Impact of Missing Teeth on Oral Health Related Quality of Life and Demand for Removable Dentures among Adults in Riyadh-KSA.

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ABSTRACT

Background: Removable partial dentures (RPD) satisfaction has multifactorial aspects including technical and patient-related variables. Comfort, masticatory efficiency, esthetics, and retention appear to be the most essential factors for prosthesis acceptance. The patient's personality, attitude towards RPDs, prior experience, and motivation are all factors that can influence general satisfaction.

Objective: This study was designed to assess the acceptance of removable partial denture among partially edentulous patients in Saudi Arabia.

Material & Methods: A Cross-Sectional survey mailed through Questionnaire among Partially Edentulous Patients in Riyadh would be conducted during the month of June 2021after obtaining approval from Institutional Review Board. Stratified Random sampling method will be employed. Study subject's voluntary participation and confidentiality will be ensured. The questionnaire for the present study was developed by review of literature and expert opinion. The study subjects background, knowledge of Removable partial denture, acceptance/ priority in treatment / Opinion and Perceived barriers towards Removable partial denture will be assessed by means of a structured close ended questionnaire. This questionnaire is subjected to modification after pilot test. The Statistical analyses of collected data would draw logical and scientific study inferences.

Results: Results of the study revealed that there was no significant difference (p values > 0.05) between the mean GOHAI and demographic factors (gender p = 0.742, age p = 0.461, economic status p = 0.087 and education p = 0.857) and perceived oral health status rating p = 0. 130.GOHAI score was found to be significantly affected by tooth and gum status almost one-third of the participants cleaned their

teeth twice daily. Heard of options for replacing missing teeth/tooth shows that the awareness of implant was 88% out of a population. Most of our sample prefers the RPD as a third option.
Conclusion: There is a need of education and motivation of the patients among the province about prosthodontic treatment modalities. As the education level among the ageing population is low, proper educating tool has to be developed to make them understand easily.
Keywords: Missing Teeth, Removable Dentures, Riyadh Adults, Questionnaire Survey.

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INTRODUCTION:

Facial esthetic appearance, speech, and mastication can be negatively affected by tooth loss. The use of suitably designed prostheses to replace lost teeth is in high demand, and it is essential to preserve a good health status and improve quality of life. [1] There are varieties of treatment modalities available for the rehabilitation of partially edentulous patients. These include implant-supported prostheses, fixed partial dentures, and removable partial dentures (RPDs) [2,3]. However, due to general and/or oral limitations, financial issues, and patient preferences, the option of dental implants can be difficult to implement [4]. RPDs may be preferred over fixed prosthesis for a variety of reasons, in addition to overcoming the financial limitations, they facilitate hygiene access and overcome biomechanical issues associated with dental implants [5].

From a professional perspective, partial dentures have the ability to prevent unwanted teeth movement (overeruption/drifting), the burden of occlusal loading on remaining natural teeth is reduced, and oral comfort and function is improved [6]. RPDs satisfaction has multifactorial aspects including technical and patient-related variables [7,8]. Comfort, masticatory efficiency, esthetics, and retention appear to be the most essential factors for prosthesis acceptance[8]. The patient's personality, attitude towards RPDs, prior experience, and motivation are all factors that can influence general satisfaction [9].

This study was designed to assess the acceptance of removable partial denture among partially edentulous patients in Saudi Arabia.

AIM AND OBJECTIVES:

This study was designed to assess the Impact of Missing Teeth on Oral Health Related Quality of Life and Demand for Removable Dentures among Adults in Riyadh-KSA.

MATERIAL AND METHOD:

1. Study Area: The presented study will be conducted in Riyadh, KSA
2. Study Subject: Patient with missing teeth in Riyadh-KSA are the sampling units. Nonprobability Convenient sampling method will be employed. Study subject's voluntary participation and confidentiality will be ensured.
3. Study Design: Cross sectional close ended mailed Questionnaire based survey of adult population sample in Riyadh.
4. Study Period: After obtaining approval from The Institutional Review Board during the month of June 2021.
5. Data collection:The questionnaire (https://docs.google.com/forms/d/e/1FAIpQLSfnkTN8Um4Su-78rxIdWbJsDT3eMcUqoKe_jEXDVIfSCbVktg/viewform?usp=sf_link) for the present study is developed by review of literature and expert opinion. The study subjects background, perceived oral health status and rating, GOHAI[10] 12 questions, Oral health behavior comprising of oral hygiene and Dental Visits, Questionnaire on self-reported missing tooth status and demand for Removable Denture Treatment Options.

