

# Is There an Association of Self-Esteem and Negative Affectivity with Oral Health Related Quality of Life in Patients with Tooth Loss? : A Hospital Based Study

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## ABSTRACT

**Introduction:** To meaningfully interpret the oral health-related quality of life measures, the association of personality traits must be investigated. **Aim:** To determine the association of self esteem and negative affectivity with oral health related quality of life in patients with tooth loss. **Methodology:** OHRQoL measured by the Oral Health Impact Profile 14 (OHIP-14), self-esteem measured by the Rosenberg Self-Esteem Scale (RSES), Negative affectivity (NA) measured by the Eysenck Personality Inventory Questionnaire (EPI-Q), global oral rating of oral comfort and controlling variables like gender, age, number of teeth, experience of wearing Removable Partial Denture (RPD), Complete Denture (CD), location of missing teeth and zone of missing teeth were collected from 91 patients with tooth loss, signed in for treatment with RPD and CD. **Results:** Pearson correlation test showed the association of negative affectivity on oral health related quality of life and the result was statistically significant. In the multivariate analysis, the controlling variables alone explained 22.7% of the variance in the OHIP-14 score, while the addition of EPI-Q score and RSES score individually, and both together explained additionally 10.2%, 0.1%, and 12.5% respectively. For each unit increase in EPI-Q score and RSES score, the OHIP-14 score increased 1.97 times and 0.34 times. **Conclusion:** Negative affectivity was found to influence OHRQoL. This indicates the possibility to explain some of the impact of tooth loss on OHRQoL based on personality traits.

**KEYWORDS:** Behavioural Science, Personality Traits, Tooth Loss, OHRQoL

## INTRODUCTION

Edentulism, either partial or complete is a debilitating, and irreversible condition described as “final marker of disease burden on oral health.”<sup>1</sup> There are many variables affecting the quality of life out of which tooth loss is one of the premier factors. The loss of one or more teeth can have profound effects on an individual’s oral health and quality of life. A lot of measures have been introduced to measure and describe the oral health-related quality of life (OHRQoL).<sup>2</sup> Interpretation of these measures must be carried out not only with regard to the psychometric properties such as validity and reliability, but contextual factors must also be included in the interpretation.<sup>3</sup> Factors such as age, gender, dental status variables, socio-economic status, self-reported oral health, dental attendance, and personality traits might influence patient’s assessment.<sup>4</sup> To interpret the OHRQoL measures meaningfully, it is necessary to understand the influence of personality traits on them.<sup>5</sup> It is especially interesting if the OHRQoL measures are used to guide clinical decisions<sup>3</sup>; by investigating the influence, that is a mediating role, of personality traits on OHRQoL in

patients with tooth loss, the clinician could take it into account the treatment planning and could better inform the patient of the impact of tooth loss.

In the case of tooth loss, the indication for treatment is impaired function, which can be determined only by incorporating the patient in the decision making.<sup>6</sup> Without clarifying the patient’s need before treatment, a potential for treatment failure occurs.<sup>7</sup> Not all teeth need to be replaced, and a high prevalence of RPDs or CDs are not accepted by patients.<sup>8</sup> This implies that use of OHRQoL measures in this patient group is highly indicated. It is not known, however, if differences in personality traits influence the impact of tooth loss in patients with partial/complete tooth loss about to receive an denture.

Negative affectivity (NA) is a personality variable that involves the experience of negative emotions (such as anger, contempt, disgust, guilt, and fear, and nervousness) and poor self-concept.<sup>9</sup> More complaints and more diffuse and widespread complaints have been found in patients with high NA compared to persons with

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low NA.<sup>10</sup> As the complaints in patients with partial tooth loss are the primary basis for treatment, it would be highly relevant to include NA in the interpretation of OHRQoL in this patient group.

Another personality trait important for quality of life is self-esteem.<sup>5</sup> The impact of oral treatments on self-esteem has been investigated to some extent<sup>11</sup>, whereas the influence of self esteem on OHRQoL in patients with partial tooth loss has not been described. In medicine, self-esteem has been reported to be an important factor to be considered when predicting the outcome of health treatments.<sup>12</sup> Self-esteem has further been said to be captured by OHRQoL measures<sup>13</sup> and was therefore also thought to be a relevant personality trait to include in this study.

The overall purpose of this study was to determine the association of negative affectivity and self esteem with OHRQoL in patients with tooth loss about to receive a denture.

## MATERIALS AND METHODS

The present cross sectional study was conducted in May and June 2015 among the subjects with tooth loss of either sex signed in for treatment with Removable Partial Denture AND/OR Complete Denture attending the Department of Prosthodontics at Vokkaligara Sangha Dental college and Hospital, Bengaluru. Ethical clearance was obtained from institution review board of V.S Dental College and Hospital. Informed consent was obtained from study participants. If patients were presenting with acute pain, profound carious lesions, periodontal treatment, temporomandibular joint treatment and patients who were not voluntarily interested to participate in the study are excluded.

