determine whether or not there is an association between the oral health status and OHRQoLof senior individuals who live in aged care facilities in the state of Punjab.

MATERIAL AND METHODS

A cross-sectional epidemiological study was carried out to assess the dental caries status, periodontal status and its association with OHRQoL among the elderly residents of aged care homes in punjab.

Ethical considerations

It was explained to the ethical committee of "Genesis dental college" that the purpose of theresearch and its significance were being investigated, and they gave their approval. The necessaryauthorization was secured from the administration of the nursing homes for the elderly and each participant gave their informed consent to take part in the research.

Study methodology

A single examiner carried out the clinical examination who was expert in the field of fieldresearch after consultation with other experts. The training was carried out on elderly patients reporting as outpatients to the Department of Public Health Dentistry, Genesis dental college, India, with varied oral findings. The intra-examiner variability was checked by doing the duplicateexaminations and intra-examiner kappa coefficient values were calculated to be ≥0.80 for dentitionstatus.

Pilot study

A pilot study was conducted in order to determine whether or not the methodology could besuccessfully implemented. This was done in order to estimate the sample size for the primary studyas well as to determine whether or not the questionnaire could be successfully implemented. The research was conducted on a total of 56 residents of two different nursing homes for the elderly. The nMaster programme was used to calculate the sample size, and was found to be 550participants. We were successful in collecting data on 800 individuals from the several retirementcommunities located around Punjab. Data collection The internet and a variety of websites were used to compile a list of all registered senior carefacilities in the state of Punjab. The targeted sample consisted of all of the elderly residents of thevarious residential care facilities for the elderly who satisfied both the inclusion and the exclusioncriteria. Government data sources and variety of websites were used to compile a list of all registeredsenior care facilities in the state of Punjab. The targeted sample consisted of all of the elderly residents of the various residential care facilities for the elderly who satisfied both the inclusion and the exclusion criteria. The study excluded non-willing and uncooperative patients.

Clinical Oral examination

The Second part included clinical examination, which included teeth present, teeth absent and reason for loss of teeth. The decayed, missing and filled teeth were recorded according to theDentition status and Treatment needs as per World Health Organization (WHO) criteria 2013.

OHRQoL

The validated Hindi translation of the Geriatric Oral Health Assessment Index (GOHAIHi), which the authors themselves created and field-tested, was used to assess OHRQoL. The answer codes ranged from Never, Seldom, Sometimes, Often, to Always, with a Likert scale of 0 to 4. Theadditive score (Add-GOHAI-Hi) is a summative score with a lowest value of 0 and a maximum value of 48, with a higher score indicating poorer reported oral health condition. [11] The simple count score (Sc-GOHAI) is a count of the items, with "sometimes," "often," and "often" replies being coded as 1 and "never," "rarely," and other responses being recorded as 0. The score is between 0 and 12. (0 indicates good health and 12 indicates poor oral health). When summing the total score, the scores for questions 3, 5, and 7 were reverse-coded sincethey were favourably phrased. The scores for the other nine questions (question 1,

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2, 4, 6, 8, 9, 10,11, and 12) were not reverse-coded because they were negatively worded. A greater score suggested a concern with oral health, whereas a lower score suggested an excellent quality of life.The validated Hindi translation of the Geriatric Oral Health Assessment Index (GOHAIHi), which the authors themselves created and field-tested, was used to assess OHRQoL. The answer codes ranged from Never, Seldom, Sometimes, Often, to Always, with a Likert scale of 0 to 4. Theadditive score (Add-GOHAI-Hi) is a summative score with a lowest value of 0 and a maximum value of 48, with a higher score indicating poorer reported oral health condition. [11] The simple count score (Sc-GOHAI) is a count of the items, with "sometimes," "often," and "often" replies being coded as 1 and "never," "rarely," and other responses being recorded as 0. The score is between 0 and 12. (0 indicates good health and 12 indicates poor oral health). When summing the total score, the scores for questions 3, 5, and 7 were reverse-coded since they were favourably phrased. The scores for the other nine questions (question 1, 2, 4, 6, 8, 9, 10,11, and 12) were not reverse-coded because they were negatively worded. A greater score suggested a concern with oral health, whereas a lower score suggested an excellent quality of life.

