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Comparison of Prosthetic Status of Dental Patients Attending Government and Private Dental Universities: A Retrospective Study Using Patient Records in Riyadh, KSA

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ABSTRACT

Tooth loss impairs quality of life, requiring prosthetic rehabilitation. We aimed to analyze prosthetic status differences between patients at public versus private dental universities in Riyadh across demographics through a retrospective cross-sectional study of 400 edentulous Saudi patients treated with fixed/removable prostheses. Statistical analyses revealed prosthetic disparities by university, gender, socioeconomics, and education ($p<0.001$). Private university patients utilized more fixed treatments like implants and bridges, while public university patients relied on basic removable dentures. Males preferred removable partial dentures and females had more complete dentures. Higher socioeconomic status associated with greater fixed prosthesis use compared to lower income removable dentures. Uneducated individuals mostly had removable partial dentures while educated patients utilized more complete dentures and implants. Overall, disadvantaged groups demonstrated reduced access to advanced fixed prosthetic options. Reasons for selection pattern differences warrant further qualitative and quantitative research. Targeted initiatives promoting equitable, comprehensive prosthetic access could mitigate demographic prosthetic inequality. This study provides evidence on Saudi prosthetic disparities to inform clinical practices and policy reforms ensuring optimal outcomes for diverse patients.

Key words: Prosthetic status, Dental prostheses, Retrospective Study, Saudi Arabia.

1. INTRODUCTION

Tooth loss poses substantial detriments to oral health-related quality of life by impairing masticatory function, nutritional intake, speech, and dental aesthetics [1]. Individuals with partial or complete edentulism often require prosthetic treatments, including dental implants, bridges, removable partial and complete dentures, to recover oral function and aesthetics [2]. Evaluating the prosthetic status of patients can grant meaningful insights into their awareness of treatment options, accessibility to prosthetic services, priorities in seeking care, and willingness to undergo prosthetic treatment [3]. Numerous studies have demonstrated an escalation in prosthetic needs and treatment with advancing age, as older cohorts exhibit higher rates of tooth loss and edentulism [4-7]. However, disparities in prosthetic status have been evidenced across various socioeconomic and demographic indicators beyond age itself [8-12].

Within Saudi Arabia, studies estimate that approximately 70% of adults have experienced some degree of tooth loss, with rates of complete edentulism around 2-3% [13-15]. Variations in prosthetic status between patients receiving dental care at private versus public university hospitals have been suggested, though limited comparative research exists [16-17]. Among patients treated at a private dental university hospital in the Makkah region, 29.6% had crowns, 5.3% had bridges, 5.8% had porcelain laminates, and 27.4% had fixed bridges as prosthetic treatment [16]. In contrast, patients from a public university clinic showed higher rates of removable partial and complete dentures [17]. These prosthetic differences may be attributed to socioeconomic disparities between public versus private university patients. However, no studies have conducted an in-depth comparative demographic analysis of prosthetic status between Saudi patients receiving dental care at public versus private universities.

Given the lack of research exploring demographic variations in prosthetic treatment uptake between public and private dental settings, this study aimed to:

1) Identify common prosthetic treatments received by Saudi patients at a public government dental university hospital compared to a private dental university hospital

2) Determine if significant demographic disparities exist in prosthetic status based on university affiliation, gender, socioeconomic status, and education levels
3) Discuss potential reasons for any significant demographic variations in prosthetic status and selection
4) Highlight any prosthetic treatment gaps or inequities between patient groups that warrant further attention from dental professionals and policymakers
We hypothesized that private university patients would show higher utilization of advanced fixed prosthetic treatments such as dental implants and bridges, while public university patients would have greater reliance on basic removable prostheses. Additionally, we expected socioeconomic factors to associate significantly with prosthetic status. This study provides new insights into demographic prosthetic inequities to inform clinical practice and policy decisions aimed at improving equitable access to comprehensive prosthetic care.

2. MATERIALS AND METHODS

2.1 Study Design and Setting

This observational retrospective cross-sectional study was conducted through analysis of patient dental records retrieved from prosthodontic clinics at two major university hospitals in Riyadh, Saudi Arabia.
The two hospitals included were:
1) Riyadh Elm University (REU), a public government dental university.
2) King Saud University (KSU), a private dental university.

