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Orginal Article

CORRELATION BETWEEN NUMBER OF MISSING TEETH AND ORAL HEALTH RELATED QUALITY OF LIFE. A CROSS-SECTIONAL STUDY

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ABSTRACT

Objectives: *To determine correlation between number of missing teeth and Oral Health Related Quality of Life.*

Materials and Methods: *This study was carried out in the department of Prosthodontic, Khyber College of Dentistry, Peshawar. A non-probability consecutive sampling technique was used. A total of 177 partially edentulous patients were selected following strict inclusion and exclusion criteria. Data were collected using the method of interview. General Oral Health Assessment Index questionnaire was used as a tool for measurement of Oral Health Related Quality of Life. Number of missing teeth was determined through intra-oral examination. Pearson's correlation and Linear Regression analysis was used to determine correlation and strength of association between number of missing teeth and General Oral Health Assessment Index score. A P < 0.05 was considered statistically significant.*

Results: *Out of 177 patients 49.7% were males and 50.3% were females. Means age of the patients was 35.8 (± 5.83). Average General Oral Health Assessment Index score for Oral Health Related Quality of Life was 47.82. Number of missing teeth was strongly related negatively with General Oral Health Assessment Index score, r= −0.53, p=<0.001. Linear regression analysis showed beta coefficient of −1.02 [CI = 95% (−1.24 to −0.79)].*

Conclusion: *Increase in number of missing teeth was strongly correlated negatively with Oral Health related Quality of life.*

Key words: *Partial edentulisim, Missing teeth, Oral health related quality of life, General Oral Health Assessment Index*

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INTRODUCTION

Health is no longer considered in respect of ailment. According to World Health Organization (WHO), the definition of health is "complete Physiological, Psychological and social aspect of wellbeing of a person"[1]. The concept of Health Related Quality of Life (HRQoL) mainly considers the person's feelings along with the clinical aspect of health which could be influenced by a multiple of factors[2].

Oral Health related Quality of Life (OHRQoL) is considered a very important part of general health that can be affected by oral diseases[3]. Many oral diseases are not usually fatal but can compromised quality of life which can be determined by patients' self-perception. Studies have verified that major factors affecting one's OHRQoL are number of

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missing teeth (NMT), socio-demographic status, number of decayed teeth, xerostomia, restrictions in mastication, periodontal problems and helitosis[4,5]. Dental problems can negatively impact both physical, psychological well-being and nutritional level. It is important to know the affect of oral diseases on individual's life[6].

Measures of OHRQoL are necessary for epidemiological and clinical studies to provide exact data for health improvement, planes for prevention of disease and allotment of health sources[7]. Different questionnaires have been established to measure OHRQoL. Commonly used assessment tools are Oral Health Impact Profile (OHIP), Oral Impact on Daily Performance (ODIP) and well retified Geriatric/General Oral Health Assessment Index (GOHAI)). These questionnaires are used to analyze the functional, psychological and social effect of oral diseases[8].

Atchinson and Dolan developed GOHAI in 1990[9]. It is a 12-items assessment questionnaire instrument that is divided into three domain; physical, psychological and pain or discomfort. Physical functional domain consists of four questions assessing trouble in eating, limit type of food, speech. Psychological domain comprises of five questions assessing anxiousness about teeth problems, reduce social interaction, disturbed or shame to eat with others and dissatisfaction with appearance. Third aspect inquires about pain or discomfort like sensitive to hot /cold/ sweet or sour food, use of analgesics drugs, not able to swallow easily[10]. The total score ranges from 12 to 60. Higher GOHAI score represents a more satisfactory OHRQoL[11]. Since its development the GOHAI has been translated into German[2], Hindi[7], French[8], Malay[10], Arabic[12], Swedish[13], Chinese[14] and Pushtho[15].

Tooth loss, periodontal disease, tooth caries or cavities, ulcers, tumors and other anomalies in the mouth are some of the factors that have a negative influence on OHRQo[11]. Chewing of foods and nutritional status is affected by teeth loss and faulty dentition. Facial charm plays a major role in employment situations which can be badly affected by missing or abnormal teeth[16].

A study conducted in Saudi Arabia, the mean score for GOHAI was 32.1with the range of 11-59. According to this study frequency for good, average and poor OHRQoL was 21.8%, 40.1% and 37.8%[12]. A local study demonstrated that 20% patients had good, 27% patients had average and 53% patients had poor OHRQoL[15]. According to another local study OHRQoL has a negative effect due to an increase in NMT, low education level and low socio-economic status[16].

There is a lot of variability in OHRQoL among different countries or among different geographical regions with in a country. Different studies have shown the effect of missing teeth, masticatory problems and decayed teeth on OHRQoL. According to our findings no study has been carried out to show correlation and strength of association between number of missing teeth and OHRQoL.

