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Original Article

Dentistry Section

Co Relation between PUFA Index and Oral Health Related Quality of Life of a Rural Population in India: A Cross-Sectional Study

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ABSTRACT

Introduction: A new measuring system called PUFA index had been identified to quantify the consequences of untreated dental caries. The co relation between PUFA index and oral health related quality of life has not been documented so far in India and thereby the need for this study

Design: Cross-sectional observational study.

Materials and Methods: Sample size of 212 subjects, who are the residents of a town in Rangareddy district were included to be a part of this study. The subjects were interviewed for the OHIP score and the clinical examination done to record the PUFA scores.

Results: The main objective of this study was to find out if there was any correlation between the OHIP scores and the study subjects and using the Pearson' s co relation coefficient, there was a significant correlation between the OHIP and the PUFA scores.(Pearson' s correlation= 0.31)

Conclusion: The mean OHIP and PUFA scores of the study subjects were 2.21 and 0.40 respectively. There is a positive correlation between the OHIP score and the PUFA score among the study population i.e. with the PUFA scores increasing, it has a detrimental effect on the oral health related quality of life of the individual.

Keywords: OHIP-14, Oral health related quality of life (OHRQoL), PUFA

INTRODUCTION

Dental caries is a microbial disease of the calcified tissues of the teeth, characterized by the demineralization of the inorganic portion and destruction of the organic portion of the teeth. Although the prevalence of dental caries has declined markedly in the developed countries, it still remains a major public health problem in the developing countries [1].

During the past decades, the DMFT/dmft index had been used extensively worldwide to assess the caries experience of the communities. A drawback of this index is that it fails to record the clinical consequences of untreated carious lesions such as pulpal involvement and dental sepsis [2]. A deep carious lesion with pulpal involvement is still considered as "caries in dentin" [3,4] and the presence of pulpal involvement is not mentioned in the latest edition of the oral health surveys by the WHO [5].

There is an urgent need to identify a scoring system which quantifies the clinical consequences of untreated carious lesions. So far, we have limited data on the prevalence of caries with pulpal involvement and even if such data exists, it is difficult to compare with the different scoring systems [6,7].

A thorough search of the existing literature was done to identify an index which could quantify the various advanced stages of a carious lesion and a new measuring system which is called the PUFA index was retrieved from the existing literature. This index records the consequences of an untreated carious lesion (P–Pulpal involvement, U-Ulceration, F-Fistula and A-abscess) [8].

Off late, there is a growing concern regarding the impact of the various oral diseases/ disorders on the quality of life of an individual and moreover on the psychosocial impact caused by it. Oral health has an impact on the general health of an individual, it has a substantial influence on the quality of life [9-16]. People with good oral health are known to have a better quality of life compared to people with poor oral health [9,12]. Oral health-related quality of life (OHRQoL) is a multidimensional concept which reflects people's comfort when eating or sleeping, and their satisfaction with respect to their oral health [17].

A number of instruments have been developed in the past to assess the quality of life in relation to oral health (OHRQoL) [18-20].

One of the frequently used instruments to assess OHRQoL is the Oral health impact profile (OHIP) questionnaire [21]. The (OHIP-14) is one such instrument that measures people's perception of the social impact of oral disorders on their well-being. This questionnaire aims to capture the impact of oral diseases on everyday well being and parameters such as functional limitation, physical pain, psychological discomfort, social disability, handicap are assessed [17].

The OHIP -14 questionnaire form has been used in several languages and was found to have good reliability and validity [22,23].

There are no comprehensive studies on the co relation between PUFA scores and oral health impact profile (OHIP) scores, in particular with regard to the Indian population and thereby the present study had aimed to investigate the co relation between PUFA scores and OHIP scores among a rural population in India.

AIMS AND OBJECTIVES

Aim

To assess the relation between PUFA index (objective) and the self perceived oral health quality of life (subjective) among the general population in Tandur, Ranga Reddy district, India.

Objectives

1. To record the PUFA scores among the study subjects
2. To assess the oral health impact profile(OHIP) scores among the study subjects.
3. To assess the co relation between PUFA and the OHIP scores among the study subjects.

MATERIALS AND METHODS

Ethical clearance for carrying out the present cross-sectional survey was obtained from the Institutional ethical committee of the dental institute based in India and an informed consent was obtained from every subject.

The study design employed here was a cross-sectional study which was done among the residents belonging to tandur mandal, Rangareddy district, Telangana. India

Tandur is the largest town in western ranga reddy district and is well-known for its stone and cement industries in India. It has a population of about 65,000 according to the 2011 Indian Census and the bulk of the population is rural [24].

The above mandal was chosen based on a simple random method from the list of all the mandals under Ranga Reddy district. The urban- rural variations were not considered and thereby only a sample of the residents of Tandur town was taken into consideration. The target population comprised of individuals aged 19 year to 60 year living in tandur mandal.

Sample Size Calculation

A pilot study was done among a sample of 30 residents who were picked randomly from the respective town and their mean OHIP and PUFA scores were ascertained. Using the statistical analysis, a co relation of 0.4 was found between these scores. Considering a 95% confidence interval and a design effect of 2, the final sample size of 212 subjects was derived.

