

ORIGINAL ARTICLE

PHYSIOLOGICAL AND SOCIO-ECONOMIC SATISFACTION LEVEL OF PATIENTS FOR ACRYLIC AND CAST ALLOY DENTURES

Afsheen Mansoor, Emaan Mansoor*, Aleeza Sana, Muhammad Mohsin Javid, Aleshba Saba Khan**, Khadim Hussain***

School of Dentistry, Shaheed Zulfiqar Ali Bhutto Medical University, Islamabad, *Islamic International Dental College, Riphah International University, Islamabad, **Department of Prosthodontics, Shahida Islam Dental College, Lodhran, ***Islamia University, Bahawalpur, Pakistan

Background: The ultimate loss of dentition creates lot of oral problems for edentulous patients which can be prevented with the provision of acrylic or cast alloy denture but patient satisfaction level attributed to these dentures is still unknown. We evaluated patient satisfaction level regarding aesthetics, pain, cost, retention, comfort and speech between acrylic and cast alloy denture wearers. **Methods:** Freshly edentulous patients wearing complete dentures with acrylic resin denture (AD) (n=65) and Co-Cr cast alloy denture (CD) (n=65) took part in study. Smart Patient Satisfaction Questionnaire was used to investigate satisfaction of these patients after one month (AD-1 and CD-1) and then after 3 months (AD-3 and CD-3). Scoring system 0=Not-Satisfied, 1=Satisfied and 2=Well Satisfied was used to evaluate general satisfaction of patients in both groups regarding speech, taste, pain, aesthetics, comfort, cost, and retention. **Results:** Patient satisfaction level between AD and CD wearers displayed insignificant differences with respect to aesthetics ($p=0.614$), pain ($p=0.842$), retention ($p=0.852$), comfort ($p=0.842$), speech ($p=0.943$), and taste ($p=0.753$). Patient satisfaction level between AD and CD users related to cost was significant ($p=0.001$) depicting that AD group was more satisfied with cost as compared to CD users. **Conclusions:** Both groups were satisfied with their aesthetics, pain control, retention, comfort, speech, and taste but patients using AD were found to be more satisfied with cost as compared to CD users who found these dentures quite expensive.

Keywords: Acrylic Denture, Cast alloy, Cost effective, Pakistan, Patient satisfaction

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INTRODUCTION

The main purpose of the restorative dentistry is to preserve natural teeth and their masticatory ability for maintaining both facial aesthetics and oral functions, in addition to get relief from pain.^{1,2} The WHO global oral health status 2022 has reported that a total of 3.50 billion population worldwide is influenced by oral diseases out of which, 3/4 persons residing in middle income or low income countries are more adversely affected other than high income countries. Complete loss of teeth during adulthood is referred as edentulism that gives sound information about health status of any individual. Internationally, incidence of edentulism has been reported between 6–69% by WHO.³ There is a huge prevalence of tooth loss in about 23% of the population belonging to age group above 60 years while 7% belonging to age group above 20 years worldwide.⁴ Previously, reported prevalence of edentulism in different countries has been 21.70% in Mexico, 3.0% in Ghana, 9.0% in China, 58.0% in Canada, and 16.30% in France⁵, whereas 51.40% and 48.60% in urban and rural areas especially involving the aged people. Furthermore, it has been narrated that this problem of edentulism would increase more because of the increased population of the aged people.⁶ Complete loss of tooth due to any reason might adversely affects the food selection type of an individual resulting in the poor nutritional status⁷, that could become the possible reason

of certain diseases including coronary heart disease and chronic kidney disease.⁸

Dental prosthesis is the only solution to replace missing teeth/edentulism for the patients in order to improve their quality of life by enhancing their mastication, functions, tissue preservation and phonetics.^{9,10} The dental prosthesis used to replace the complete missing teeth in the oral cavity are known complete dentures (CDs). There are two types of conventional materials used most commonly for the fabrication of dentures (CDs) such as metal alloys and methyl polymethacryls. The materials used for this purpose are cobalt-chromium alloys and acrylic resins.¹¹ The impairments in masticatory ability and satisfaction level have also been reported by the patients after using these prosthesis for some time which has most probably compromised their dietary habits in turn leading to the downfall of the healthy status of the edentulous patients.^{10,12} Therefore, currently it has become essential to evaluate the patient's self-satisfaction before confirming the future efficacy of the prosthesis.

