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# DENTURE STATUS, DEMOGRAPHIC FACTORS AND ORAL HEALTH RELATED QUALITY OF LIFE AMONG 40-70 YEAR INDIVIDUALS RESIDING IN URBAN AND RURAL AREAS OF RANGA REDDY DISTRICT – A CROSS SECTIONAL STUDY

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## ABSTRACT

Over the past decade there has been an explosion of interest in conceptualizing, developing and assessing the impact of quality life on oral health. It is increasingly recognized that the impact of disease on quality of life should be taken into account when assessing health status. It is likely that tooth loss and denture status, in most cases being a consequence of oral diseases, affects Oral Health-Related Quality of Life (OHRQoL). **Aim**-Hence, this study aimed to investigate the association between Denture status, Demographic factors on oral health related quality of life in Rural (Ranga Reddy) and Urban (Hyderabad) individuals of age 40-70 years , utilizing the oral health related quality of life instrument OHIP-21. **Methodology**- Stratified random sampling procedure was employed on total sample of 632 subjects using questionnaire consisting of demographic data, denture status and OHIP-21 item. **Result**- OHIP-21 mean score for participants with missing teeth and no dentures was 24.55±15.43, and for participants wearing dentures was 10.94±11.60. The overall prevalence of oral impacts was significantly higher in non-denture wearers when compared to denture wearers. **Conclusion**-The increase in number of missing teeth was significantly associated ($p<0.05$) with Oral Health Related Quality of Life. Denture status and demographic factors was a stronger predictor for impaired OHRQoL.

**KEYWORDS:** Denture status; Demographic factors; Tooth loss; Oral health; Oral health related quality of life

## INTRODUCTION

Health is the general condition of a person in all aspects. World Health Organization (WHO), in 1948, defined health as "a state of complete physical, mental, and social well-being and not merely the absence of disease or infirmity".[1] Life expectancy at birth has continued to increase globally over the years. For 1950-1955, the combined life expectancy at birth for both sexes was 46.5 years. Five decades later by 2002, it was 63 years - an increase of 16.5 years.[2] Advances in medicine and public health measures have extended the life expectancy resulting in a shift in the age distribution of global population. This in turn has led to an increase in the proportion of the elderly worldwide. Nations are therefore faced with the major challenge of maintaining the quality of life of this increasing elderly population.[3] There is now a growing interest in the quality of life in dentistry. The oral cavity contributes to health-related quality of life at a basic biological level as it relates to the ability to chew and swallow. But also, at the social and psychological levels, it contributes to self-expression, communication, facial aesthetics and self-esteem. For example, a study showed that elderly people missing their front teeth were less confident and less pleased with their looks than those who were missing posterior teeth. When oral health is overlooked, the overall status of health and the quality of life are compromised.[4]

The inter relationship between oral health and general health is particularly pronounced among older people. Poor oral heath can increase the risks to general health and with compromised chewing and eating abilities, affect nutritional intake. Similarly, systemic diseases and / or the adverse side effects of their treatments can lead to an increased risk of oral diseases, reduces salivary flow, altered sense of taste and smell, oro-facial pain, gingival overgrowth, alveolar bone

resorption and mobility of teeth.[5,6] Based on the assumption that the use of denture could improve quality of life that is compromised as a result of loss of teeth, dentures are often recommended for individuals with missing teeth. However, existing evidence on the effect of denture status on oral health related quality of life is not consistent. According to some studies implants when compared to conventional dentures improved oral health related quality of life.[7] Study by John et al.,[8] indicate that denture status was a stronger predictor for impaired OHRQoL than demographic variables and rendered age and education almost negligible in their influence on OHRQoL. There is an independent and important relationship between tooth retention and quality of life, with more natural teeth resulting in better oral health – related quality of life. The retention of natural teeth into old age makes a major positive contribution to maintaining good oral health related quality of life in adult people.[7,8] The OHIP-21 have been constructed with the essential aim of elaborating on the personal character of QoL and have received a great deal of attention and are most extensively used instruments in dental research.[9-11] The relationships among demographic factors, denture status have practical importance for public health programs and provide information on variables that should be included in analyses of analytical studies involving OHRQoL in order to control confounding factors. It is noteworthy that studies on denture status and oral health related quality of life have been limited to populations from western countries.[8-10] As oral health related quality of life has a cultural dimension, it is of interest to assess the impact of denture status on quality of life in (Indian) populations (that is rural and urban areas of Ranga Reddy District, Andhra Pradesh) who are culturally different to those of the west. Hence, the aim of this cross sectional study to determine the association between denture status, demographic factors with quality of life utilizing the oral health related quality of life instrument OHIP (Oral Health Impact Profile) - 21.