Statistical analysis

Utilizing the statistical programme SPSS 25.0, data were examined (SPSS, Chicago, IL, USA). The Add-GOHAI-Hi dependent variable's means and standard deviations were computed. The relationship between GOHAI-Hi scores and the CPI, loss of attachment, and tooth mobility scores used in the objective evaluation of periodontal health was examined. When comparing more than two groups on continuous, normally distributed variables, the Student's t-test and one-way ANOVA with Bonferroni's post-hoc test were employed. Categoricalvariables were subjected to the chi-square test. A p-value of 0.05 or below was regarded as statistically significant.

RESULTS

There were a total of 49.75% males and 50.25% females. Of study population, 47.25% belonged to the age group of 60–69 years, 35.50 percent belonged to the age group of 70–79 years,and 17.25 percent belonged to the age group of 80 years and older. It was discovered that the Add-GOHAI score of the population under investigation was 33.78 with a standard deviation of 5.27. The number of questions to which respondents gave the answers "sometimes," "often," and "always" (SC-GOHAI) ranged from 7.01 to 2.01 with a mean of 7.01. It may be deduced from the fact that the mean GOHAI scores for males were substantiallylower than those for females (32.79±5.84 as opposed to 35.23±5.28) that men have a higher qualityof life. The average GOHAI scores, including both the ADD-GOHAI and SC-GOHAI scores, showed a general upward trend with increasing age, and the scores were found to be at their greatest for those who were 80 years old or older. The average number of teeth found in a person varied from 18.5 to 10.8 depending on theirage group. This range was seen across all age groups. Dental caries was the leading cause of toothextraction (47 percent), followed by periodontal disease as the second most common reason (53 percent). The prevalence of decayed teeth, missing teeth, filled teeth, and dental caries, as well asthe mean DMFT, all rose considerably across all age groups. The aged population with CPI scores of 4 and X and LOA ratings of 3 and X, decaying teeth, missing teeth, and DMFT scores of less than 1 had higher mean Add-GOHAI and SC- GOHAI- scores. Scores that were low in terms of oral health-related quality of life were linked toa deterioration in oral health status, as measured by DMFT and periodontal state scores.

DISCUSSION

The dental management of the geriatric population is becoming an increasingly important aspect of dental practise. This is due to the fact that geriatric patients have a high incidence of medical problems; therefore, the dentist must be able to detect these diseases and understand howthey relate to dental treatment.[12] The sociodental method may have a better understanding of the more relevant assessment ofthe demand for treatment among the elderly population, such as dentures.[13] This method, whichincludes identifying both normative needs and socio-dental variables, such as perceived consequences and oral health-related behaviours, should be applied in further research and consists of identifying both normative needs and socio-dental factors. In the research that we conducted, the number of males and females made up a nearly samepercentage, with a tiny edge going to the women. Studies conducted in Ahmedabad by Chahar et al. [14] and Bhatt et al. produced results that were comparable to these. [14] When compared to guys, it's possible that females have a more health-seeking attitude and are more readily accessiblethan men do. This might help to explain the findings. Across all age categories, there was a considerable rise in the mean number of decaying teeth, missing teeth, filled teeth, and DMFT. The mean numbers of decaying teeth, missing teeth,and filled teeth, as well as the DMFT score, were as follows: 5.842.92, 8.184.46, and 2.721.32, respectively, among the study population. On the other hand, the values we obtained for DT and DFT were more consistent with the findings of studies done in India and China.[16] The DT for a research conducted on old people inIndia was determined to be 2.5, while another study conducted in China discovered that the DFT was also 2.5. It is possible that the large population size of our nation and the shortage of public health facilities are There may be a predilection for tooth extraction among older persons, which