Subject's responses to each of the 12 items of the General Oral Health Assessment Index [GOHAI] questionnaire determine the impact of missing teeth on Oral Health Related Quality of Life [OHRQoL]. GOHAI was developed by Atchinson and Dolan in 1990 and renamed by Atchinson in 1997so as to enable its use in all adults. The 12-items of GOHAI are grouped into three fields including. Functional field (eating, speaking and swallowing),

psychological field (concern about oral health, dissatisfaction with appearance, self-conscious about oral health and avoidance of social contacts because of oral problem) and pain or discomfort field (drugs, gingival sensitivity, teeth sensitivity, discomfort when chewing certain foods). The responses from the participants will be recorded on a 5-point Likert (1= always, 2=often, 3=sometimes, 4=seldom; 5=never). Responses to statements items 3, 5 and 7 are reverse scored. The method used in this study will be cumulative method (GOHAI-Add), which consist of summing up the scores obtained for each of the 12 GOHAI questions / statement. Using these cumulative (GOHAI-Add) score, 60 is the maximum score. A high score of GOHAI indicates better Oral Health Related Quality of Life. The OHRQoL of subject is taken as good when the GOHAI score ranged 57-60, average when 51-56 and poor when <50.

Knowledge of Removable denture, acceptance/ priority in treatment / Opinion and Perceived barriers towards Removable partial denture will be assessed by means of a structured close ended questionnaire. This questionnaire is subjected to modification after pilot test.

Sample size was 300 study subjects. The online questionnaire's validity will be examined by testing on approximately 10 % of study population on randomly selected patient distributed electronically using a link generated by google format.

Inclusion and Exclusion Criteria will be Patients who have missing teeth, older than 18 years and were willing to participate will included in this study. Patients who do not have missing teeth and those who were not willing to participate will be excluded from this study.

6. Data management and statistical methods: Data will be entered and analyzed using Statistical Package for Social Sciences (SPSS) A descriptive analysis of data will be followed by inferential statistics. Chi square and Fisher's exact tests will be used for comparison of categorical data. A p value of ≤ 0.05 at 95% CI will be considered as statistically significant

RESULTS:

Statistical analysis

All the data were analyzed using statistical analysis software (IBM-SPSS version 25, Armonk, NY: USA). Descriptive statistics of frequency distribution, percentages, mean (SD), and mean ranks were calculated. Mann-Whitney U and Kruskal-Wallis tests were applied to compare the overall GOHAI Score across different demographics and oral health variables. A value of $p<0.05$ was considered significant for all the statistical tests.

Table 1: Demographic information (N=359)

		n	%
Gender	Male	135	37.6%
	Female	224	62.4%
Age	18-35	111	30.9%
	36-50	168	46.8%
	>50	80	22.3%
Economic_Status	Lower	63	17.5%
	Middle	271	75.5%
	High	25	7.0%
Education	Illitrate/Read and Write	5	1.4%
	Primary	7	1.9%
	Intermediate	17	4.7%
	Secondary	102	28.4%
	University	228	63.5%

OralRating	Yes	254	70.8%
	No	92	25.6%
	Dont know	13	3.6%
Toothstatus	Very Poor	4	1.1%
	Poor	20	5.6%
	Average	73	20.3%
	Good	128	35.7%
	Very Good	111	30.9%
	Excellent	23	6.4%
Gumstatus	Very Poor	6	1.7%
	Poor	14	3.9%
	Average	54	15.0%
	Good	119	33.1%
	Very Good	103	28.7%
	Excellent	63	17.5%

Inference:

Demographic information was displayed in Table 1. Data were collected from 359 participants in whom more than half participants were female 224 (62.4%). The majority were in middle age which present (46.8%), most of them have middle economic status (75.5%), and university education (63.5%). 254 (70.8%) of the participants complained of tooth pain and discomfort during the past 12 months. Self-reported tooth and gum status suggested that more than 30% of them had good teeth and gum health.

