Dr. Nivedita CB
Postgraduate, Department of
Public Health Dentistry, K.L.E
Society's Institute of Dental
Sciences, Bangalore, India

Dr. BK Srivastava
Professor & Head, Department
of Public Health Dentistry,
K.L.E Society's Institute of
Dental Sciences, Bangalore,
India

Dr. Shruthi Eshwar
Reader, Department of Public
Health Dentistry, K.L.E
Society's Institute of Dental
Sciences, Bangalore, India

Dr. Vipin Jain
Reader, Department of Public
Health Dentistry, K.L.E
Society's Institute of Dental
Sciences, Bangalore, India

Comparison of quality of life among dental caries and periodontal patients using EuroQoL-5D in KLE society's institute of dental sciences, Bangalore: A cross-sectional study

Dr. Nivedita CB, Dr. BK Srivastava, Dr. Shruthi Eshwar and Dr. Vipin Jain

Abstract
Introduction: Oral health related quality of life measures have been developed because objective clinical measures of disease provided little insight into the impact of oral disorders on daily living and quality of life. The Euro QoL group developed the EQ5D questionnaire as a non-disease-specific and standardized instrument for describing and measuring health-related quality of life.
Aim: To assess the quality of life among dental caries and periodontal patients.
Materials and methods: The EQ5D questionnaire was used to assess the quality of life among OPD patients in the department of oral medicine and radiology. Oral examination was done to check for the dental caries and periodontal status of the patient using DMFT index, DMFS index [Henry T. Klein, Carrole E. Palmer, and Knutson JW-1938] and community periodontal index. Convergent and divergent validity were measured for the predetermined hypothesis.
Results: The quality of life was affected in both dental caries and periodontal patients. It was found to be poorer with patient who has high DMFS score. The anxiety and depression dimension of EQ5D was found to be significant in females than in males.
Conclusion: The EQ5D has both convergent and discriminant validity for the measurement of health status in dental caries and periodontal patients.

Keywords: EQ5D, oral health, quality of life, validity, dental caries, periodontitis

Introduction

Health is a resource and not simply absence of disease. It is multidimensional in nature, addressing physical, mental, social, psychological, environmental, and economical aspects of an individuals' life (WHO 1948). Hence one needs to capture all these to determine where an individual stands in the matters of health and what can be done to enhance it further [15].

Clear relationship exists between oral and general health, explaining oral cavity harbors plenty of microorganisms which are gateway for initiation of systemic diseases leading to disability and disturbing the quality of life.

Quality of life is a broad concept concerned with the overall wellbeing in society. The World Health Organization (WHO) defines QOL as an "a composite measure of physical, mental and social wellbeing as perceived by each individual or by group of individuals-that is to say, happiness, satisfaction and gratification as it is experienced in such life concerns as health, marriage, family work, financial situation, educational opportunities, self-esteem, creativity, belongingness, and trust in others" [10].

Oral health-related quality of life is defined as an individual's assessment of how the following affect his or her wellbeing: functional factors, psychological factors, social factors, and experience of pain/discomfort in relation to oro-facial concerns [8]. Oral diseases such as dental caries and periodontal disease are highly prevalent. The consequences of oral problems are not only physical; they are also economic, social and psychological [7, 9, 11].

Although oral diseases are not usually life-threatening, they create a large burden. Dental problems have been ranked as the fourth most frequent illness condition, caries the highest-ranked diet related disease, and periodontal disease the fifth most prevalent health condition [4].

Correspondence
Dr. Nivedita CB
Postgraduate, Department of
Public Health Dentistry, K.L.E
Society's Institute of Dental
Sciences, Bangalore, India

Dental caries is the commonly seen oral disease in developing countries, affecting 60- 90% of school children and majority Of adults. A very extensive and comprehensive National Oral Health Survey and Fluoride mapping India, 2004 reported the prevalence of dental caries to be 80.2% among 35-44 years old [13].

Periodontal diseases involve periodontal tissue inflammation that can be associated with gum recession or the formation of periodontal pockets. Pockets may lead to tooth mobility, formation of gum abscesses, and tooth loss. Gingival bleeding has been reported to be highly prevalent throughout the world, with deep periodontal pockets affecting 10-15% of adults [4].

The need for a comprehensive approach to study the social and psychological impact of oral diseases lead to the development of a number of generic and oral health related instruments/measures. Overall, the instruments can be classified into two types, Generic instruments these include instruments like, SF-36 (Short Form-36) and EuroQol-5D (European Quality of Life-5 Dimensions) and Specific instruments, these include instruments like Oral Health Impact Profile, Dental Impact Profile, General Oral Health Assessment Index, RAND Dental Index and Oral Impacts on Daily Performances etc [15].