The effectiveness of dental prosthesis in terms of patient's satisfaction towards various factors can be calculated via subjective and objective methodology.¹² The subjective method is dependent on the patient's perception and ability about satisfaction level while objective method relies on the patient's experimentation of masticating and biting the test food.¹³ The subjective

method is based on the oral health related quality of life and satisfaction through a patient's oriented questionnaire which is cost, resource and time effective in many ways.^{10,12} On the other hand, objective method provides tools and equipment to check the chewing abilities but it is more expensive, time and resource consuming.¹³ This method might not be possible in patients who received dentures from private clinics and hospitals especially in low-income countries like Pakistan that requires an easy and accurate way to assess the patient's satisfaction. Currently, subjective method including Smart Patient satisfaction level via Questionnaire has been developed which is quite authentic and valid.¹⁴ This Smart Patient Questionnaire could easily identify the patient's satisfaction towards aesthetics, speech, retention, stability, taste, pain, and cost in a much smarter and practical manner. This latest smart Questionnaire have not been incorporated in the Pakistani population in the clinical practice to evaluate the comparison of patient's satisfaction between acrylic resin denture (AD) wearers and Co-Cr cast alloy denture (CD) wearers. Our study focused to compare the patient's satisfaction level between AD wearers and CD wearers in order to find out the more feasible prosthesis for the edentulous patients.

MATERIAL AND METHODS

This Questionnaire oriented interventional study was conducted after the ethical approval from School of Dentistry, Shaheed Zulfiqar Ali Bhutto Medical University, Islamabad Pakistan with ERB Reference letter no: SOD/ERB/2023/22-05. Total 130 freshly edentulous patients, 60–70 years old, wearing complete dentures were selected for this study. These patients were medically fit and did not use any other medication that might adversely affect their ridge, bone and gums.

Freshly edentulous patients wearing complete dentures less than 1 month were included in study. These patients were divided into two groups of 65 each named as AD (n=65) and CD (n=65). The AD was allocated to the patients using acrylic resin complete denture while CD to the patients using the Co-Cr cast alloy complete denture. The Smart Patient Satisfaction Questionnaire was used in this study to evaluate the personal satisfaction of patients using AD and CD. This Questionnaire was filled by patients of both groups initially after one month (AD-1 and CD-1) and then finally, after 3 months of utilizing these dentures again (AD-3 and CD-3).

The score system was used to evaluate the general satisfaction of the patient in both groups regarding speech, taste, pain, aesthetics, comfort, cost, and retention where scoring was evaluated through three digits showing 0 (Not-Satisfied), 1 (Satisfied) and 2 (Well Satisfied).¹⁵ These data were analysed using

SPSS-22 with confidence interval at 95%, and $p \leq 0.05$ was taken as statistically significant.

RESULTS

The mean values of patient satisfaction level in AD wearers for aesthetics were AD1=1.37±0.77 and AD3=1.40±0.79, for Pain AD1=0.47±0.71 and AD3=1.66±0.65, for cost AD1=1.81±0.50, and AD3=1.81±0.50, for Retention AD1=1.27±0.75 and AD3=1.56±0.69, for Comfort AD1=0.27±0.57 and AD3=1.76±0.56, for Speech AD1=0.37±0.70 and AD3=1.56±0.71, for Taste AD1=0.50±0.76 and AD3=1.89±0.40.

The Patient satisfaction level towards acrylic denture in all aspects increased after three months. On the other hand, the mean values of patient satisfaction level in CD wearers for Aesthetics were CD1=1.40±0.79 and CD3=1.48±0.73; for Pain CD1=0.52±0.73, and CD3=1.65±0.65; for Cost CD1=0.22±0.60 and CD3=0.22±0.60; for Retention CD1=1.29±0.75 and CD3=1.59±0.66; for Comfort CD1=0.33±0.62 and CD3=1.75±0.56; for Speech CD1=0.40±0.73 and CD3=1.56±0.71; and for Taste CD1=0.54±0.767 and AD3=1.92±0.32. The Patient satisfaction level towards cast alloy denture increased in all the aspects after three months except cost (Figure-1).