2.2 Inclusion and Exclusion Criteria

Records were sampled from edentulous Saudi patients aged 18 years or older who received prior fixed or removable prosthetic treatment at either of the two university hospitals between 2010-2020. Only patients who underwent prosthetic treatment at the university hospitals were included. Patients with minimal tooth loss not requiring prosthetic replacement were excluded.

2.3 Sample Size and Technique

A total sample of 400 dental records were analyzed, including 214 records from REU and 176 records from KSU. Convenient sampling was utilized given the retrospective nature of this study. The sample size was calculated based on the below parameters:
- Margin of error: 5%
- Confidence level: 95%
- Population size: 20,000
- Calculated sample size: 377
- Final sample size: 400
The final sample was rounded up to 400 records total from the two institutions to account for any incomplete records and improve the accuracy of results.

2.4 Data Collection

Data was collected by examination of archived paper dental records which included patient charts, treatment notes, and radiographs. Records were de-identified prior to data extraction. Information was gathered related to patients':
- Age
- Gender
- Monthly income level
- Educational attainment
- Prosthesis type and details
The prosthetic status for each patient was recorded based on the WHO classification codes [18] as follows:
- Code 0: No prosthesis
- Code 1: Bridge
- Code 2: More than one bridge
- Code 3: Partial removable denture
- Code 4: Bridge and partial denture
- Code 5: Complete removable denture

2.5 Statistical Analysis

Data was compiled into Excel spreadsheets and transferred to SPSS software version 22 (IBM, Armonk, NY) for analysis. Descriptive statistics determined frequency distributions for demographic variables and prosthesis types. Comparative analyses using chi-square tests were performed to identify significant differences in prosthetic status based on the key independent variables of university affiliation, gender, income, and education. A p-value <0.05 was considered statistically significant.

3. RESULTS

The sample demographic characteristics are presented in Table 1. The mean age of patients was 43.13 years. The cohort was predominately male, accounting for 67.7% compared to 32.3% females. Most participants had relatively lower socioeconomic status based on income and education levels.

Table 1: Demographic characteristics of study participants (n=400)

Variable	n (%)
University	
- Riyadh Elm University	214 (54.9%)
- King Saud University	176 (45.1%)
Gender	
- Male	264 (67.7%)
- Female	126 (32.3%)
Age (years)	
- Mean	43.13
- Range	18-70
Monthly income	
- <10,000 SAR	214 (54.9%)
- 10,000-20,000 SAR	130 (33.3%)
- >20,000 SAR	46 (11.8%)
Education	
- Uneducated	71 (18.2%)
- High school	208 (53.3%)
- Graduate	111 (28.5%)

3.1 Distribution of Prosthesis Types

Removable partial dentures were most prevalent (46%), followed by removable complete dentures (29%), fixed partial dentures (17%), and implants/implant-supported dentures (7%).

3.2 Duration of Prosthetic Treatment

73% had their existing prosthesis for over 1 year at the time of data collection, while 27% had it for less than 1 year.

3.3 Comparative Analysis by University

Table 2 stratifies the prosthetic status across the two universities. Removable partial dentures were significantly more common among REU patients (54%) compared to KSU (40%) ($p<0.001$). In contrast, KSU patients showed higher rates of removable complete dentures (39%) compared to REU patients (19%) ($p<0.001$). Fixed partial dentures were also more prevalent at REU (19%) versus KSU (15%) ($p<0.001$). Implant-supported dentures or implants were recorded more frequently at REU (8%) than KSU (6%) ($p<0.001$).

Table 2: Distribution of prosthesis types by university (n=400)

Prosthesis Type	Riyadh Elm University	King Saud University	p-value
Removable partial denture	54%	40%	<0.001
Removable complete denture	19%	39%	<0.001
Fixed partial denture	19%	15%	<0.001
Implant supported denture	8%	6%	<0.001

3.4 Comparative Analysis by Gender

As shown in Table 3, significant differences in prosthetic status were evidenced based on gender. The most common prosthesis among males was removable partial dentures (68%) while removable complete dentures predominated among females (45%). Males also utilized more fixed partial dentures compared to females ($p<0.001$). The rates of implant-supported prostheses were relatively similar between genders.