Table 2: Distribution of the GoHAI score

GOHAI-Items	Always 5	Often 4	Sometimes 3	Seldom 2	Never 1
How often did you limit the kinds or amounts of food you eat because of problems with your teeth?	4	19	160	117	59
	1.1%	5.3%	44.6%	32.6%	16.4%
How often did you have difficulty biting or chewing any kinds of food, such as firm meat or apples?	13	29	136	110	71
	3.6%	8.1%	37.9%	30.6%	19.8%
How often were you able to swallow comfortably?	88	71	93	41	66
	24.5%	19.8%	25.9%	11.4%	18.4%
How often have your teeth prevented you from speaking the way you wanted?	11	17	75	104	152
	3.1%	4.7%	20.9%	29.0%	42.3%
How often were you able to eat anything without feeling discomfort?	72	117	111	41	18
	20.1%	32.6%	30.9%	11.4%	5.0%
How often did you limit contacts with people because of the condition of your teeth?	8	16	71	110	154
	2.2%	4.5%	19.8%	30.6%	42.9%
How often were you pleased or happy with the look of your teeth	76	103	85	52	43
	21.2%	28.7%	23.7%	14.5%	12.0%

and gums?					
How often did you use medication to relieve pain or discomfort from around your mouth?	18	28	126	120	67
	5.0%	7.8%	35.1%	33.4%	18.7%
How often were you worried or concerned about the problems with your teeth, gums?	49	56	104	101	49
	13.6%	15.6%	29.0%	28.1%	13.6%
How often did you feel nervous or self-conscious because of problems with your teeth, gums?	28	44	115	94	78
	7.8%	12.3%	32.0%	26.2%	21.7%
How often did you feel uncomfortable eating in front of people because of problems with your teeth?	16	23	84	112	124
	4.5%	6.4%	23.4%	31.2%	34.5%
How often were your teeth or gums sensitive to hot, cold or sweet foods?	28	36	123	122	50
	7.8%	10.0%	34.3%	34.0%	13.9%
The scores were maintained for all items except 3, 5, and 7 (Scores reversed). Score range 0-60 Mean(SD)=42.56(7.79), Minimum=12 and Maximum=60.					

Table 3: Comparison of mean GOHAI Score across different demographic and oral health status categories

Variables		Mean	SD	Mean rank	p
Gender	Male	42.83	8.34	182.32	0.742
	Female	42.40	7.45	178.60	
Age	18-35	43.14	8.00	183.62	0.461
	36-50	41.89	7.67	173.09	
	>50	43.15	7.71	189.48	
Economic Status	Lower	41.67	8.53	169.52	0.087
	Middle	42.45	7.52	178.53	
	High	46.00	8.10	222.40	
Education	Illitrate/Read and Write	43.20	10.85	174.40	0.857
	Primary	40.57	5.13	148.00	
	Intermediate	41.88	8.70	168.88	
	Secondary	41.85	8.96	175.97	
	University	42.97	7.16	183.74	
Perceived oral health status rating	Yes	41.97	7.73	173.33	0.130
	No	44.27	7.97	198.80	
	Dont know	42.00	6.14	177.27	
Tooth status	Very Poor	36.00	3.37	76.63	**<0.001**
	Poor	33.80	7.63	73.83	
	Average	38.15	6.74	119.32	
	Good	42.91	6.78	186.48	
	Very Good	45.09	6.61	213.72	

	Excellent	51.13	7.07	284.09	
Gums tatus	Very Poor	36.50	3.08	82.92	**<0.001**
	Poor	34.64	11.51	102.82	
	Average	40.02	6.59	145.30	
	Good	41.66	6.91	169.95	
	Very Good	44.06	7.48	195.74	
	Excellent	46.33	7.65	229.40	

Inference:

This table shows the comparison of mean GOHAI Score across different demographic and oral health status categories. There is no significant difference (p values > 0.05) between the mean GOHAI and demographic factors (gender p = 0.742, age p = 0.461, economic status p = 0.087 and education p = 0.857) and Perceived oral health status rating p = 0.130. However, the effect of tooth and gum status were statisticaly significant where p values <0.001.

Table 3a: How often you clean your teeth

Frequency	n	%
Never	17	4.7%
Once a week	43	12.0%
2-6 times a week	27	7.5%
Once a day	162	45.1%
Twice or more a day	110	30.6%
Total	359	100.0%

Table 3b: Multiple response analysis for the use of oral hygiene aids

	Responses		
	N	Percent	Percent of Cases
Toothbrush	330	48.5%	91.9%
Wooden toothpick	79	11.6%	22.0%
Plastic toothpick	56	8.2%	15.6%
Dental floss	96	14.1%	26.7%
Charcoal	5	0.7%	1.4%
Miswak	114	16.8%	31.8%
Total	680	100.0%	189.4%

Table 3c: Utilization of dental care

Utilization of dental care		n	%
Last visit to dentist	Less than 6 months.	134	37.3%
	6–12 months.	94	26.2%
	More than 1 year but less than 2 years.	114	31.8%
	Never received dental care.	17	4.7%
Reason for last Visit	Pain or trouble with teeth, Gums or mouth	196	54.6%
	Treatment for missing teeth	68	18.9%