The patient satisfaction level among AD and CD wearers increased after three months of utilization confirming the enhanced patient satisfaction level for Pain, Retention, Comfort, Speech, and Taste which was statistically significant ($p=0.001$). Patient satisfaction for Aesthetics was found to be insignificant in both groups AD ($p=0.484$) and CD ($p=0.526$). On the other hand, inter-group patient satisfaction level for cost remained insignificant among AD ($p=0.577$) and CD wearers ($p=0.589$) even after three months of usage (Table-1).

The mean value of patient satisfaction in AD and CD wearers respectively was 1.39±0.78 and 1.44±0.76 for Aesthetics, 1.06±0.90 and 1.09±0.89 for Pain, 1.81±0.50 and 0.22±0.60 for Cost, 1.42±0.73 and 1.44±0.72 for Retention, 1.02±0.93 and 1.04±0.92 for Comfort, 0.97±0.92 and 0.98±0.92 for Speech, and 1.19±0.92 and 1.23±0.91 for Taste (Figure-2).

The variables investigated for the patient satisfaction level between AD and CD wearers displayed insignificant differences after three months with respect to Aesthetics ($p=0.614$), Pain ($p=0.842$), Retention ($p=0.852$), Comfort ($p=0.842$), Speech ($p=0.943$), and Taste ($p=0.753$). On the other hand, after three months the differences in patient satisfaction level between AD and CD wearers related to cost were significant ($p=0.001$). Patients using AD were found to be more satisfied with the cost of this prosthesis as compared to the CD users (Table-2).

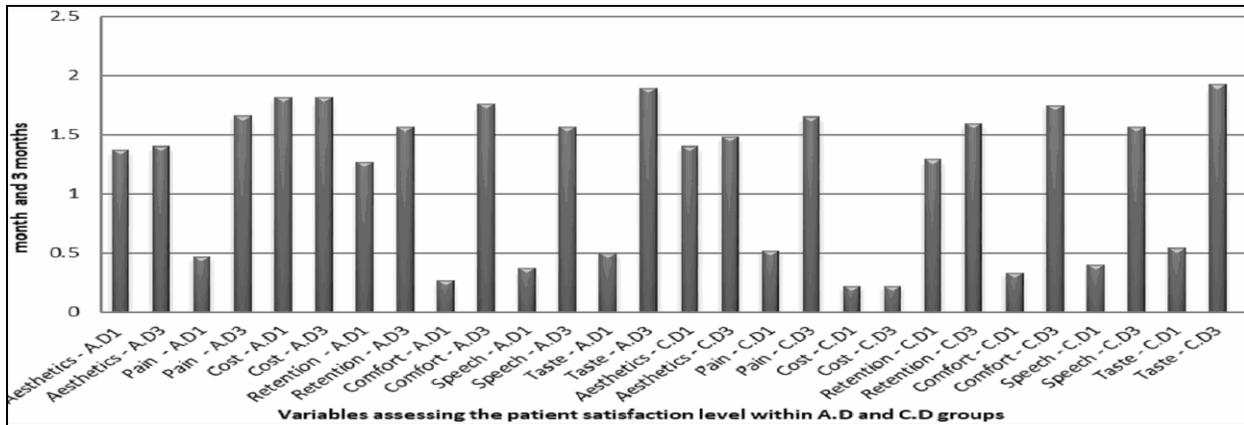


Figure-1: Patient satisfaction level among acrylic denture wearers (AD1 and AD3) and cast alloy denture wearers (CD1 and CD3) after one and three months

Table-1: Inter-group comparisons in patient satisfaction between AD and CD wearers

