



OPEN The effect of students' attitudes towards elderly patients on satisfaction with removable complete dentures

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Elderly patient satisfaction with removable complete dentures (RCDs) is challenging. One important influencing factor is the interpersonal relationship formed during the treatment. This study investigates student-patient relationship when fabricating RCDs. It assesses the effects of dental students' attitudes towards elderly people on patient satisfaction. This is a prospective longitudinal study of completely edentulous patients, aged 50 years and over, who received at the end of treatment newly RCDs fabricated by undergraduate students. All RCDs were objectively evaluated by expert examiners, and only those given high ratings, scoring above 80%, were included ($N = 533$). Students' attitudes towards elderly people were assessed using the Kogan's scale (KAOP). Patient satisfaction was assessed by the visual analogue scale (VAS) after one month of using the dentures. A weak-positive but significant correlation was found between students' scores on the KAOP scale and elderly patient satisfaction with the dentures. Patient satisfaction with their RCDs was significantly higher when treated by student groups with positive/slightly positive attitude. Students' attitudes toward elderly people reflected their behavior and communication while treating elderly patients. That, in turn, affected patient satisfaction with the dentures, indicating that the dentist-patient relationship is a significant influencing factor. Differences in elderly patient satisfaction with good quality RCDs fabricated by undergraduate students can be attributed to students' attitudes toward elderly people; the more-positive students attitudes, the higher patient satisfaction.

Keywords Attitudes, Elderly people, Dental students, Patient satisfaction, Removable complete dentures

Removable complete dentures (RCDs) are the most widely used prosthetic treatment option to manage complete teeth loss¹, but not always the most favored by patients. Many elderly edentulous patients may be dissatisfied with the dentures and do not wear them², indicating that the treatment outcome was subjectively unsuccessful, as opposed to the dentist's objective assessment. Thus, in clinical practice, successful treatment with RCDs is a challenge for every dentist³.

It is well known that satisfaction with RCDs differs among patients even when the dentures may be of similar technical quality. These differences have been attributed to the influence of complicated clinical and psychological factors, not related to the quality of the denture itself, e.g. the patients' personality traits, self-perception, pre-treatment expectations, and interactions with their dentists²⁻⁶.

During treatment visits, a crucial relationship is formed between the patient and the dentist. This interpersonal relationship is especially important while fabricating RCDs. It is affected by many factors, such as the dentist's behavior and communicating skills with the patients (especially with elderly ones). It impacts the patient's personality and psychologic reactions, which eventually leads to improved patient satisfaction with RCDs^{2,7,8}.

Also, the patient-dentist relationship could greatly depend on the latter's attitudes, as attitudes predispose and influence behaviors⁹. Hence, attitudes towards elderly people may not always be positive. Many negative thoughts were reported toward the elderly across different societies¹⁰. For instance, believing that elderly patients pose an extra burden on the health care systems because they are fragile, disabled, slow, forgetful and inevitably sick¹¹. Such negative attitudes may eventually result in negative behaviors¹². About 73.4% of Brazilian dentists reported that they do not treat the elderly patients¹³, and only 16.8% of Saudi Arabian dental students felt comfortable dealing with this group¹⁴.

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Approximately, 95.5% of the studies found significantly worse health outcomes among elderly patients due to the negativism they had experienced¹⁵. On the other hand, significantly higher patient satisfaction was related to treatments by physicians with positive behaviors⁷. However, few data could be found indicating whether dentist attitudes affect the dentist-patient relation while fabricating RCDs, thus reducing or increasing elderly patient satisfaction with the treatment.

To the best of our knowledge, this is the first study that has attempted to explain the differences in elderly patient satisfaction with good quality RCDs, by relating this to the attitudes of the students who fabricated the RCDs.

This study aims to: 1- Examine the relationship between student attitudes towards elderly patients and patient satisfaction with RCDs. 2- Determine if there are any significant differences in patient satisfaction with RCDs among student attitude groups.

The null hypothesis states that there is no significant correlation between student attitudes and patient satisfaction with RCDs, and that no significant differences in patient satisfaction exist among student attitude groups.

Materials and methods

Study design

A prospective longitudinal study was designed. The World Health Organization formula was used to calculate the sample size ($n = 400$) with a 95% power and 0.05 level of significance¹⁶. The trial was conducted in accordance with the declaration of Helsinki, authorized by the research ethics committee of the Faculty of Dentistry at Damascus University on 23-8-2021 (2494).

The recruitment of participants took place over four academic terms in the university, starting from 26-9-2021 to 8-6-2023, until the number of participants exceeded the required sample size. Eight hundred completely edentulous patients attended the Department of Removable Prosthodontics during that period of time wishing treatment with RCDs. They were all selected sequentially and examined by the same MSc. supervisor to permit clinical-stage students to initiate fabricating RCDs for them.