Finally, a total of 91 study participants were included in the study based on convenience. The required sample size to detect a correlation coefficient of -0.31 at the significance level of 5% ( $\alpha = 0.05$ ) and power 90% ( $\beta = 0.1$ ) is Sample size,  $N = \{(1.64+1.28)/-0.31\}^2 + 3 = 91.54 \sim 91$ .

**Rosenberg's self-esteem scale:** The Rosenberg Self-esteem Scale<sup>14</sup> (RSES) consisted of 10 items regarding self-esteem, each item was rated on a 4-point response scale, 1 being 'strongly agree' and 4 being 'strongly disagree.' Five items were positively worded (item 1,3,4,7,10), and 5 were negatively worded (item 2,5,6,8,9). The scores for the positively worded items were in the analysis inversed so that a score of 1 ('strongly agree') was set to 4. The addition of the item scores gave an overall score from 10-40 with a higher score indicating higher self-esteem.

**Eysenck Personality Inventory Questionnaire:** Negative affectivity (NA) was measured by the Eysenck Personality Inventory Questionnaire (EPI-Q)<sup>15</sup>, which consisted of nine questions regarding affection with dichotomous answers(yes/no). A point was given each time a question was answered 'yes' giving a final score

for each participant between 0 and 9 and a higher score indicating higher NA.

**OHIP-14 Questionnaire:** The Oral Health Impact Profile (OHIP-14) questionnaire a shorter version of the original tool which comprises of 49 questions (developed in Australia by Slade and Spencer in 1994)<sup>16</sup>, is one of the most technically sophisticated instruments for assessing OHRQoL.<sup>17</sup> The participants answered how often each problem had occurred during the past month on a scale with six choices and according to scores: (5) All the time, (4) very often, (3) fairly often, (2) sometimes, (1) seldom, (0) never. The overall OHIP-14 score (0-28) was calculated by adding the 14 answers for each participant. The final OHIP-14 scores were categorized as follows: 0-no impact, 1-3—low impact, 4-6—medium impact, 7-10—negative impact, 11-16—high negative impact<sup>18</sup>.

**Rating of Oral Comfort:** To further investigate the influence of NA and self-esteem on OHRQoL, the current oral comfort was rated on a 5-point response scale from 1='very poor' to 5='very good'. For analytical purposes, the ratings were divided into the groups (i) good oral comfort (score 4 and 5), (ii) ok oral comfort (score 3) and (iii) poor oral comfort (score 1 and 2).

**Controlling variables:** After oral examination and history takings, the controlling variables considered in the study were age, gender, the number of teeth, the experience of wearing RPD, CD(yes/no), the location of missing teeth to be replaced (one jaw or both), and zone of missing teeth to be replaced (masticatory or masticatory/aesthetic). The aesthetic zone was defined as incisors, canines, and 1<sup>st</sup> premolars in the upper jaw and incisors and canines in the lower jaw. The upper 2<sup>nd</sup> premolars/lower both premolars, and 1<sup>st</sup> and 2<sup>nd</sup> molars of both the jaws were defined as masticatory zone in the case of partial tooth loss. In patients with complete tooth loss, their experience of wearing of CD (yes/no) and location of missing teeth to be replaced (one jaw or both) were taken into consideration.

**Statistical analysis:** Data analysis was carried out using SPSS software version 20.0 (SPSS Inc., Chicago, IL, USA). The correlations above 0.40 were considered acceptable with 5% significance. Descriptive statistics was used to calculate the distribution of participants according to controlling variables and the distribution of the OHIP-14, EPIQ and RSES scores. The influence of gender, the experience of wearing RPD, location of missing teeth and zone of missing teeth was calculated using ANOVA. Student's t-tests were used to investigate the difference in EPI-Q and RSES score between participants with the good and poor rating of oral comfort. The differences were clinically evaluated by comparing them to the needed difference calculated from the parameter estimates. Pearson's correlation was used to test the correlation between EPI-Q score and RSES score

The amount of variance in OHIP-14 score explained by the EPI-Q score and RSES score was calculated using

general linear models to create four multivariate models from which the R-squared value was used: Controlling variables were included in the first model, followed by EPI-Q score in second, RSES score in third, both EPI-Q and RSES scores in the fourth and final model. Parameter estimates were derived from the final model to quantify the influence of the personality traits on the OHIP-14 score.

## RESULTS

**Distributions:** The distribution of OHIP-14, EPI-Q, and RSES scores, as well as the distribution of the participants according to age, gender, number of teeth, location, and zone of missing teeth are presented in Table 1.