The Euro Qol Group established in 1987, it is a network of international multidisciplinary researchers devoted to the measurement of health status. The EQ5D questionnaire was developed as a standardized generic and non-disease-specific instrument for describing and valuing health-related quality of life. The EQ5D is intended to complement other forms of quality of life measures and it was basically developed to generate a generic index of health that places health states on scale from zero (worst health) to one hundred (best health), Visual Analogue component of EQ5D. The EQ5D is widely used internationally and reported to have adequate validity, but it is highly skewed and has relatively poor sensitivity especially in relation to specific disease-based outcomes research [5, 6, 10]. EQ-5D-3L is available in many languages for different countries, in this study we have used Indian version (India English sample version).

Oral diseases like dental caries and periodontal diseases are highly prevalent and can significantly impair the quality of life in large number of individuals leading to pain, discomfort, anxiety, poor facial appearance, low self-esteem and impaired function [15, 2, 13]. The need of the study was to assess the impact of dental caries and periodontal disease on the quality of life in adults using EQ5D.

Aim
To assess the oral health related quality of life among dental caries and periodontal patients using Euro QoL (EQ5D) among adult patients aged 30-60 years who visited KLE Society's Institute of dental sciences in Bangalore.

Objectives
1. To assess the oral health related quality of life among dental caries and periodontal patients using Euro QoL (EQ5D).
2. To test for convergent validity, the hypothesis made was that there would exist a strong correlation between increasing age and self-reporting of problems in the domains mobility, self-care and usual activities. It was also hypothesized that anxiety and worries would be greater among women respondents.
3. To test for discriminant validity, it was hypothesized that

the EQ5D would be able to distinguish between dental caries and periodontal disease patients.

Material and methods
A cross sectional, Analytical study was conducted on adults of age 30-60-years who visited to Outpatient department (OPD)-Oral medicine and Radiology department of KLE Society's Institute of Dental Sciences from 01st December 2016 to 31st December 2016 with the fulfillment of inclusion criteria.
1. The protocol of this study was reviewed and approved by the ethics committee of the KLE institute of dental science Bangalore. Subjects who consented to take part and patients who complain of pain due to dental caries or periodontal disease were included in the study, whereas, Patients who were uncooperative, Patients who were having pain with other dental diseases and Subjects with any systemic disease were excluded from the study.
2. Information regarding quality of life among dental caries and periodontal patients was collected using EQ5D. It is a simple two-page questionnaire which has five descriptive questions which may have one of three-level answers and a visual analogue scale (VAS) on which patients can mark their current health state. The 5D (mobility, self-care, usual activities, pain/discomfort, and anxiety/depression) have three levels of functioning each (no problems, some problems, and unable to/extreme problems). The VAS is a scale from 0 (worst imaginable health state) to 100 (best imaginable health state) [17].
3. A self-administered questionnaire was given to subjects and response was collected by interviewing each subject. Type I (Complete/Comprehensive examination) examination were carried by positioning the patient on a dental chair and examined under artificial light for detection of dental caries and periodontal diseases.

Oral health status was assessed by examining Dental caries experience and periodontal condition using Decayed Missing Filled Teeth index (DMFT) and Decayed Missing Filled Surface index (DMFS) [Henry T. Klein, Carrole E. Palmer, Knutson JW- 1938] in which caries experience was calculated by adding decayed, missing and filled teeth and severity of caries experience was calculated by adding decayed, missing and filled surfaces. Periodontal status of the patient was assessed using community periodontal index (CPI) for bleeding on probing, pocket depth and for loss of attachment using WHO probe. In this study, subjects with a score of 3 and 4 were defined as a case of periodontal disease.

The collected data were classified and tabulated in windows excel sheet. SPSS v 20 for windows was employed for statistical analysis. The chi square test was used to check the difference between the groups. The alpha error was set between $P<0.05$-statistically significant and $p\leq0.001$-statistically highly significant.

Results
A total of 270 patients were interviewed in between 01st December 2016 to 31st December 2016. Of these, 156 patients were having dental caries and 114 patients were having periodontitis. Their demography and characteristics are summarized in [Table 1]. There were 144 females and 126 males participated in the study. The mean age of the study population was 42.77 (SD ±8.39 ranging from 30-60 years).