The inclusion criteria for the patients in this study were: 1- aged 50 years and elderly. 2- only little to mid-alveolar ridge resorption. 3- normal jaw relations (Class I). 4- adequate inter-arch distance (15–20 mm at least). 4- have not worn RCDs previously. 5- would receive at the end of treatment newly fabricated RCDs that must score at least 80% in the objective evaluation to eliminate any confounding variables related to dentures with poor quality. All patients that did not satisfy the inclusion criteria were excluded.

Intervention

The patients in this study were given personal ascending ID numbers respectively to link each one of them with an attending student, and they were followed up during the whole treatment period and after one month of the delivery of dentures.

Students' attitudes towards elderly people were measured immediately before contacting the elderly patients, using Kogan's scale (KAOP). This consists of 34 statements each with 6-graded responses from "strongly disagree" to "strongly agree". The KAOP scale has a possible range of scores between 34 and 238; the higher the student scores, the more positive their attitudes are towards the elderly, and vice versa¹⁷. A score of 136 represents neutral attitudes^{18,19}. According to the scores of this scale, students' attitudes were divided into seven groups (very negative, negative, slightly negative, neutral, slightly positive, positive and very positive)²⁰. A validated Arabic-translated version of the KAOP scale was used in this study²¹. Each student was asked to fill in a printed form of the KAOP scale anonymously, and only write their patient's ID number on it; in order to link it afterwards with the same-patient assessment forms. The KAOP scales were recorded, and the final KAOP score for each student was calculated by summing the grades of all the phrases.

The students took about 1–2 months to finish the treatment. Upon completion, all RCDs were objectively examined by two MSc. expert prosthodontists using Smith's evaluation²². The inter-examiner reliability between the two examiners was tested using Cohen's kappa test. The examiners were not told the patient's or the student's name but only the ID number of the examined case. Each examiner put a mark (out of 34) for denture success, the median of the two marks was taken, and then the percentage of success was calculated. The examined cases scoring a percentage of less than 80% were excluded. Written informed consents for participation in the study were collected from both of students and patients.

Each patient's overall satisfaction with RCDs was assessed using a printed form of the visual analogue scale (VAS); a straight horizontal line with numerical gradations on it from 0 to 100 and terms expressing satisfaction. The extreme values (0/not satisfied at all – 100/maximum degree of satisfaction) were on the left and right ends of the scale respectively²³. VAS assessments were anonymous as the patients were asked to write down only their ID numbers and choose a point along the line expressing their satisfaction during the delivery appointment, the follow-up after one week, and finally after one month of using the newly fabricated RCDs. To ensure the patient adapted to the dentures and reported an accurate and reliable score, the final VAS evaluation was carried out after one month of wearing RCDs.

Data analysis

SPSS 26.0 (IBM) was used for data analysis. Kolmogorov-Smirnov test was used to test the normality of data distribution. Spearman's correlation coefficient was calculated to assess the nature and strength of the correlation between students' attitudes and elderly patient satisfaction with RCDs. Kruskal-Wallis test was used to test if differences in patient satisfaction among different attitude groups were significant. The Mann-Whitney test was

Variable		n (%)		Range		Total Mean	Standard deviation (SD)
Student attitudes towards elderly people	Very negative	0	0	81	192	139.63	17.18
	Negative	9	1.69				
	Slightly negative	192	36.02				
	Neutral	22	4.13				
	Slightly positive	290	54.41				
	Positive	20	3.75				
	Very positive	0	0				
Elderly patient satisfaction with RCDs		533	100	20%	100%	93.26%	10.37

Table 1. Descriptive statistics for the variables.

Spearman’s correlation		
Elderly patient satisfaction with RCDs	Student attitudes towards elderly people	
	Correlation Coefficient	0.19
	p-value	0.00***

*** Highly significant

Table 2. Correlation between student attitudes towards elderly people and patient satisfaction with RCDs.

applied to test possible differences between each pair of attitude groups. P-values of less than (0.05) were set to be statistically significant.

Results

Out of 800 patients, a total of 533 were ultimately included in this study (N= 533). Cronbach’s alpha coefficient was calculated for the translated version of the KAOP scale, and its value reached about (0.854); indicating internal consistency and reliability.

Cohen’s kappa test results for Smith’s evaluation showed a high level of inter-rater agreement ($\kappa = 0.91$), which indicated a strong reliable quantitative assessment of RCDs quality for patients between the two examiners.

Students’ scores on the KAOP scale ranged between 81 and 192 out of 238. The mean (139.63 ± 17.18) was higher than the neutral score of 136; which indicated slightly positive attitudes towards elderly people. Based on their scores on Kogan’s scale, students were divided into only five attitude groups (negative, slightly negative, neutral, slightly positive, and positive), which were ordered ascendingly (Table 1).