## MATERIALS AND METHODS

A cross-sectional study was undertaken to assess and correlate denture status, demographic factors and oral health related quality of life in elderly population of urban and rural areas of Ranga Reddy District, Andhra Pradesh. The study comprised of 632 subjects of which, 316 subjects were from rural areas of Ranga reddy district and 316 subjects were from urban areas of Hyderabad.

### SAMPLE SIZE ESTIMATION

The sample for the present study was selected from community dwelling elders whose age ranged from (40 to 70 years) residing in the urban and rural areas of Ranga Reddy district. The overall sample size was 316 in urban and 316 in rural population and total sample taken was 632.

### SAMPLING PROCEDURE

Stratified cluster sampling procedure was employed. For the Census of India 2011, the definition of urban area is as follows:

1. All places with a municipality, corporation, cantonment board or notified town area committee, etc.
2. All other places which satisfied the following criteria:

1. A minimum population of 5,000;
2. At least 75% of the male main working population engaged in non-agricultural pursuits; and
3. A density of population of at least 400 persons per sq. km.

The National Sample Survey Organisation (NSSO) defines ‘rural’ as follows:

- An area with a population density of up to 400 per square kilometer,
- Villages with clear surveyed boundaries but no municipal board,
- A minimum of 75% of male working population involved in agriculture and allied activities.

In the present study, subjects were asked how often during the past one year they had experienced any of the problems measured by the OHIP-21. The responses to the OHIP -21 items were scored on a 5 point likert scale with five response categories for each question (Never, Hardly ever, Occasionally, Fairly often, and Very often).

## SELECTION OF SAMPLE

### INCLUSION CRITERIA

1. Individuals residing in ranga reddy district (rural ) and Hyderabad (urban).
2. Subjects who were 40 – 70 years were selected.

**Table 1: Comparison of subject's denture status with quality of life**

| | | N | Mean | SD | p-value | Post-hoc test |
|---|---|---|---|---|---|---|
| Denture status | No dentures (1) | 345 | 24.57 | 15.45 | **<0.001** | **1>2,3,4** |
| | Removable Dentures (2) | 117 | 12.26 | 11.48 | | |
| | Fixed (3) | 138 | 8.75 | 11.48 | | |
| | CD (4) | 32 | 15.56 | 10.76 | | |

**Table 2: Comparison and distribution of prosthetic status with OHRQoL**

| Prosthetic status | N | % | Mean | SD | p-value | Post-hoc test |
|---|---|---|---|---|---|---|
| 1. No prosthesis | 337 | 53% | 24.97 | 15.73 | **<0.001** | **1>2,3,4,5** |
| 2. Bridge | 96 | 15% | 9.17 | 10.88 | | |
| 3. More than one bridge | 52 | 8% | 8.48 | 10.77 | | |
| 4. Partial Denture | 87 | 14% | 12.01 | 10.50 | | |
| 5. Both bridge and partial denture | 7 | 2% | 21.43 | 10.91 | | |
| 6. Full removable denture | 53 | 8% | 12.96 | 10.60 | | |

**Table 3: Comparison and distribution of prosthetic needs with OHRQoL**

| Prosthetic need | N | % | Mean | SD | p-value | Post-hoc test |
|---|---|---|---|---|---|---|
| 1. No prosthesis needed | 216 | 34% | 8.00 | 9.72 | **<0.001** | **5>4,3,2,1 4>1,2 3>1,2 2>1** |
| 2. need for one unit prosthesis | 89 | 14% | 13.91 | 11.87 | | |
| 3. need for multi-unit prosthesis | 201 | 32% | 22.61 | 13.19 | | |
| 4. need for a combination of one and /multi-unit prosthesis | 43 | 7% | 25.98 | 8.51 | | |
| 5. need for full prosthesis | 79 | 13% | 34.90 | 15.96 | | |