Selection of the Study Subjects

The town of Tandur is divided into 27 Municipal wards by the district administration and each of the 27 wards encompasses two streets under their jurisdiction. A systematic random sampling method was employed, where in every 5th ward under the Tandur municipality was picked and therefore a total of five wards were selected to be a part of the study.

With respect to the five wards selected, both the streets under each ward were visited and from the beginning of each street, every 3rd household was selected and the subjects residing in these households were interviewed for the OHIP score and the clinical examination performed to record the PUFA score. The households were visited either early in the morning i.e. before 9 am or during the evening hours to include the working members of each of the selected households.

Care was taken to select an equal number of study subjects from each of the selected five wards, so that an equal number of participants would be picked from the different streets of the town.

The purpose of the study was explained to each participant and the information was retrieved by using a questionnaire form which assessed both the PUFA and the OHIP scores.

PUFA is an index used to assess the presence of oral conditions resulting from untreated caries. The index is recorded separately from the DMFT/ dmft and scores the presence of either a visible pulp, ulceration of the oral mucosa due to root fragments, a fistula or an abscess.

Lesions in the surrounding tissues that are not related to a tooth with visible pulpal involvement as a result of caries are not recorded. The assessment is made visually without the use of an instrument. Only one score is assigned per tooth. In case of doubt concerning the extent of odontogenic infection, the basic score (P /p for pulp involvement) is given [8].

If the primary tooth and its permanent successor tooth are present and both present stages of odontogenic infection, both teeth will be scored. Uppercase letters are used for the permanent dentition and lowercase letters used for the primary dentition. The codes and criteria for PUFA index are as follows:

P/p: Pulpal involvement is recorded when the opening of the pulp chamber is visible or when the coronal tooth structures have been destroyed by the carious process and only roots or root fragments are left. No probing is performed to diagnose pulpal involvement.

U/u: Ulceration due to trauma from sharp pieces of tooth is recorded when sharp edges of a dislocated tooth with pulpal involvement or root fragments have caused traumatic ulceration of the surrounding soft tissues, e.g., tongue or buccal mucosa.

F/f: Fistula is scored when pus releasing sinus tract related to a tooth with pulpal involvement is present.

A/a: Abscess is scored when a pus containing swelling related to a tooth with pulpal involvement is present.

The PUFA/pufa score per person is calculated in the same cumulative way as for the DMFT/dmft and represents the number of teeth that meet the PUFA/ pufa diagnostic criteria. The PUFA for permanent teeth and pufa for primary teeth are reported separately. Thus, for an individual person the score can range from 0 to 20 pufa for the primary dentition and from 0 to 32 PUFA for the permanent dentition [8].

The examiners was trained initially with respect to the PUFA index and calibrated accordingly to assess the inter and intra examiner variability, which was analyzed by the kappa statistic (0.90) and was found to be excellent.

The self-perceived oral health i.e. Oral health related quality of life (OHRQoL) was assessed by an oral health impact profile (OHIP-14) questionnaire form consisting of 14 questions, which is based on the seven dimensions of the lockers theoretical model of oral health.

All the questions in the OHIP-14 questionnaire form began in the same way: How often have you, as a result of your oral cavity, teeth, jaw or prosthesis, during the past one year, experienced the following situations?

The responses for the 14 questions were categorized according to the 5 point likert scale coded as 0 = never, 1= hardly ever, 2= occasionally, 3 = fairly often, 4= very often.

The questions were organized in seven dimensions: functional limitations, physical pain, psychological discomfort, physical disability, psychological disability, social disability and handicap, each of which contained two questions. The total score for the OHIP-14 questionnaire (individual) was obtained by adding up the points for the individual questions (max 56 points)

The English version of the OHIP-14 was converted into the local vernacular language with the help of a professional dentist well versed with this language.

This vernacular version of the questionnaire form was then again back translated into english by two independent dentists, who were fluent in both English and vernacular language.. The back translated English version was compared to the original English version to check whether the questions were properly translated. The statistical test used was Cronbach's – α to check the validity of the questionnaire which was found to be 0.92. The OHIP scores were recorded through verbal interviews and the scoring for each question was marked by the investigators themselves.

STATISTICAL ANALYSIS

All the data were collected and entered into spreadsheets and SPSS software version 15.0 was used for statistical analysis. Mean and standard deviations were calculated for PUFA and OHIP scores. The relation between the PUFA and the OHIP scores was assessed by employing the Pearson' s relation coefficient.