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might accountfor the lower number of filled teeth, as well as the high number of decaying and missing teeth. Alternatively, this could be a reflection of an underutilization of restorative therapy owing to a variety of factors.[17] There is a low rate of use of professional dental treatments among the elderlypopulation, particularly among the economically disadvantaged subset of the population.[18] Dental caries is becoming a serious public health concern among the senior population. It has a tight link with the social and behavioural aspects, notably the irregular oral hygiene routinesand the occasional visits to the dentist that are the primary causes of this disease. One of the most important results from this research was that both the number and the mean DMFT showed a notably significant connection with age. This finding was verified by the findings of the other studies as well. [19] According to Agrawal et al., the CPI and LOA score, both of which portray periodontal disease, likewise revealed a tendency of growth throughout the age groups. Periodontal disease often worsens with advancing age, and almost everyone has some degree of susceptibility to developing it. In most cases, the ravages of destructive periodontal disease are responsible for theprogression of edentulousness with age. Additionally, older age groups have larger mean tooth loss and increased mean periodontal index scores. [20] In the present investigation, score X (excluded sextant) owing to missing teeth was the mostprevalent result, followed by score 3 (4-6 mm pockets), score 2 (calculus), and score 4 (deep pockets > 6 mm). The judgments obtained here are similar to those obtained by Rao and colleagues. [21] among Indian people. It has been reported for a long time that periodontal disease worsens with age, particularly the pocket depth and excluded sextants. This is made worse by the high rateof illiteracy among the population, as well as by unhealthy oral hygiene practises, such as the useof finger, datun, and red tooth powder rather than tooth brush and toothpaste. Tobacco use and other behaviours that contribute to poor oral health also contribute to poor oral health. The LOA was calculated so that an estimate of the lifetime cumulative damage of the periodontal attachment could be obtained. According to the results of the current research, the mostoften encountered periodontal conditions in terms of LOA were 4-5 mm, which was consistent with the findings that Agrawal et al. had found. [20] Our results, which coincided with those of Mozafari et al.[22], indicated that gender was nota major factor in determining outcomes, and this was confirmed by the fact that no significant differences were discovered between the overall research population and any of the groups. In the population that was the focus of our research, we found that the average GOHAI scorewas 42.97. This was greater than the results of Alcarde et al.,23 who found that the GOHAI final score of 27.5 indicated a negative self-perception of oral health among Brazilian senior people residing in the municipality of Piracicaba, and the finding of Rodrigues, who had a score of 28. [24] It was reported that the mean GOHAI score in Malaysia was 46, which was significantly higher than the score obtained from our research population. [25]. With an increase in the CPI and LOA scores, a significant increase in the mean GOHAI scores was observed, indicating deteriorating OHRQoL, which correlated very well with the studyby *Rekhi et al*.[26] The relationship of GOHAI scores with CPI and LOA scores showed that with anincrease in the CPI and LOA scores, a significant increase in the mean GOHAI scores was observed. However, it could not agree with the findings by *Wong et al*.,[27] no significant associationcould be observed between these 2 variables. *Khanal et al*.[[28]] reported that LOA 4–5 mm was seen in majority (37.5%). Lee in his study in accordance with our study found the effect of the oral health status on OHR-QoL among Chinese hospitalized geriatric patients with decayed teeth, non-occlusion, coated tongue, tartar in large amounts, dry and rough red oral tissue and gum disease are the mostrelevant which impact the OHL-QoL.[[29]] Aurelene found that main oral problems which profoundly impact the OHR-QoL are the findings such as the number of missing teeth, dry mouthand restricted chewing capacity.[[30]] This study attempted to assess the OHRQoL of the geriatric population residing in the oldage homes in Punjab which was multicentric, which had the limitation of being a cross-sectional study and thus warranting the need for follow-up study to establish the cause-effect association between the factors established in our study.