	Routine check-up/treatment/ follow up	77	21.4%
	Don't know/don't remember	18	5.0%

Inference:

When they asked about how often they clean their teeth, almost half of the participants (45.1%) reported once a day and 30.6% twice or more a day (Table **3a**). Regarding the use of oral hygiene aids, the majority of them (91.9%) were used the toothbrush to clean their teeth, while only a few of them were used miswak, dental floss and wooden toothpick as cleaning aids with the percentages of 31.8%, 26.7% and 22% respectively (Table **3b**). Regarding their last dental visit, 4.7% of them were never received dental care while 37.3% were within 6 months. In more than half (54.6%) of the participants, the pain or trouble with teeth and gum were the reason for their last visit to the dentist while only a few of them (21.4%) was for a routine check-up (Table **3c**).

Questionnaire on self-reported missing tooth status and Removable Denture

Table 4: Questionnaire on self-reported missing tooth status and Removable Denture

		Count	Column N %
Number of natural teeth	No natural teeth	8	2.2%
	1–9 teeth	49	13.6%
	10–19 teeth	114	31.8%
	20 teeth or more	188	52.4%
	Total	359	100.0%

Relationship of number of missing teeth and GOHAI score for the above table..

Among the self-reported missing tooth status in the study population, most of them lost more than twenty teeth (52.4%), while the lowest was seen in participant with no natural teeth (2.2%). See table 7 for more details.

Table8: Heard of options for replacing missing teeth/tooth

		n	%
Ever heard of following options for replacing missing tooth/ teeth?	RPD	271	75.5%
	FPD	307	85.5%
	Implants	316	88.0%
Do you wear any Removable Dentures?	Yes	42	11.7%
Replacing_UpperTeeth	Yes	45	19.0%
Replacing_LowerTeeth	Yes	40	16.9%
Both	Yes	32	14.2%
FullCd_UPPer	Yes	29	13.0%
FullCD_Lower	Yes	17	7.6%
RPD_reason_comfortable	Yes	141	39.3%
Maintainance_followup	Yes	162	45.1%
Easy to do	Yes	151	42.1%
Demand for the replacement of missing teeth according to			

Prioritized Demand for the replacement of missing teeth according to number of missing teeth

Number of missing teeth	Prioritized Demand for replacement of missing teeth			
	RPD	FPD	IMPLANTS	NONE
1-9				
10-19				
20 or more				

Table 9 The demand for the replacement of missing teeth according to the position of saddle in upper arch

Upper arch Kennedy	None	RPD (removable partial dentures)	TS (tooth supported) bridges	Implants	TS bridges and implants	Percentage requested fixed prosthesis	Percentage requested replacement
CI (Class I)	0	22	3	6	4	37	100
CII (Class II)	6	16	14	14	8	62	98
CIII (Class III)	32	61	37	2	9	34	77
CIV (Class IV)	0	2	1	1	0	50	100

Individuals of Maxillary Kennedy class I, II and IV were more interested in getting missing teeth replaced than class III individuals. A higher number of class II and IV individuals were keener on fixed options for replacing missing teeth than the other two classes

Table 10 The demand for the replacement of missing teeth according to the position of saddle in lower arch

Lower arch Kennedy	None	RPD	TS bridges	Implants	TS bridges and implants	Percentage requested fixed prosthesis	Percentage requested replacement
CI	6	36	8	12	8	40	91
CII	7	28	13	28	12	66	92
CIII	27	45	40	6	5	23	71
CIV	0	0	1	1	0	100	100

Individuals of Mandibular Kennedy class I, II and IV were more favorable towards the replacement of missing teeth than class III individuals. All class IV participants were interested in fixed prostheses as the option of replacement

Table 5 shows the Heard of options for replacing missing teeth/tooth. Most of the population was aware with the three options of replacement of missing tooth, with the highest percentage for implant (88%), and lowest for RPD (75.5%). Among them there was (11.7%) wear Removable Dentures, (19%) of them were Replacing only some of the upper teeth. While (7.6%) were replacing all the lower teeth. The questioner shows that the reason for choosing RPD was mostly for its Maintenance and follow-up (45.1%), while immediately followed by easy to do with (42.1%), and for it's comfort it was (39.3%).