**Table 4: Comparison of various dimensions of Quality of Life between prosthesis wearers and non wearers**

| | No prosthesis (n = 345) | | Prosthesis user (n = 287) | | p-value |
|---|---|---|---|---|---|
| | Mean | SD | Mean | SD | |
| Functional | 6.81 | 4.13 | 3.21 | 3.66 | **<0.001** |
| Physical pain | 6.87 | 4.19 | 3.46 | 3.92 | **<0.001** |
| Psychological discomfort | 2.22 | 1.93 | 1.01 | 1.48 | **<0.001** |
| Physical disability | 2.73 | 2.04 | 1.32 | 1.71 | **<0.001** |
| Psychological disability | 2.59 | 2.86 | 0.93 | 1.90 | **<0.001** |
| Social disability | 2.08 | 2.53 | 0.69 | 1.60 | **<0.001** |
| Handicap | 1.24 | 1.82 | 0.32 | 1.03 | **<0.001** |
| OHIP total | 24.55 | 15.43 | 10.94 | 11.60 | **<0.001** |

3. Subjects with missing teeth (minimum 1) without dentures and with dentures (complete dentures, removable partial dentures or fixed partial dentures).
4. Individuals willing to participate, who agree to give informed consent (verbal consent) was included.

**EXCLUSION CRITERIA**

1. Individuals who were bed ridden
2. Those with functional disability.
3. Mentally and physically disabled.

Individual homes were visited and information on demographic details, denture status, perceived oral health status and OHIP -21 was collected. This study was carried out using OHIP – 21 Questionnaire, and clinical examination (Prosthetic status and Prosthetic needs) was carried out using WHO oral assessment proforma 1997. The statistical test, Cronbach's – α was used to test the validity of the questionnaire and it was found to be consistent value of 0.92. The questionnaire was pilot tested on a sample of 30

elderly subjects. A pilot survey was conducted to assess the feasibility of the study and to test the selected methodology. The sample for the present study was selected from community dwelling elders whose age ranged from (40 to 70 years) residing in the urban and rural areas of Ranga Reddy district. Subjects with missing teeth (minimum 1) without dentures and with dentures (complete dentures, removable partial dentures or fixed partial dentures). Individual homes were visited and information on demographic details, denture status, perceived oral health status and OHIP -21 was collected. The Ethical clearance was taken from the institutional review board of Sri Sai College of Dental Surgery, Vikarabad. The study was conducted over a period of 4 months from February 2012 to June 2012. The information was recorded by Face - to - Face interview by the trained and calibrated examiner.

**STATISTICAL ANALYSIS**

The data collected was entered into standard Microsoft Excel 2010 and statistical analysis was done using SPSS 15.0 version. Continuous data were presented as mean ± Standard deviation. ANOVA followed by post hoc Tukeys HSD test to compare mean scores when there were 3 or more groups. Multiple group comparisons were made by one way ANOVA. Turkey's HSD post hoc tests was done for situations in which the researcher has already obtained a significant p value with a factor that consists of three or more means and additional exploration of the differences among means is needed to provide specific information on which means are significantly different from each other. Categorical data were presented as frequencies and percentages and analyzed by chi square. p value of 0.05 or less was accepted as statistical significant.

## RESULTS

Of the 632 included subjects, 47.78% (302) were males and 52.22% (330) were females. The subjects were divided into two groups, with the maximum 56.80% (359) in the '40-55' years age group and 43.20% (273) in the '56-70' years age group. Based on education and among the subjects (illiterate / primary school / high school / degree / PG) majority were illiterate 32.59%. Based on occupation and the respondents were categorized as agriculture / service/ retired/ household/ business/ others with the maximum 30.70% were housewives, 24.53% were into service, 22.63% were agriculturist, 8.39% were retired, 5.22% were into business and 8.54% were into other occupation. In this study the respondents in the low income category was slightly higher 50.16% when compared to 49.84% who were high income.

**Based on Responses and scores of OHIP – 21 items**

Of the 632 elderly individuals, the oral health related quality of life for an individual was calculated by adding the scores of each of the 21 questions (OHIP-21 items) on 5 point like scale. Using inter quartile method the range of OHIP that is divided into three levels of low, medium and high. Majority of people had a moderate OHIP score. The Add - OHIP score showed that 48.7% (308) had moderate OHIP score, 26.7% (169) had low OHIP score, and 24.5% (155) had high OHIP score.