| Comparing groups for AD and CD wearers | Comparison of patient satisfaction level between AD1-AD3 and CD1-CD3 wearers | Mean difference with SD | 95% Confidence Interval of the Difference | | p |
|--|--|-------------------------|---|-------------|-------|
| | | | Lower limit | Upper limit | |
| AD for Aesthetics | Comparison of Aesthetics | -0.03±0.36 | -0.12 | 0.05 | 0.484 |
| AD for Pain | Comparison of Pain | -1.19±0.95 | -1.43 | -0.95 | 0.001 |
| AD for Cost | Comparison of Cost | -0.05±0.67 | -0.13 | 0.07 | 0.577 |
| AD for Retention | Comparison of Retention | -0.29±0.61 | -0.44 | -0.13 | 0.001 |
| AD for Comfort | Comparison of Comfort | -1.48±0.93 | -1.72 | -1.24 | 0.001 |
| AD for Speech | Comparison of Speech | -1.19±1.09 | -1.47 | -0.91 | 0.001 |
| AD for Taste | Comparison of Taste | -1.38±0.89 | -1.61 | -1.16 | 0.001 |
| CD for Aesthetics | Comparison of Aesthetics | -0.07±0.98 | -0.32 | 0.17 | 0.526 |
| CD for Pain | Comparison of Pain | -1.12±0.90 | -1.35 | -0.89 | 0.001 |
| CD for Cost | Comparison of Cost | -0.07±0.79 | -0.14 | 0.09 | 0.589 |
| CD for Retention | Comparison of Retention | -0.30±1.10 | -0.57 | -0.02 | 0.034 |
| CD for Comfort | Comparison of Comfort | -1.41±0.81 | -1.61 | -1.20 | 0.001 |
| CD for Speech | Comparison of Speech | -1.15±0.97 | -1.40 | -0.91 | 0.001 |
| CD for Taste | Comparison of Taste | -1.38±0.83 | -1.59 | -1.17 | 0.001 |

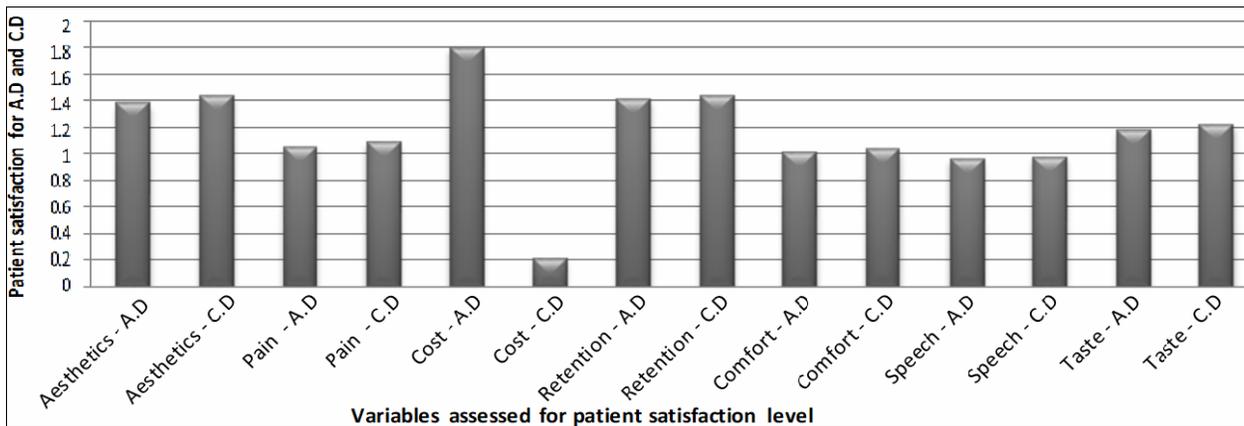


Figure-2: Mean patient satisfaction level between acrylic denture wearers and cast alloy denture wearers

Table-2: Comparison of patient satisfaction between AD and CD wearers

| Variables | Mean difference | 95% CI of the Differences | | p |
|------------|-----------------|---------------------------|-------------|-------|
| | | Lower limit | Upper limit | |
| Aesthetics | -0.049 | -0.242 | 0.143 | 0.614 |
| Pain | -0.049 | -0.247 | 0.202 | 0.842 |
| Cost | -1.58 | 1.44 | 1.72 | 0.001 |
| Retention | -0.017 | -0.198 | 0.164 | 0.852 |
| Comfort | -0.024 | -0.255 | 0.208 | 0.842 |
| Speech | -0.008 | -0.239 | 0.222 | 0.943 |
| Taste | -0.037 | -0.266 | 0.193 | 0.753 |

DISCUSSION

Various subjective methods have been employed to assess the patient satisfaction level while using the removable prosthesis either partial or full dentures. This methodology is valid enough to evaluate the ‘Oral Health Related Quality of Life’ (OHR-QoL) with respect to the patient satisfaction level in terms of aesthetics, pain, cost, retention, comfort and speech.^{10,12} Multiple questionnaires have been developed and used

in distinct countries depending upon the evident differences in their ethnicity, culture, and socio-economic status. These questionnaires were formulated to measure the patient satisfaction level regarding general aspects and masticatory abilities in elderly people¹⁴, complete and partial denture wearing individuals¹⁶. Currently, latest validated questionnaires^{14,17} are utilized to investigate the subjective aspects of the patient satisfaction level because this method is more easy and reliable. Secondly, this methodology saves time and cost when patients give their feedback about the specific treatment of partial or complete denture quite feasibly.^{13,18}