Table 1: Demographic characteristics of subjects (n=270)

Demographic characteristics	N (%)
Gender	
Male	126(46.7%)
Female	144(53.3%)
Age (Years)	
≤ 30	6(2.2%)
31-40	116(43.0%)
41-50	90(33.3%)
50≥	58(21.5%)

Euro Qol five-dimension data

VAS index had a median value of 6 (skewness 0.60), with a range from 5 to 10 for dental caries and median value of 7 (skewness 0.49), with a range from 5 to 9 for periodontitis patients respectively [Figures 1].
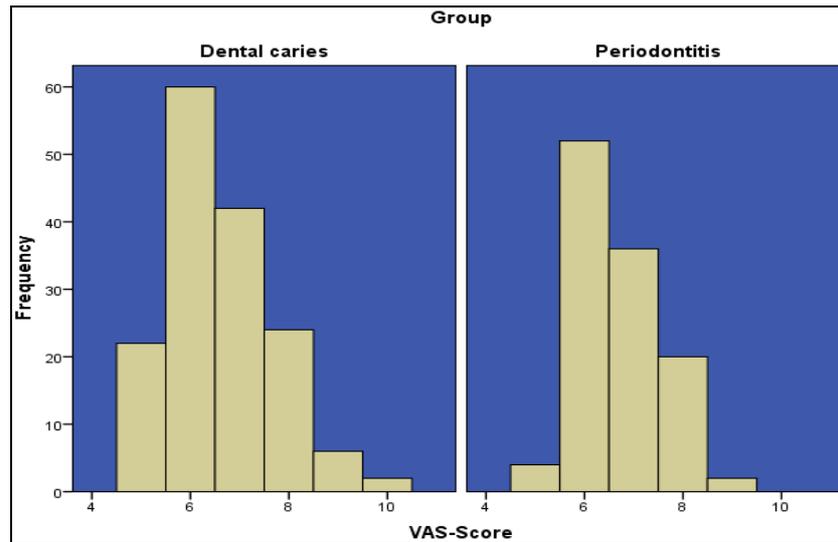

Fig 1: Histogram of Euro Qol five dimension visual analogue scale scores in dental caries and periodontal patients.

Convergent validity (H2)

As hypothesized, with an increase in age, respondents demonstrated a significant increase in self-reported problems in the usual activities, anxiety and pain dimensions: Reported problems in mobility and self-care did not differ significantly across age [Table 2]. Females reported significantly more problems in the self- care, usual activities, anxiety and pain dimensions of EQ5D. There was no difference in mobility dimension among males and females [Table 3].

Discriminant validity (H3)

A significant difference was noted in the frequency of reported problems among the dental caries and periodontal patients in all the dimensions except Mobility dimension of EQ5D [Table 4].

Table 2: Frequency of total respondents (*n*=270) reporting any difficulty in the dimensions of EQ5D categorized by age

EQ5D Domain	≤30	31-40	41-50	>51	Total	P
Mobility						
No problem	6	116	88	58	268	
Some problem	0	0	2	0	2	0.258
Severe problem	0	116	0	58	0	
Self-care						
No problem	6	106	74	48	234	
Some problem	0	10	16	10	36	0.141
Severe problem	0	0	0	0	0	
Usual activities						
No problem	2	38	24	14	78	
Some problem	4	70	46	38	158	0.03*
Severe problem	0	8	20	6	34	
Pain/Discomfort						
No problem	0	0	0	0	0	
Some problem	6	66	50	48	170	0.001*
Severe problem	0	50	40	10	100	
Anxiety/Depression						
No problem	4	58	46	32	140	
Some problem	2	54	44	20	120	0.04*
Severe problem	0	4	0	6	10	

Table 3: Difference the frequency of reported problems among male and female patients.

EQ5D Domain	Male n (%)	Female n (%)	P
Mobility			
No problem	124(98.4%)	144(100%)	
Some problem	2(1.6%)	0(0%)	0.129
Severe problem	0(0%)	0(0%)	
Self-care			
No problem	118(93.7%)	116(80.6%)	
Some problem	8(6.3%)	28(19.4%)	*0.002
Severe problem	0(0%)	0(0%)	
Usual activities			
No problem	52(41.3%)	26(18.1%)	
Some problem	64(50.8%)	94(65.3%)	*0.000
Severe problem	10(7.9%)	24(16.6%)	
Pain/Discomfort			
No problem	0(0%)	0(0%)	
Some problem	92(73.0%)	78(54.2%)	*0.001
Severe problem	34(27.0%)	66(45.8%)	
Anxiety/Depression			
No problem	104(82.5%)	36(25.0%)	
Some problem	22(17.5%)	98(68.1%)	*0.000
Severe problem	0(0%)	10(6.9%)	

Table 4: Difference in the reported problems among dental caries and periodontitis patients.