Most patients, in general, were very satisfied with their newly fabricated dentures after one month of using them. The lowest satisfaction percentage reported by patients on the VAS scale was 20%, and the highest was 100% (Mean: $93.26\% \pm 10.37$) (Table 1).

The results of the Spearman correlation testing the correlation between students’ attitudes and elderly patient satisfaction with RCDs, indicated a weak, positive, and significant correlation ($p < 0.001$) (Table 2).

The means of patient satisfaction with RCDs for student attitude groups (negative, slightly negative, neutral, slightly positive, and positive) were approximately in ascending order (87.78, 89.73, 95.68, 95.40, and 96 respectively) (Table 3). The results of Kruskal-Wallis test revealed that differences in patient satisfaction among student attitude groups were significant ($p < 0.001$) (Table 3). The findings of Mann-Whitney test indicated that significant differences in patient satisfaction were found between each of the following students’ attitude groups: negative versus slightly positive, negative versus positive, slightly negative versus slightly positive and slightly negative versus positive, with respective p- values 0.013, 0.044, 0.00, and 0.027 respectively (Table 4).

Discussion

Given that there was a significant correlation between student attitudes and patient satisfaction with RCDs, and that patient satisfaction with their RCDs was significantly higher when treated by student groups with positive/ slightly positive attitudes, the null hypothesis was rejected.

Attitudes are the foundation of how the individual thinks, feels, and acts about someone or something⁹. They are particularly important in healthcare for elderly patients, because positive attitudes towards elderly patients

Student attitudes towards elderly people	Elderly patient satisfaction with RCDs (%)	N	Kruskal-Wallis test statistics for patient satisfaction with RCDs			
	Mean \pm SD		Mean Rank	Kruskal-Wallis H	Df	Sig.
Negative	87.78 \pm 11.49	9	175.00	26.43	4.00	0.00***
Slightly negative	89.73 \pm 13.96	192	230.43			
Neutral	95.68 \pm 5.83	22	285.52			
Slightly positive	95.4 \pm 6.74	290	289.87			
Positive	96 \pm 6.61	20	307.40			

*** Highly significant

Table 3. Kruskal-Wallis test testing possible differences in patient satisfaction in different student attitude groups.

mean choosing to work more with them, and taking care of them better²⁴. In addition, the health outcomes of elderly patients are adversely affected by the younger people's negativism¹⁵. In accordance with results of other studies^{24–26}, undergraduate students had slightly positive attitudes (Mean: 139.63 \pm 17.18) prior to contact with elderly patients or working with them (Table 1).

A total of 533 completely edentulous patients, aged ≥ 50 years, presently treated by dental students with different attitudes and provided with RCDs of good qualities (at least 80% successful according to the objective assessments), were prospectively followed-up.

In general, the patients in this study accepted their newly inserted complete dentures well and were using them satisfactorily. The mean satisfaction VAS score was (93.26% \pm 10.37), which indicated promising results of patients' well-adapting to RCDs fabricated by undergraduate students, similar to the results of a previous study that found elderly patients to be more significantly satisfied with student-fabricated RCDs than with those fabricated by expert prosthodontists²⁷.

Other studies emphasized the importance of multiple factors in patient satisfaction other than the dentist's experience; satisfaction with RCDs is how the patients subjectively evaluate their dentures and accept them; it is what every dentist aspires to and aims to reach at the end of the treatment. It differs among patients according to multiple personal and psychological variables^{2,8,27,28}.

This was the first study to examine the impact of attitudes towards elderly patients on patient satisfaction with the treatment. A weak, positive, and statistically significant correlation was found between scores on the KAOP scale, which represented student attitudes towards elderly people, and elderly patient satisfaction with RCDs; indicating that the elderly patient was significantly more satisfied with highly rated RCDs fabricated by students whose scores were higher on the KAOP scale and their attitudes towards the elderly were more positive (Table 2).

Therefore, aside from the good technical specifications of dentures, additional significant factors are involved in increasing patient satisfaction and must be considered during treatment; the positive attitudes of the attending dentists seem to be one of them. The high ratings for RCDs in objective evaluation by professional dentists did not equally guarantee similar high rating levels of patient satisfaction with the dentures.

Moreover, the results showed that patient satisfaction with student-fabricated RCDs was higher when the students had, in general, positive or slightly positive attitudes towards elderly patients in comparison with negative or slightly negative-attitude students (Tables 3 and 4). These results could be attributed to the reflection of the implicit attitudes on students' behaviors toward the elderly patients during the treatment. Behaviors can be predicted through the attitudes of individuals, as the attitudes direct and guide what someone thinks, what they would do, and how they would react²⁹. Thus, it is important to address the attitude-behavior relationship while treating patients. This study showed that implicit positive students' attitudes reflected on behaviors and helped the students to form positive communication and relations with elderly patients while fabricating RCDs. As a result, patient satisfaction with the treatment significantly increased regardless of the quality of the dentures. The same applied when students had negative attitudes towards elderly patients; their attitudes negatively impacted their communications with patients, resulting in patient satisfaction significantly decreasing, although the success rates of these RCDs were above 80% in objective assessments by the experts.