**Results of social and demographic characteristics with respect to oral health related quality of life**

On comparing the subjects with respect to age groups, 359 individuals within the 40-55 years and 273 individuals with 56-70 years age group reported statistically significant association with OHIP score.

Age and gender was found to be significantly associated with OHRQoL. Type of denture status was found to have an impact on QoL, among these individuals with no dentures had a greater impact on quality of life followed by that of individuals wearing removable partial dentures, fixed dentures and completes dentures. Upon comparison of type denture status among individuals, a statistically significant difference was noted with impact on quality of life. Individuals wearing no dentures 345 (55%) had a greater impact on quality of life when compared to those wearing removable partial dentures 117 (18%) or fixed partial dentures 138 (22%), or complete dentures 32 (5%) [Table 1].

On comparison of prosthetic status and OHRQoL a statistically significant difference was noted for the prosthetic status and quality of life. Individuals with no prosthesis 337 (53%) had highest impact (highest mean) on OHIP [Table 2]. On comparison and distribution of prosthetic needs with OHRQoL a statistically significant difference was noted for the prosthetic needs and

quality of life. Individuals 79 (13%) with need for full prosthesis had highest adverse impact on quality of life when compared to individuals who didn't need any prosthesis (or were already a denture wearer) 216 (34%) [Table 3]. The distribution of the 7 dimensions of the OHIP-21 and the total OHIP-21 score among the response of the participants towards 7 dimensions of quality of life, physical pain showed the highest mean 5.32±4.41, this was followed by functional limitation with mean of 5.18±4.31, which is followed by physical disability with mean of 2.09±2.02, psychological disability with mean of 1.84±2.60, this is followed by psychological discomfort with mean of 1.67±1.84, social handicap with a mean of 1.45±2.26, and the least being handicap with mean of 0.82±1.85.

The total OHIP mean was found to be highest in individuals who were not wearing prosthesis 24.55±15.43 when compared to those wearing prosthesis 10.94±11.60. The total OHIP mean was found to be highest in individuals who were not wearing prosthesis 24.55±15.43 when compared to those wearing prosthesis 10.94±11.60. It was inferred that the total OHIP was highest or there was an adverse impact of quality of life on individuals with missing teeth but not wearing prosthesis when compared to those individuals with missing teeth but wearing prosthesis [Table 4].

**Comparison of various variables between rural and urban population**

It was found that the majority of the rural participants 65.2% were non denture wearers. Among urban participants 56.7%, majority of them 28.5% were fixed denture wearers, followed by removable dentures 24.3% and 3.95% wore complete dentures. On comparison of denture wearing pattern among rural and urban population; it was found among the rural population that 210 (64%) had no dentures, among those who wore dentures 59 (18.3%) wore all day, 44 (14.9%) wore dentures occasionally, 3 (0.5%) never wore dentures. Amongst urban population 134 (44.2%) had no dentures among those who had dentures 115 (37.1%) wore all day, 60 (17.4%) wore occasionally, 7 (1.3%) wore never. On comparison of denture satisfaction among rural and urban population; it was found that among 173 denture wearers of urban area majority 110 (63.6%) were very satisfied with wearing dentures when compared to 56 (47.9%) of rural population.

## DISCUSSION

Oral diseases are the most common of the chronic diseases and are important public health problems because of their prevalence, their impact on individuals and society, and the expense of their treatment.[12] Oral health related quality of life has a cultural dimension and so it is of interest to assess the impact of denture status on quality of life in (Indian) populations (that is rural and urban areas of Ranga Reddy District, Andhra Pradesh) who are culturally different to those of the west. To the best of our knowledge, this study is the first attempt at providing some insights into how adults in urban and rural population of Ranga Reddy district perceive the effect of oral health on their Quality of life. The internal consistency of OHIP-21 was assessed with Cronbach's alpha and the results of this study showed that the OHIP-21 was very reliable with an alpha value of 0.95. This was very similar to the study done by Sashidhar Acharya.[13] All subjects were between the age group of 40 to 70 years. Based on the age, subjects were divided into two groups that is '40-55' years age group (15.77 mean) and '56-70' years age group (21.82 mean). The age influence on OHRQoL was statistically significant. This is similar to the study done by John MT *et al.*[13] in which a personal interview to 2050 subjects 16-79 years of age and in a study done by Colman Mc Grath *et al.*[14] The result was in contrast with the study done by S. Einarson *et al.*[16] in which there was a non-significant association with age. The reason for this association could be that increase in age causes commonly poor oral health status which results in adverse impact on quality life. In the present study the correlation between genders and OHIP-21 was statistically significant; there was a greater adverse impact on quality of life among males16.93 (mean) when compared to females 12.94 (mean). This result was similar to the study done by S. Einarson *et al.*[16] and Colman Mc Grath *et al.*[15] and in contrast to the study done by John MT *et al.*,[14] S. Einarson *et al.*,[16] where in particular, women and younger age groups perceived oral health as impacting more strongly on their life quality as compared to men and older people. The inference from this study was made that the individuals of low income group were found to have an adverse