EQ5D Domain	Dental caries n= 156 (%)	Periodontitis n= 114 (%)	P
Mobility			
No problem	154(98.7%)	114(100%)	
Some problem	2(1.3%)	0(0%)	0.225
Severe problem	0(0%)	0(0%)	
Self-care			
No problem	124(79.4%)	110(96.5%)	
Some problem	32(20.6%)	4(3.5%)	*0.000
Severe problem	0(0%)	0(0%)	
Usual activities			
No problem	28(18.0%)	50(43.9%)	
Some problem	100(64.1%)	58(51.0%)	*0.000
Severe problem	28(17.9%)	06(5.1%)	
Pain/Discomfort			
No problem	0(0%)	0(0%)	
Some problem	80(51.3%)	90(78.9%)	*0.000
Severe problem	76(48.7%)	24(21.1%)	
Anxiety/Depression			
No problem	78(50.0%)	62(54.4%)	
Some problem	74(47.4%)	46(40.4%)	*0.319
Severe problem	4(2.6%)	6(5.2%)	

Discussion

Oral diseases like dental caries and periodontal diseases are highly prevalent and can lead to pain, discomfort, anxiety, poor facial appearance; low self-esteem and impaired function which intern affect the quality of life.[15] As a public health dentist one should know how quality of life has an impact on oral diseases so that he/she can prevent the occurrence of the diseases and help to maintain the quality of life of the individuals.

The quality of life is affected in both dental caries and periodontal patients. Our results showed a significant difference in all dimensions except mobility and self-care dimension of EQ5D. It was found to be poorer with patient who has high DMFS score. All dimensions except mobility dimension of EQ5D were found to be significant in females than in males.

Scapini et al. conducted a study to assess the effect of dental caries and malocclusion on OHR QoL of adolescents. They found that dental caries had a significant impact on OHR QoL [3]. Shrestha N et al. conducted a study to evaluate the oral health related quality of life (OHR QoL) and to determine its relationship with their perceived oral health (OH) status, satisfaction with OH and perceived treatment need. Assessment of dental caries status by prevalence and severity was also done.They found that largest impact on the performance of daily activities was related to decayed and missing teeth and a higher DMFT. Participants with a higher number of intact teeth presented less impact of oral health related problems on their daily activities [14].

Kanuvanaghatta N et al. conducted a study to determine the association between oral health-related quality of life (OHR QoL) and periodontal status among police personnel in Virajpet, India. They found that periodontal health has a significant impact on the OHR QoL of police personnel in Virajpet, India [1].

Various instruments were developed in an attempt to understand and assess how the oral problems have affected the daily lives of people. Kushnir et al. mentioned that oral health status was closely associated with QoL, and that a problem in oral health might seriously decrease a patient's QoL. On the other hand, Gregory et al. mentioned that QoL could be variable, according to patient perceptions. Therefore,

the associations between QoL and clinical status can be weak or nonexistent. In the present study, investigators tried to handle the issue from the patient's perspective, and we used each patient's first complaint that made them to come to our hospital. Investigators determined the nature of their complaints and then observed if there was an association between these complaints and their OHR QoL [12].

The present study has several strengths. Foremost among these is that the study used both clinical examination of oral health status and EQ5D generic health measure-item OHR QoL scale. Clinical examination of oral health status was significantly related to the oral health related quality of life measure of EQ5D.

The present study also has some limitations. Firstly, convenience sample of patients attending the KLE society's institute of Dental science, Bangalore that may influence its interpretation and generalizability. So results cannot be assumed to apply to the general population. According to Euro QoL group, several aspects of the VAS have been modified. Hence, we can't guarantee that the outcomes would have been comparable if the official EQ-5D had been used. Also the study was cross sectional and other factors were not considered. So, further studies are needed with definite populations; especially in different social and cultural environment as these factors play an important role in both oral hygiene status and its impact on quality of life.

Conclusion

About one third of the population reported that their oral condition had negatively impacted them in some way thereby affecting their quality of life. Females experienced more severe impacts of oral disorders on every day's life than males despite the fact, that females in this study had fewer carious teeth, fewer missing teeth and less prevalence of periodontal disease. EQ5D scores in this study were significantly associated with oral health status. These findings indicate that self-reported OHR QoL measures have a future, in population based surveys not as a substitute for the oral examination, but as an adjunct to identifying the conditions with the most potential to compromise patient well-being and quality of life. So, it can be beneficial, if we use OHR QoL instruments along with traditional measures, especially when planning public health services for those most in need of oral health promotion interventions or community based strategies. When health care resources are scarce, findings from such patient based outcome measures can be used to ensure that services/funding are directed at those conditions most likely to have negative effect on OHR QoL of specific populations.

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