Distributions	N=91
OHIP-14 score (Mean)	16.25 (2-33)
EPIQ (Mean)	4.38 (2-7)
RSES (Mean)	20.8 (13-28)
Age (Mean)	58.2 (32-78)
Gender	
Male	56
Female	35
Number of teeth (Range)	13.53 (0-30)
Location of missing teeth	
One jaw	17
Both	74
Zone of missing teeth	
Aesthetic	78
Masticatory	87

Table 1. Distribution of OHIP-14, EPI-Q AND RSES scores and the participants according to controlling variables (range)

**Rating of oral comfort:** The mean RSES scores in participants reporting good, ok and poor oral comfort was 20.50, 20.67, and 20.75; EPI-Q scores 4.50, 4.61 and 3.75; the mean OHIP-14 scores 10.75, 18.61 and 17.17 respectively. The difference in EPI-Q score between participants reporting good oral comfort and participants reporting poor oral comfort was not significant. The difference in RSES score between participants reporting good oral comfort and participants reporting poor oral comfort was not significant. The difference in OHIP-14 score between participants reporting good oral comfort and participants reporting poor oral comfort was not significant.

**Correlation analysis:** The correlation analysis of the independent variables with the controlling variables is shown in Table 2. Among the variables, A weak positive association was found between age and oral health quality of life with a significance of  $P=0.001$ . A weak positive association was found between negative affectivity and type of denture wearing with the oral health related quality of life which was significant. A little or no association was found between socioeconomic status and self esteem which was clinically significant. A significant result was found between negative affectivity and self esteem ( $P=0.004$ ), and negative affectivity and oral health quality of life ( $P=0.000$ ) with a weak positive association. A little association was found between self

esteem and negative affectivity, and the result was significant.

**Multivariate models:** The results from the multivariate models created to explain the variance in OHIP-14 scores are shown. The addition of EPI-Q score to the first model of controlling variables (22.7%) explained additional 10.5% of the variance, while the addition of RSES score to the first model explained additional 0.1% of the the variance. The addition of both EPI-Q and RSES score provided a 35.1% increase in R-square.(Table 3)

The parameter estimates from the final model showed that for each unit increase in EPI-Q, the OHIP-14 score increased by a statistically significant of 1.97 times, and for each unit increase in RSES score, the OHIP-14 score increased by a statistically non significant 0.348 units. Similarly for each unit increase in age, the OHIP-14 score increased by statistically significant of 0.18 times.

## DISCUSSION

The increase in population with tooth loss was widely discussed in social implications in different sectors but particularly in health related sectors. Oral health is one of the relevant aspects to analyze in social implications of the tooth loss population. Negative affectivity and self esteem are one of the personal traits which play a role in the quality of life including oral health in the population. So an attempt was made to assess the association of self esteem and negative affectivity on oral health related quality of life of patients with tooth loss.

Majority of the study subjects were male (61.5%) which was similar to the study done by Torres et al. and most of the participants belonged to 51-60 year age group. Most of the study participants belonged to middle/lower middle class. The controlling variables (i.e. age, gender, the number of teeth, the experience of RDP and CD, location and zone of missing teeth) were selected as they were thought to potentially influence the OHIP- 14 score in the study population.

Baron and Kenny<sup>19</sup> explained that ‘a given variable is said to function as a mediator to an extent when it accounts for the relation between the predictor and the criterion.’ In this study, it was aimed to determine the association self-esteem and NA on the OHRQoL and thereby be seen as mediators of the relationship between tooth loss and OHRQoL. The relationship between subjective and objective variables is complex, however, and different methods for investigating such relationships have been used. Since the main purpose of this study was to determine the association of the two known personality traits and the population size was limited, it seemed to be sufficient using general linear models, which also allowed for quantification of the influence. This is in line with Kressin et al<sup>3</sup>, who used the same method for investigating the association between NA and OHRQoL.

From the multivariate analyses, it was found that NA had the greatest single influence of the explaining variables; it

Correlations		OHIP-14	CE-A (no. of teeth present)	Age (in year)	Gender	Socioeconomic status	Self-esteem score	Eysenck personality questionnaire	Type of denture
OHIP-14	Pearson Correlation	1	-.282**	.357**	.107	-.016	-.021	.445**	.231*
	P value		.007*	.001*	.314	.880	.845	.000*	.027*
Self-esteem score	Pearson Correlation	-.021	.033	.000	-.099	-.299**	1	-.383**	-.062
	P value	.845	.753	.996	.349	.004*		.000*	.558
Eysenck personality questionnaire	Pearson Correlation	.445**	-.092	.088	.155	.133	-.383**	1	.173
	P value	.000*	.388	.408	.142	.208	.000*		.101

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

Table 2: Correlation between OHIP-14, self esteem and EPIQ with no. of teeth present, age, gender, socioeconomic status, self esteem, EPIQ, and type of denture wearing.