Table 5: Removable denture-related concerns among study participants

		n	%
You desire to prioritize the treatment of Removable Denture)	First	150	41.80%
	Second	133	37.00%
	Third	197	54.90%
Perceived factors while choosing Removable denture	Accuracy	303	84.40%
	Efficiency	289	80.50%
	New Technology	257	71.60%
	Painless treatment	268	74.70%
	Few appointments	232	64.60%
	Cost	285	79.40%
What would lead you to change your interest to Removable Denture?	Cost	253	70.50%
	Appointment frequency	200	55.70%
	Unresolved problem	287	79.90%
Dentist explained the treatment plan	Yes	239	66.60%

Removable denture-related concerns among study participants shows that most of the population (54.9%) will chose the treatment of Removable Denture as the third choice, and they focused on accuracy (84.4%), efficiency (80.5%), and cost (79.4%), while lest factor was the few appointments (64.6%). The questioner shows that most of the population will choose RPD if there was no alternative solution to their case (79.9%). Among the people who have the RPD there was only (66.6%) who received Dentist explained in the treatment plan (Table 9).

DISCUSSION:

Understanding and analyzing the factors that influence Oral Health Related Quality of Life (OHRQoL) of population is the most important thing to improve the oral health of the people[10]. Hence,this study is designed to assess the impact of missing teeth on oral health related quality of life and demand for removable dentures among adults in Riyadh-KSA.

The Geriatric Oral Health Assessment Index (GOHAI) was used as a well-validated instrument for the detection of oral quality of life[11].

Results of the study revealed that there was no significant difference (p values > 0.05) between the mean GOHAI and demographic factors (gender p = 0.742, age p = 0.461, economic status p = 0.087 and education p = 0.857) and perceived oral health status rating p = 0.130. On the other hand, similar study conducted in 2018 has shown that males have significantly higher mean scores of pain and discomfort and overall GOHAI scores compared to the females[10]. Moreover, clear socioeconomic inequality in oral health among elderly can be considered as one of the contributing factors for poor OHRQoL among elderly[12]. Thus, the relationship between sociodemographic factors and OHRQoL is not clear-cut[13].

In our study, GOHAI score was found to be significantly affected by tooth and gum status. This finding is similar to study by Jain M *et al.*, in which reports have also shown correlation between the natural teeth health and OHRQoL. In addition, many other studies concluded that periodontal diseases are associated with a worse health-related quality of life, and this impact increases with disease severity [14].

Based on our study, almost one-third of the participants cleaned their teeth twice daily. Similarly, among university student 39.4% where researchers from Jeddah showed that male students cleaned their teeth twice. [15] in addition, the majority of participants 91.9% were use toothbrush to clean their teeth, while only few of them were use miswak, dental floss and wooden toothpick as cleaning aids.

Regarding the percentage of last dental visit, 37.3% of participants had receive dental care within 6 months, while 4.7% had not receive any dental care. The main reason of last dental visit was pain or trouble with teeth and gum 54.6%, while only a few of participants 21.4% were for a routine check-up. This result was similar to large household survey in 2013 among adults where The Saudi Health Information Survey reported that 48.6% of participants visited for a complaint, whereas 11.5% ofthem visited a dental clinic for a routine check-up.[16]

The result of the Questionnaire on the Heard of options for replacing missing teeth/tooth showsthat the awareness of implant was 88% out of a population consists of 359, comparing it with the study that conducted in Sri Lanka(Berge IT 2000)[17] and India(Kuzhalvaimozhi, P. 2020)(18) respectively it was 32% and 38%, it may be due to the educational and background of the deferent culture.

There were (56.5%) of our population using partial RPD, which coincide with Finland, where full dentures (14.2%) which lower than Finland (12% out of 30) in Suominen (2008)[19], and India (19%)as in Naik (2020)[20].

In this study most of our sample prefer the RPD as a third option in their treatment plan, on the other hand there was a study conducted in Jazan region KSA, that concluded about 50% of (N-467) will go for RPD for replacing the missing teeth, and no patient willing to replace with implants (R. Naveen Reddy 2016)[21]. The reason for this deferent it could be due to the deferent in the income level between the two regions, and the high awareness that can be observed in our subject of the deferent treatment chooses.

CONCLUSION:

Despite these limitations, Of the factors analyzed in this study, denture satisfaction was the strongest predictor of OHRQoL , will chose the treatment of Removable Denture as the least , the study results also revealed that there is a need of education and motivation of the patients among the province about prosthodontic treatment modalities. As the education level among the ageing population is low, proper educating tool has to be developed to make them understand easily.

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