The objective of this study was to investigate correlation between number of missing teeth and OHRQoL in partially dentate patients.

MATERIALS AND METHODS

This study was approved by institutional research review board of KCD, No.214/RRB/KCD. This descriptive cross-sectional study included the patient from Prosthodotics department of Khyber College of Dentistry, Peshawar from December 2024 to January 2025. Sample size was 86, calculated by G-Power, based on the estimated Pearson's correlarion r=0.3[12], a confidence level of 95%, and with the alpha value of 0.05. But in order to get more reliable result and better generalizability, increase precision in results and higher likelihood of detecting a statistically significant effect the sample size taken was 177. Consecutive (non- probability) sampling technique was used.

Inclusion criteria encompassed partially edentulous patients in one or both jaws, aged 30 years to 45 years. Exclusion criteria included complete absence of teeth in one or both jaws, systemically ill, disabled or have acquired or congenital orofacial defects, subjects' having temporo-mandibular disorders (TMD) and other acute and chronic dental and orofacial pain conditions, depressed, psychiatric or uncooperative subjects and patients wearing any prosthesis. The modified form of Pushtho GOHAI[15] was used. Those subjects who were referred from OPD and following inclusion and exclusion criteria were invited to participate in the study. The patients were informed about the reason, risks and benefits of study. A verbal informed consent was taken from the

participants of the study. The Pushto version of GOHAI questionnaire was completed for each subject through the method of interviewing by the author. Five point Likert scale was used for participant's answers to GOHAI questionnaire. Each Likert-type scale is allotted number from 1 to 5 i-e always=1, often=2, sometimes=3, seldom=4; and never=5. Score for the statements items 3, 5 and 7 of GOHAI were reverse to get the appropriate response. The scores from 12 GOHAI questions were summed to get cumulative GOHAI score. The score could vary from 12 to 60, with higher score indicating better OHRQoL. The NMT was assessed through intra-oral examination method by a single examiner.

Data collected was analyzed by using SSPS version 22. For categorical variables like gender and age groups frequencies and for numerical variables like age, number of missing teeth and GOHAI score mean and standard deviation was calculated. Pearson's correlation analysis was used to assess the correlation of the GOHAI score and NMT. The magnitude of correlation was judged according to Cohen, "with correlations greater than 0.5 considered large, correlations greater than 0.3 considered medium and correlation greater than 0.1 considered small". In addition, a linear regression analysis was performed with GOHAI sum score as the dependent variable and number of missing teeth as independent variable.

RESULT

The total number of patients was 177 (n=177). Eighty eight (49.7%) were males and 89 (50.3%) were females. The mean age of the patients was 35.8 (SD=5.83) years. Mean GOHAI score was 47.82 (±8.34) Table 1.

There was a strong negative correlation between OHRQoL and NMT (Pearson correlation coefficient: -0.53), indicating that increase in number of missing teeth was strongly correlated negatively with the GOHAI scores ($p < 0.001$) Figure 1. So it can be interpreted that as the NMT increases, OHRQoL decreases significantly. Linear regression analysis shows that one unit increase in NMT was related to a decrease of 1.017 GOHAI units (beta= -1.017, 95% CI: -1.243 to -0.791, $p < 0.001$) (Table 2).

There was a weak correlation between age and number of missing teeth (Pearson's correlation=0.293). No correlation was found between age and GOHAI (r= 0.022),

The most affected quality of life dimensions were "Discomfort during eating any kind of food" and "Worried about teeth and gums" reported by 77 (43.5%) and 65 (36.7%) of subjects respectively.

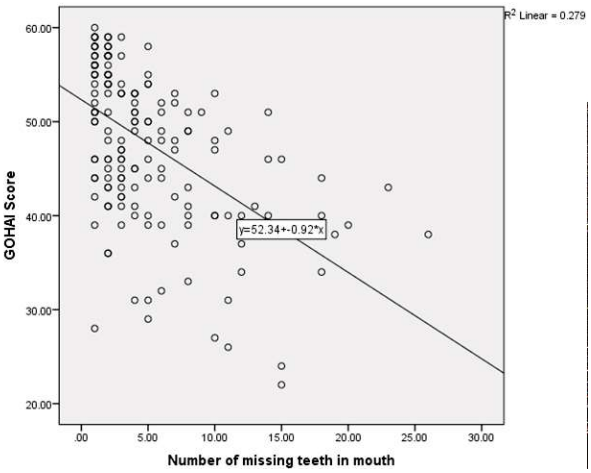

Fig 1: Scatter chart demonstrating correlation of number of missing teeth and GOHAI score

Table 1: Descriptive Statistics of Age, missing teeth & GOHAI

	N	Range	Minimum	Maximum	Mean	Std. Deviation
Age	177	15.00	30.00	45.00	35.7458	5.83171
Number of missing teeth in mouth	177	25.00	1.00	26.00	4.9153	4.78974
GOHAI Score	177	38.00	22.00	60.00	47.8192	8.33810

Table 2: Linear regression analysis of GOHAI with Number of missing teeth & age.