Pakistan is a low income country where subjective method to calculate the patient satisfaction level regarding aesthetics, pain, cost, retention, comfort and speech could be more appropriate and easy to conduct. The present study compared the effects of patient satisfaction level between acrylic denture and cast alloy denture wearers initially after one month of usage and then finally after three months. The patient satisfaction level enhanced within both AD wearer and CD wearer groups regarding pain control, retention, comfort, speech, and taste after three months. Patient satisfaction level regarding aesthetics and cost reduced within both AD (AD1 and AD3) wearer and CD (CD1 and CD3) wearer groups after three months of usage. Patient satisfaction level while comparing AD and CD revealed that both groups were satisfied with its aesthetics, pain control, retention, comfort, speech, and taste after three months. On the other hand, patients using AD were found to be more satisfied with the cost of this prosthesis as compared to CD users who found these dentures quite expensive. The findings of this study were different from some other researches conducted in the past, despite the fact that validated subjective tools were used.^{14,19,20}

The difference in the results of our study might be due to alterations in the socio-economic status and lifestyles where AD wearers and CD wearers both were satisfied regarding their aesthetics, pain control, retention, comfort, speech, and taste in the same manner. On the other hand, AD wearers were more satisfied about the cost of this prosthesis in comparison to the CD wearers who were not very well satisfied about the cost of their prosthesis where cost of CD was comparatively more. Our study was found to be better than another study because in our study various factors contributing in the patient's satisfaction level were investigated separately in comparison to the ultimate impact observed previously which gave little clue about the patient satisfaction level using a prosthesis.^{14,19,20} The complete denture prosthesis is the basic need of the edentulous patients who have lost their teeth entirely in the old age²¹ that has become a global problem⁶. Factors found in close association with edentulism are diabetes,

smoking, education, hypertension, arthritis, asthma, quality of life especially low income, and old age. These major factors induced the edentulism in about one-third of the aged people ≥ 65 years²² because of direct relationship between the aging process and health demand which is important. Moreover, increasingly shifted demographic status in Pakistan has contributed to the declined health indices, enhanced poverty rate and fast population growth rate.²³ Thus, acrylic denture was more cost-effective as compared to the cast alloy denture which was statistically significant ($p=0.001$).

The unaffordable cost could be a big challenge in meeting the required healthcare demand of the society. The economic status of the individual is responsible for the provision of the adequate healthcare.²⁴ Other factors responsible for determining the health include lifestyle, socio-economic, and environmental conditions.²⁵ Some researchers also confirmed that lower socio-economic status is the main cause responsible for the dental caries prevalence eventually leading to the edentulism^{26,27}, and endodontic/restorative procedures are among most commonly practiced procedures in a dental setup.²⁸ Tooth retention is still considered a vital indicator of oral health of the population.²⁹ Poor control for dispensing regulations, cost and medicine availability has been confirmed by many developing and underdeveloped countries.³⁰ There is a definitive need to improve the socio-economic demographics and health status by ensuring the cost-effective dental treatment to the population.

CONCLUSIONS

Patient satisfaction level while comparing AD wearer and CD wearer revealed that both groups were satisfied with their Aesthetics, Pain control, Retention, Comfort, Speech, and Taste, but Patients using AD were found to be more satisfied with the cost of this prosthesis as compared to the CD users who found their dentures quite expensive. The unaffordable cost could be a big challenge in meeting the required healthcare demand of the Pakistani society. There is need to improve the socioeconomic demographics and health status by ensuring the provision of cost-effective dental treatment.

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Address for Correspondence:

Dr Afsheen Mansoor, Associate Professor, School of Dentistry, Shaheed Zulfiqar Ali Bhutto Medical University, Islamabad, Pakistan. **Cell:** +92-321-5879166

Email: drafsheenqamar@gmail.com

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AS: Data collection, data analysis

MMJ: Data collection, data analysis

ASK: Critical review

KH: Statistical analysis

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