A study in Taiwan found that the quality of dentures, no matter how high, cannot compensate for the lack of communication; patients whose doctors did not communicate sufficiently with them were about 6.5 times more likely to be dissatisfied with their dentures². Multiple other studies also emphasized the importance of the relationship formed between dentists and their patients in improving patient satisfaction with the RCDs^{7,8,30}.

Different-intensity attitudes of the same nature, however, did not have a significant influence on satisfaction. For instance, there were no differences between students' positive or slightly positive attitudes on elderly patient satisfaction with RCDs, but there were between each of them and negative attitudes. It should be noted that to

Mann-Whitney Test statistics						
Student attitudes towards elderly people	Patient satisfaction with RCDs					
	Mean Rank	Sum of Ranks	Mann-Whitney U	Wilcoxon W	Z	Sig.
Negative/ Slightly Negative	81.39	732.5	687.5	732.5	-1.08	0.278
	101.92	19568.5				
Negative/ Slightly Positive	87.17	784.5	739.5	784.5	-2.49	0.013***
	151.95	44065.5				
Negative/ Positive	10.22	92	47	92	-2.23	0.044*
	17.15	343				
Negative/ Neutral	11.22	101	56	101	-1.98	0.064
	17.95	395				
Slightly negative/ Slightly Positive	209.18	40162	21634	40162	-4.53	0.001***
	262.9	76241				
Slightly Negative/ Positive	103.65	19901.5	1373.5	19901.5	-2.22	0.027**
	133.82	2676.5				
Slightly Negative/ Neutral	105.18	20195.5	1667.5	20195.5	-1.70	0.088
	127.7	2809.5				
Slightly Positive/ Positive	154.81	44896	2701	44896	-0.58	0.559
	165.45	3309				
Slightly Positive/ Neutral	156.71	45445.5	3129.5	3382.5	-0.17	0.867
	153.75	3382.5				
Positive/ Neutral	22.48	449.5	200.5	453.5	-0.56	0.573
	20.61	453.5				

* Borderline significant. ** Significant. ***Highly significant

Table 4. Mann-Whitney test for the differences in patient satisfaction between each pair of student attitude groups.

make full comparisons between the variables, the students in this study were sorted into detailed and multiple groups according to their scores on Kogan's scale, similar to other studies^{20,25}. However, significant differences were seen only when comparing the two basic groups of attitudes (positive and negative), and perhaps it would have been better if students' distribution was limited to these two groups, just as the Kogan's scale is divided through its statements into two parts: KAOP⁺ and KAOP⁻¹⁷.

To the best of our knowledge, none of the studies have previously examined the role of dentists' or students' attitudes in affecting patient satisfaction with RCDs. The importance of this study is that it is the first to discuss this subject. However, there are some limitations in this study; one of them is the use of the VAS scale to determine the overall satisfaction with RCDs. Some patients reported a difficulty in choosing a sole number

to represent their whole satisfaction with both dentures. It would be more preferred if patient satisfaction is divided into subgroups evaluating different aspects for each denture. For example, satisfaction with esthetics, masticatory functions, speech, comfort, retention, and stability.

Another limitation is the short follow-up period; if it had lasted six months, the results would have been more reliable, and over-time changes in the reported satisfaction could have been compared and studied. Thus, preferable further investigations on this topic are required.

Conclusions

Significant differences were found in elderly patient satisfaction with removable complete dentures that were fabricated for them by undergraduate dental students. Other than the highly rated quality of dentures, these differences were related to an important factor: the effect of student attitudes towards elderly people. Positive/slightly positive attitudes significantly increased patient satisfaction when compared with negative/slightly negative attitudes. This study concluded that the elderly edentulous patient was significantly more satisfied with removable dentures fabricated by a student with positive attitudes towards the elderly.

Data availability

The datasets used and/or analysed during the current study available from the corresponding author on reasonable request.

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Author contributions

R.A. contributed in study design; collection of data; data analysis/interpretation and writing of the manuscript. M.A. contributed in writing of the manuscript. M.H. and M.S. reviewed the manuscript.

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Declarations

Competing interests

The authors declare no competing interests.

Conflict of interest

The authors have nothing to disclose.

Consent to participate

Informed consent was obtained from all individual participants included in the study.

Ethics approval

Approval was obtained from the ethics committee of Damascus University. The procedures used in this study adhere to the tenets of the Declaration of Helsinki.

Additional information

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