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B	
	B	Std. Error	Beta			Lower Bound	Upper Bound
(Constant)	42.967	3.282		13.092	.000	36.490	49.445
Age	.276	.094	.193	2.932	.004	.090	.461
Number of missing teeth in mouth	-1.017	.114	-.584	-8.887	.000	-1.243	-.791

DISCUSSION

Teeth are the main component of oral health. Their intactness and presence is very much needed to perform different oral functions. This study was mainly focused on relation between OHRQoL and NMT, irrespective of region of missing teeth. A study conducted by Khan SU demonstrated that a single tooth missing in anterior region has more adverse influence on OHRQoL than a single tooth missing in posterior region[15].

This study demonstrated that OHRQoL is substantially correlated with NMT. There was a strong negative correlation of GOHAI with increase in NMT ($r = 0.53$, $p<0.01$) This has been demonstrated by other studies such as conducted by Vishal Singh[17].

According to our study mean GOHAI score was 47.8(±8.34). These findings are consistent with those reported by Othman WN et al conducted in Malaysia where this was 46.2(±9.7) although the participants mean age was 67 years (SD 5.5)[10]. Another study conducted in Poznan, Poland the mean GOHAI was 48.9 (±8.2) which is also in line with our study results[18]. GOHAI score in this study was higher than North Jordan (40.9) as reported by Daradkeh S and their mean age was 33.4±13.2 .Our study's mean GOHAI was also higher than another study by reported by Momen A Atieh (Saudi Arabia) where mean GOHAI score was 32.1 (± 12.2)[12,19]. The differences in mean GOHAI score among our study and their studies may be due to cultural differences and NMT per subject, although mean age of participants of both studies (Daradkeh S and Momen A Atieh) was almost similar to mean age of participants in our study.

According to some studies age has been observed a crucial factor affecting OHRQoL. That's why for purpose of this study young age group subjects were selected to control confounder in this study where age rang was from 30 years to 45 years. Usually in this age group a person is young, energetic, usually free of chronic diseases, has selected a profession and is not dependent on others.

There was a strong negative correlation between NMT and GOHAI score. So the more the teeth are missing suggests more the negative effect on OHRQoL. Linear regression analysis showed that one unit increase in NMT would decrease the GOHAI by 1.017 unit (95% CI: −1.24 to −0.79, $p<0.001$). In this study most affected quality of life dimension was discomfort when eating any kind of food reported by 120 (68%) patients, and these results are consistent with a study conducted by Mika Inukia[20].

There was a weak (small) correlation between age and NMT ($r=0.29$). So age is not a good predictor of missing teeth. The reason may be that in our study there was not much variation in age of participants (30 to 45 years).

In our study there was almost no relation between age and GOHAI score ($r=0.022$) and again the reason may be that there was not much variation in age of the participants. As stated by Mohamad Fuad at el, gender has influence on OHRQoL; however in this study no association was found with gender[21].

The OHRQoL is a multidimensional construct that captures subjective concept of oral health. It will help for the development of any oral health programme. Moreover, oral health care providers are encouraged to incorporate the OHRQoL concept into practice to improve the results of their services.

LIMITATIONS

This study was conducted in prosthodontic department where patients come for the replacement of missing teeth and this behavior shows their interest and care about OHRQoL. If it would be conducted outside the hospital they would provide more generalized and maybe different results.

CONCLUSION

Missing teeth has strong negative correlation with OHRQoL irrespective of age or gender. On basis of these results we can conclude that replacement of missing teeth is necessary to improve OHRQoL. But Prosthodontic treatment is very expensive all over the world. Although Sehat Insaf Card facility is an insurance programme for all citizen of Khyber Pakhtunkhwa but this facility is only for admitted patients in hospital, that's the reason Prosthodontic treatment is not covered in it. So it is suggested that government should implement coverage of Prosthesis in Sehat Card insurance. Also dental personals should educate general population to protect their teeth by conducting awareness programmes.

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CONFLICT OF INTEREST
Authors declare no conflict of interest.
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AUTHORS' CONTRIBUTION

The following authors have made substantial contributions to the manuscript as under:

Conception or Design:	SUK, FAH,EK, MR
Acquisition, Analysis or Interpretation of Data:	SUK, FAH,EK, MR
Manuscript Writing & Approval:	SUK, FAH,EK, MR

All the authors agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.