CONCLUSION

This study demonstrates that there is significant oral health deterioration with increasing age and a proportional effect on the quality of life. Since our study was done in the old age homes among people residing in the instutionalized settings, they had significantly less frequent dental care than the general population as it was funded by the NGOs. This vulnerable population is moredependent upon the self-service societies and dental camps organized for the benefit of this community.

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TABLES

Table 1: Distribution of Decayed, Missing, Filled teeth and DMFT score ≥ 1 among thedifferent age groups

Age groups	Decayed teeth (DT)	Missing teeth (MT)	Filled teeth (FT)	DMFT ≥ 1
60–69 years (n = 378)	138 (36.51%)	156 (41.27%)	98 (25.93%)	194 (51.32%)
70–79 years (n = 284)	114 (40.14%)	170 (59.86%)	58 (20.42%)	178 (62.68%)
80 years and older (n = 138)	96 (69.57%)	90 (65.22%)	30 (21.74%)	102 (73.91%)
Overall	348 (43.50%)	416 (52.00%)	186 (23.25%)	474 (59.25%)
Chi-square value[a]	23.485	17.062	1.482	11.754
P-value	< 0.001*	< 0.001*	0.476[#]	0.004*

[a] Chi-square test * Significant difference [#] Non-significant difference

Table 2: Mean number of decayed, missing, filled teeth and DMFT score among differentage groups

Age groups		Decayed teeth	Missing teeth	Filled teeth	DMFT
		Mean±SD	Mean±SD	Mean±SD	Mean±SD
1	60–69 years	3.89±1.45	5.09±2.98	3.11±1.78	12.09±4.89
2	70–79 years	6.58±3.09	8.23±4.57	2.58±1.12	17.39±9.96
3	80 years and older	7.06±4.21	11.21±5.83	2.46±1.05	20.73±11.74
	Overall	5.84±2.92	8.18±4.46	2.72±1.32	16.74±8.86
ANOVA F-value[b]		36.23	45.39	4.73	76.82
P-value		< 0.001*	< 0.001*	0.009*	< 0.001*
Post-hoc comparisons[c]		3> 2, 1	3 > 2 > 1	1> 2,3	3 > 2 > 1

[b] One-way ANOVA test [c] Post-hoc Bonferroni test * Significant difference

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Table 3: Distribution of highest Community Periodontal Index and loss of attachment scoreamong the different age groups

	Community Periodontal Index					
Age groups	Score 0	Score 1	Score 2	Score 3	Score 4	Excluded
60–69 years (n = 378)	0 (0%)	0 (0%)	110 (29.10%)	160 (42.33%)	30 (7.94%)	78 (20.63%)
70–79 years (n = 284)	0 (0%)	0 (0%)	78 (27.46%)	38 (13.38%)	12 (4.22%)	156 (54.93%)
80 years and older (n = 138)	0 (0%)	0 (0%)	24 (17.39)	4 (2.90%)	4 (2.90%	106 (76.81%)
Overall	0 (0%)	0 (0%)	212 (26.50%)	202 (25.25%)	46 (5.75%)	340 (62.50%)
P-value[a]	1.000	1.000	< 0.001*	< 0.001*	0.476[#]	0.004*
	Loss of attachment scores					
	Score 0	Score 1	Score 2	Score 3	Score 4	Excluded
60–69 years (n = 378)	10 (2.6%)	180 (47.6%)	102 (27.0%)	8 (2.1%)	N/A	78 (20.63%)
70–79 years (n = 284)	4 (1.4%)	46 (16.2%)	66 (23.2%)	12 (4.2%)	N/A	156 (54.93%)
80 years and older (n = 138)	0 (0.0%)	12 (66.7%)	18 (100.0%)	2 (11.1%)	N/A	106 (76.81%)
Overall	14 (3.7%)	238 (63.0%)	186 (49.2%)	22 (5.8%)	N/A	340 (62.50%)
P-value[a]	0.667[#]	< 0.001*	< 0.001*	0.411[#]	N/A	< 0.001*

[a] Chi-square test *** Significant difference** **[#] Non-significant difference**