Multivariate analysis	R <sup>2</sup>
Explaining percentages of variance in OHIP-14 score	
Model 1. Controlling variables	22.7%
Model 2. Controlling variables+EPI-Q	33.2%
Model 3. Controlling variables+RSES	22.8%
Model 4. Controlling variables+EPI-Q+RSES	35.1%
PARAMETER ESTIMATES FROM MODEL 4	
Age (in years)	<b>0.186 (0.75)*</b>
Gender	1.078 (1.33)
Socioeconomic status	-0.184 (0.95)
ROC-A	-0.025 (0.81)
CE-A (no. of teeth present)	0.518 (0.44)
CE-CA (aesthetic zone)	0.546 (0.53)
CE-CM (masticatory zone)	0.725 (0.57)
Self-esteem score	0.348 (0.23)
Eysenck personality questionnaire	<b>1.970 (0.50)*</b>

Table 3: Multivariate models explaining the variance in OHIP-14 score and parameter estimates (SE) from the final model. (Dependent Variable: OHIP-14, \*P<0.05)

increased the explanation percentage of the variance in OHIP-14 score by well over half of what the controlling variables accounted for combined, and the parameter estimate was highly significant. The direct correlation with the OHIP-14 score was acceptable. Compared to other studies correlating NA to the OHIP score, the R-value of 0.59 found in this study is a little higher: Brennan et al<sup>4</sup> found a correlation of R = 0.36 in a large random sampled Australian population and Kressin et al.<sup>3</sup> found a correlation of R = 0.46 in a large population of older men. The association of self-esteem in this study was negative; a large increase in the explanation percentage was found, but the weak direct correlation with the OHIP-14 score was found.

Few other studies have investigated the relationship between self esteem and OHRQoL. As in this study, Agou et al<sup>5</sup> found a low but significant negative correlation between self-esteem and OHRQoL in a group of children seeking orthodontic treatment. Along with the significant relationship of high NA and poor oral comfort found in this study, this indicates that the personality traits, in fact, have an association with OHRQoL in the study population.

The greatest influence on the OHIP-14 score in this study was found when was accounted for in the multivariate model, that is, the additional variance was explained compared to when NA and self-esteem were added alone. This may be expected as the correlation between NA and self-esteem, even though, was low. This also makes it unlikely that collinearity problems occurred. When the influence of the personality traits was quantified, it was

found that for each unit increase in EPI-Q score and RSES score, the OHIP-14 score increased by a statistically significant 1.97 and nonsignificant 0.34 units, respectively.

In a somewhat similar patient group as this, John et al<sup>20</sup> estimated the minimally important difference for the OHIP-14 questionnaire to be between 2 and 9 units. These estimates can be used to understand the clinically meaning of the EPI-Q and the RSES. The results further showed that the reason for the clinical significant difference in EPI-Q score was related to the association between poor oral comfort and high NA; a significant difference in EPI-Q score between participants reporting poor and ok oral comfort was also seen.

The multivariate analyses showed that the controlling variables indeed explained some of the variance in the OHIP-14 score, and the bivariate analyses showed that the high age span in the study population especially influenced the OHIP-14 score. It is recognized that the controlling variables in this study do not encompass all OHRQoL aspects, and other dental status variables, socioeconomic status, and dental attendance could account for additional variance in the OHIP-14 score.

The present study cannot yield conclusive data on causality because of its cross-sectional design. Even though the study population was large enough to produce significant results, the population was selected from a dental college and hospital, and the results, therefore, might not be generalized to the entire population. Dental attendance might account for additional variance in the OHIP-14 score<sup>11</sup>. Social desirability bias may also exist.

Longitudinal studies are required to further address a conclusive data on the causality. The additional variances that might influence Oral Health Related Quality of Life can be added. Studies should be done to know the association of other personality traits such as Openness to experience, Extraversion, and Agreeableness on OHRQoL in tooth loss patients.

## CONCLUSION

An association was found between negative affectivity and oral health quality of life whereas no association was found between self esteem and oral health quality of life in the study participants. High negative affectivity was associated with worse oral health related quality of life. If OHRQoL measures are used to guide clinical decisions, it is thus important to determine whether the impact of tooth loss is in a part of the function of high negative affectivity. As the negative affectivity was the trait influencing OHRQoL, it may not clinically indicate worse oral health but could reflect a person's disposition to view things negatively. The question remains, however, if these persons benefit from treatment to the same extent as persons with a more positive attitude.

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