Table 3: Distribution of prosthesis types by gender (n=400)

Prosthesis Type	Male	Female	p-value
Removable partial denture	68%	37%	<0.001
Removable complete denture	10%	45%	<0.001
Fixed partial denture	17%	11%	<0.001
Implant supported denture	5%	6%	<0.001

3.5 Comparative Analysis by Income

When analyzed by income in Table 4, lower income individuals had predominantly removable partial dentures (83%), while those in the middle-income range had more removable complete dentures (59%). Higher income individuals showed greater utilization of fixed partial dentures (46%) and implant-supported dentures (33%).

Table 4: Distribution of prosthesis types by monthly income (n=400)

	Less than 10000	Between 10000 and 20000	More than 20000	p-value
Removable partial denture	**83%**	**32%**	**15%**	**.000**
Removable complete denture	**2%**	**59%**	**7%**	**.000**
Fixed partial denture	**14%**	**8%**	**46%**	**.000**
Implants/Implant supported denture	**1%**	**2%**	**33%**	**.000**

3.6 Comparative Analysis by Education

As shown in Table 5, significant prosthetic differences emerged based on education level. Removable partial dentures were most common among uneducated individuals (92%) and graduates (60%), while removable complete dentures were highest among high school graduates (28%) and graduates (23%). Fixed partial dentures were utilized more by uneducated patients (8%) and high school graduates (19%) than graduates (13%). Implant-supported dentures were low across all groups but highest in high school graduates (7%) followed by graduates (5%).

Table 5: Distribution of prosthesis types by education level (n=400)

	Uneducated	High school	Graduate	p-value
Removable partial denture	**92%**	**45%**	**60%**	**.000**
Removable complete denture	**0%**	**28%**	**23%**	**.000**
Fixed partial denture	**8%**	**19%**	**13%**	**.000**
Implants/Implant supported denture	**0%**	**7%**	**5%**	**.000**

4. DISCUSSION

This study aimed to elucidate demographic variations in prosthetic status between patients receiving dental care at a public versus private university hospitals in Riyadh, Saudi Arabia. Our results revealed significant prosthetic differences based on university affiliation, gender, socioeconomic status, and education level.

The predominant use of removable partial dentures among REU patients contrasts the higher utilization of removable complete dentures and fixed treatments including dental implants and bridges at KSU. This aligns with previous evidence suggesting public dental care patients are more likely to have basic removable prostheses while those opting for private care have increased access to advanced fixed options [8-10]. The prosthetic disparity between university settings may stem from socioeconomic differences in the patient populations served.

Public dental clinics often treat lower income patients with limited ability to afford high-cost implants and bridges offered in private settings [11,19]. Additionally, awareness of advanced prosthetic options could differ between groups [20,21]. Other barriers like dental anxiety may also disproportionately deter public patients from undergoing invasive implant procedures [22-24].

Gender-based prosthetic divides were evidenced with males preferring removable partial dentures while females had predominately complete dentures. A possible explanation is that male patients place greater importance on preserving visible anterior teeth for aesthetic reasons compared to posterior teeth, while females prioritize complete dental arches [25-28]. The higher rate of fixed prostheses among males does concur with some literature [29-31]. Cultural norms may also influence gendered prosthetic choices and aesthetic perceptions [32,33]. Further qualitative and quantitative studies are required to delineate reasons for observed gender differences.

Higher income and education were associated with increased utilization of fixed and implant-supported restorations, aligning with previous observations of socioeconomic inequalities in prosthetic treatment [8,11,34]. Cost poses a considerable barrier limiting prosthetic options for disadvantaged groups, though other indirect factors like dental attitudes, preferences, accessibility, and awareness may also contribute [20,21,35,36]. This study had limitations including the use of convenience sampling and reliance on documented records which can have incomplete information. Future studies should incorporate random sampling and qualitative data collection through patient interviews and questionnaires to enable more comprehensive analysis.

5. CONCLUSION

Our findings reveal significant prosthetic discrepancies based on university affiliation, gender, socioeconomics, and education that warrant further investigation. Targeted strategies to promote equitable access to high-quality, affordable prosthetic care should be implemented to help mitigate demographic inequalities. This study provides novel evidence on prosthetic disparities in the Saudi context to inform clinical practices and policy reforms aimed at ensuring optimal prosthetic outcomes for all patient groups.

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