quality of life when compared to those of high income group and those with higher education level which was in accordance with the study done by GrathCM.[15] The reason could be that well educated people are more likely to be highly paid and much more aware and accessible to better treatments and hence have a better oral health status when compared to illiterates or low paid individuals. Upon comparison of type of denture status among individuals, a statistically significant difference was noted on quality of life. Individuals wearing no dentures had a greater impact on quality of life when compared to those wearing removable partial dentures or fixed partial dentures, or complete dentures. Similar results were obtained in a national survey done in Germany on 2025 participants by John MT *et al.*[17] in which the largest difference were observed for denture status and those subjects wearing dentures more impaired quality of life was found among those likely to have removable or partial denture. Denture status was found to be a strong predictor for impaired OHRQoL measured by OHIP. In a study by Pallegedra C *et al.*[18] it was found that in the edentate group, overall prevalence of oral impacts was significantly higher in non-denture wearers (53%) compared to denture wearers. This finding supports the finding of the study done by Hujouel *et al.*[19] on subjects 16-79 years age (Germany) and found that wearing removable dentures have poorer OHRQoL than fully or partially dentate subjects without removable dentures. Upon comparison of denture status among rural and urban population it was found that most of the participants from rural population despite of being edentate had no dentures (65.2%). Where as in urban participants most of them with missing teeth preferred getting it replaced with dentures and the most preferred type included fixed partial dentures (28.5%), removable partial dentures (24.3%) as their prosthesis. The comparison of the type of dentures between urban and rural population was found to be statistically significant. The scenario in urban areas is entirely different, urban populations is comparatively more educated and is aware and have access to dental treatments. The high OHIP scores (mean) indicate poor oral health related quality of life and low OHIP scores indicates satisfactory oral health related quality of life. In this study the most frequently reported problem of the edentulous or denture wearers were difficulty in chewing/biting food because of problems with teeth, mouth or dentures (mean =1.92). For the purpose of oral health promotion, the key factor is to spread the principles of oral hygiene and denture cleanliness. Ekelund[20] in a study to investigate the dental services provided for elderly people living in inland, reported that ignorance among the individuals towards importance of oral health was alarming; only one - fifth of the elderly considered dental care important than services such as hairdressing. Wirz *et al.*[21] also stressed upon the need for improvement in dental care, especially among elderly population. Thus the need of the hour with respect to elderly population should be towards more of oral health promotion and answering to immediate treatment needs, which could have effect in improving their oral health related quality of life.

## CONCLUSION

Healthy teeth and gums are more than just an aesthetic or hygiene issue, it's a quality of life issue. Over the past decade there has been an explosion of interest in conceptualizing, developing and assessing the impact of oral health on life quality. With this view point in mind, the following study was contemplated to assess denture status, demographic status and Oral Health Related Quality Of Life of elderly population. Males, low income participants and illiterates had an adverse impact on quality of life. Upon comparison of type of denture status among individuals, a statistically significant difference was noted on quality of life. Individuals wearing no dentures had a greater adverse impact on quality of life when compared to those wearing removable partial dentures followed by fixed partial dentures followed by complete dentures.

It was found that most of the participants from rural population despite of being edentate had no dentures. Where as in urban participants most of them with missing teeth preferred getting it replaced with dentures and the most preferred type included fixed partial dentures and removable partial dentures as their prosthesis. The prosthetic status of this population when related to the oral health related quality of life showed a significant difference. The percentages of complete edentulous individuals were 53% (both maxillary and mandibular arches). Among the

response of the participants towards 7 dimensions of quality of life, physical pain showed the highest mean. Hence, Oral Health Related Quality of Life has an adverse impact in non-denture wearers followed by complete dentures, removable partial dentures and fixed partial dentures.

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