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Table 4: Mean number of sextants showing specific Community Periodontal Index scoresand loss of attachment scores in each age group

Community Periodontal Index score		Score 0	Score 1	Score 2	Score 3	Score 4	Excluded
Age groups		Mean±SD	Mean±SD	Mean±SD	Mean±SD	Mean±SD	Mean±SD
1	60–69 years	0.00±0.00	0.00±0.00	2.58±1.97	1.34±1.56	0.13±0.41	1.95±2.13
2	70–79 years	0.00±0.00	0.00±0.00	1.53±2.08	0.41±1.02	0.08±0.19	3.98±2.29
3	80 years and older	0.00±0.00	0.00±0.00	0.78±1.36	0.18±0.39	0.03±0.13	5.18±1.99
	Overall	0.00±0.00	0.00±0.00	1.63±1.43	0.64±0.99	0.08±0.24	3.70±2.08
P-value[b]		1.000	1.000	< 0.001*	< 0.001*	0.009*	< 0.001*
Post-hoc comparisons[c]		N/A	N/A	1 > 2 > 3	1 > 2 > 3	1 > 2, 3	3 > 2 > 1
LOA scores		Score 0	Score 1	Score 2	Score 3	Score 4	Excluded
		Mean±SD	Mean±SD	Mean±SD	Mean±SD	Mean±SD	Mean±SD
1.	60–69 years	1.19±1.89	2.37±2.04	0.62±0.98	0.05±0.22	N/A	1.98±1.99
2.	70–79 years	0.31±0.78	1.18±1.87	0.61±1.03	0.08±0.27	N/A	3.99±2.11
3.	80 years and older	0.00±0.00	0.41±1.02	0.31±0.80	0.12±0.00	N/A	5.09±2.08
	Overall	0.50±1.09	1.32±1.78	0.52±1.18	0.08±0.26	N/A	3.69±2.20
P-value[b]		0.569	0.005*	0.047*	0.651[#]	N/A	< 0.001*
Post-hoc comparisons[c]		N/A	1 > 2	1, 2 > 3	N/A	N/A	3 > 2 > 1

[b] One-way ANOVA test **[c] Post-hoc Bonferroni test** *** Significant difference**

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Table 5: Comparison of Dentition status with ADD-GOHAI and SC-GOHAI scores amongthe study population

		Add-GOHAI-scores (Mean±SD)	p-value[d]	SC-GOHAI-scores (Mean±SD)	p-value[d]
Decayed teeth	≥ 1	45.09±6.65	< 0.001*	10.09±3.49	< 0.001*
	0	38.80±5.78		6.80±2.06	
Missing teeth	≥ 1	45.73±6.79	< 0.001*	10.41±3.35	< 0.001*
	0	35.65±5.47		6.95±2.21	
Filled teeth	≥ 1	37.98±5.26	0.770[#]	8.89±4.09	0.574[#]
	0	37.45±5.82		8.35±4.14	
DMFT status	≥ 1	46.09±6.94	< 0.001*	10.87±4.20	< 0.001*
	0	35.28±5.86		6.28±2.41	
CPI score	Score 2	37.89±5.07	< 0.001*	6.29±2.13	< 0.001*
	Score 3	43.48±4.09		7.90±2.69	
	Score 4	46.17±5.02		9.12±3.99	
	Score X	48.45±5.17		10.83±3.70	
		Score 4, X > Score 2, 3		Score 4, X > Score 2, 3	
LOA score	Score 0	37.78±5.69	< 0.001*	6.09±3.09	< 0.001*
	Score 1	42.93±4.70		6.84±3.23	
	Score 2	43.08±5.11		7.96±2.85	
	Score 3	45.49±4.98		9.11±2.14	
	Score X	49.03±6.25		10.48±2.55	
		Score X > Score 3 > Score1, 2 > Score 0		Score X > Score 3 > Score1, 2 > Score 0	

[d] Unpaired t-test *** Significant difference** **[#] Non-significant difference**