RESULTS

[Table/Fig-1] indicates the gender wise distribution of the study subjects, the males and females constituted 44.3% and 55.6% respectively. [Table/Fig-2] indicates that 31.1% of them belonged to the age group (19-34 y), 47.6% of them belonged to the age group (35-44y) and 21.2% of them belonged to the age group (45-60yrs). [Table/Fig-3] denotes the mean PUFA score of the subjects is 0.40 and the mean OHIP score of the study subjects is 2.21

Gender	Number	Percentage
Male	94	44.3%
Females	118	55.6%

[Table/Fig-1]: Gender distribution of the study subjects

Age group	Number (%)
19-34 Y	66(31.1)
35-44 y	101(47.6)
45- 60 y	45(21.2)

[Table/Fig-2]: Age wise distribution of the study subjects

Total number of subjects	Mean OHIP score	Mean PUFA score
212	2.21	0.40

[Table/Fig-3]: Mean OHIP and PUFA scores of the study subjects

Correlation between OHIP and PUFA Scores

The main objective of this study was to find out if there was any corelation between the OHIP and PUFA scores of the study subjects and using the Pearson' s co relation coefficient, there was a significant correlation between the OHIP and the PUFA scores. (Pearson' s correlation= 0.31) [Table/Fig-4].

PUFA	Mean OHIP
	0.319

[Table/Fig-4]: Correlation between OHIP and PUFA scores (0.3)
P<0.05

DISCUSSION

Data from epidemiological studies can highlight a number of important aspects, such as the prevalence and severity of oral diseases, but also to identify disease determinants and high risk groups.

This study represents possibly one of the first attempts to explore the correlation between PUFA (consequences of an untreated carious lesions) and OHIP scores of an Indian study population using the OHIP- 14 questionnaire form.

During the last decade or so, International caries detection systems have focused more on the development of a sensitive diagnostic criterion that identify a carious lesion at a very incipient stage [25,26]. This is important because of the decline in the number of cavitated lesions especially in the developed countries [27].

However, in a developing country like ours, where in a majority of the population has little access to basic oral health care, the concept of identifying incipient carious lesions does not hold ground. Even with the standard age old DMFT, DMFS index, which calculates the caries experience of the populations, often provides misleading information, as the actual quantification and the consequences of an untreated carious lesion isn't there.

This study had employed the PUFA index to assess the complications of untreated dental caries. However, the DMFT/DMFS index, the untreated caries, PUFA ratio, the prevalence of the P, U, F and A component has not been presented, as the focus of the study was on the co relation between the PUFA and the OHIP scores.

One of the drawbacks of the PUFA index is the inclusion of the code "u" which stands for traumatic ulceration and is generally not regarded as the complication of a untreated carious lesion and to substantiate the above highlighted drawback of this index, not a single unit of the code "u" was reported among the subjects of the present [28].

Regarding the instrument used to measure the oral health related quality of life (OHRQoL), the OHIP-14 (oral health impact profile questionnaire) has been used internationally, its reliability and validity has been well established. The OHIP-14 has a drawback wherein the questionnaire form is self rated and does not give an option for the subjects to pen down their perceptions and a few subjects in the present study had voiced their concerns regarding this aspect of the questionnaire form.

The mean OHIP score of the present study was 2.2 which is far less in comparison to the studies done in other countries [29]. The reason which may be attributed to this is that the quality of life depends on a number of factors which cannot be accounted for. This sample consisted of a predominantly rural population, wherein the other major health concerns occupy a predominant role in comparison to oral diseases and this fact may be compounded by the low awareness and the socio-economic status of the study subjects, thereby a much lower OHIP score can be justifiable [30].

It has been well-documented in the literature about the detrimental impact of the presence of dentures, tooth mobility, edentulism on the Oral health related quality of life [31]. Considering the fact that dental caries is a major public health problem among a vast majority of the population, surprisingly there are conflicting results of the impact of the carious lesions on the quality of life of the subjects. Anyhow, these results must be carefully weighed as the study population belonged to different sub sets of populations [32-34].

This stimulated the investigators of the present study to look into the objective assessment of the complications of untreated carious lesions (PUFA index) on the oral health related quality of life especially among a general non patient adult rural population in our country.

A significant co relation was found between the PUFA and the OHIP scores of the study subjects (0.3) and this denotes that with deteriorating oral health conditions, it does have an impact on the quality of life of an individual. Other studies have also found similar findings between the PUFA scores and quality of life but as discussed earlier, the findings of these studies should be cautiously weighed as the study population differs from the current study [35]. The findings of the present study cannot be compared in the Indian scenario as there is a dearth of literature in this aspect.

Regarding population based studies; one important question is always whether the results can be regarded as a representative of populations other than the one being studied. In this study, a small rural centre was randomly selected and a systematic random sampling was employed to select the study subjects. The ethnic composition of this study population would be difficult to compare with the other major population groups across our country and therefore more studies, targeting a wide geographic area and with different population sub groups is required to validate the results of this study.

It is difficult to compare the results obtained from other studies with the present one because of the differences with respect to the methodology, age groups and cultural aspects of the various sub sets of the population both within and between countries.

Based on the findings of this study, it is imperative that dental researches, policy makers and practitioners focus on the systems which assess the consequence of untreated carious lesions and its impact on the quality of life, so that they come out with a much improvised comprehensive oral health policy to address the oral health problems of the masses in our country.

CONCLUSION

The mean OHIP and PUFA scores of the study subjects were 2.21 and 0.40 respectively.

There is a positive correlation between the OHIP score and the PUFA score among the study population i.e. with the PUFA scores increasing, it has a detrimental effect on the oral health related quality of life of the individual.

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