

ORIGINAL ARTICLE

PATIENT-DRIVEN LIMITATIONS IN DENTAL IMPLANT THERAPY:
A CROSS-SECTIONAL STUDY OF ITS BARRIERSRakhshanda, Ali Waqar Qureshi*, Adnan Sunny*, Asma Ejaz Khan*,
Shujaat Hasan Idris**, Sardar Waleed Babar***Dental Surgeon, Cat-D Hospital, Drosh, Chitral Lower, Health Department KPK, *Department of Prosthodontics, **Community Dentistry,
***Oral Pathology, Shifa College of Dentistry, Rawalpindi, Pakistan

Background: Implant dentistry offers a reliable, advanced alternative to traditional prosthetics for replacing missing teeth. The objective of this study was to document patient's related local and systemic causes that preclude dental implant prosthesis. **Methods:** This descriptive cross-sectional study was conducted over a period of 16 months in Prosthodontics Department, Peshawar Dental College, Peshawar, Pakistan. The study population consisted of patients seeking missing tooth/ teeth replacements. The data to identify factors hindering implant supported prosthesis was collected through a pre-structured proforma, interviews, clinical, and radiographic assessments. Data was analysed on SPSS-24 via post-stratification chi-square test. **Results:** The study involved 219 participants aged 19–65 years, with a mean age of 41.79±12.5 years. The implant supported prosthesis faced psycho-social obstacles (180, 82%) such as lack of information, time constraints, and procedure-related fear. Systemic causes included uncontrolled diabetes (26, 11.9%), active smoking (15, 6.8%), and age extremes (7, 3.2%), while local/oral factors included inadequate space and bruxism due to protracted tooth loss (11, 5%), and bruxism (13, 5.9%). **Conclusion:** Ignorance and cost are the major barriers to dental implant supported prosthesis selection, along with oral factors like bruxism and insufficient space, and systemic variables like diabetes and smoking. Public education regarding these issues is recommended.

Keywords: Complete denture, Fixed partial denture, Implant-supported fixed dental prostheses, Lifetime cumulative attachment loss, Removable partial denture

Pak J Physiol 2025;21(3):22–5, DOI: <https://doi.org/10.69656/pjp.v21i3.1861>

INTRODUCTION

Implant dentistry presents a reliable and advanced alternative to traditional fixed prosthetics for replacing missing teeth. Over the past five decades, it has evolved into a predictable treatment option.¹ However, not all patients are eligible for implant placement due to various medical, psychosocial, and anatomical reasons.²

Psychosocial barriers such as cost, anxiety, lack of access, and insufficient perceived need often prevent patients from pursuing implant treatment. Oral health plays a vital role in determining implant success. Poor bone density and a history of periodontal disease can double the risk of implant failure.³ Thorough systemic and oral health screening is crucial prior to treatment.⁴

Replacing lost teeth is essential for restoring function, speech, and aesthetics. The concept of osseointegration, introduced by Per-Ingvar Brånemark in the 1960s, underpins the success of implants by enabling titanium to fuse with bone. Osseointegration is affected by implant design, material properties, surgical techniques, and load conditions.⁵

Material science and biomechanics are integral to successful implant therapy. Ideal implant materials must be biocompatible and resistant to wear, corrosion, and fracture. Common materials include metals, ceramics, alloys, and polymers.⁶ Key biomechanical considerations include implant length, diameter, crown-

to-implant ratio, and the design of the occlusal surface to withstand forces and avoid complications.⁷

Achieving a passive fit of the prosthesis is critical to prevent biological and mechanical issues.⁸ Stress distribution must be managed carefully, as poor fabrication steps, like errors in impressions or casting, can cause misfits.^{8,9} Implant-protected occlusion (IPO) principles help minimize forces on implants through controlled occlusal design and positioning.⁸

Material choice for occlusal surfaces depends on existing dentition and location of the implant. Proper fixture length, placement, and use of night guards can prevent damage from parafunctional habits.¹⁰ In some cases, tooth-implant supported prostheses (TISP) may be used to combine natural teeth and implants. The cantilevers should be minimized, stress breakers should be avoided, and occlusal loads should be oriented properly. However, TISPs should be avoided in patients with high caries risk or parafunctional habits.¹¹

Patient awareness is vital in treatment acceptance.¹² Demographics such as age, gender, education, and number or location of missing teeth influence prosthesis choices. Dental implants offer excellent aesthetic and functional outcomes when planned properly.^{13–17} Factors like bone quality, inter-arch distance, occlusion, cost, and treatment duration impact treatment planning.^{14,18,19} The options like All-on-4 immediate loading are predictable solutions for

edentulous patients.²⁰ The objective of this study was to document and identify reasons that preclude dental implant prosthesis therapy.

METHODOLOGY

This was a descriptive cross-sectional study conducted in the Department of Prosthodontics, Peshawar Dental College and Hospital, for 16 months from Jun 2020 to Sep 2021. The sample size was calculated as 219 patients not opting for implant therapy, with an estimate of 17% in the population, with a 5% margin of error at 95% confidence interval. Consecutive sampling technique was used and included both genders, patients aged 19–65 years with at least one missing tooth.

The socio-economic status was categorized into 3 broad categories based on the modified Kuppuswamy's SES scale.²¹ Patients with an overall monthly income of more than PKR 65,500 were categorised as High, 19,701–65,500 as Middle, and less than PKR 19,700 as Low SES. Exclusion criteria included age less than 19 or over 65 years, mentally handicapped patients, and patients not consenting.

Data collection was done through a pre-structured proforma which included Demographic data, psychosocial reasons, and local oral reasons. The proforma was divided into two parts: demographic data (name, age, gender, address, Out-Patient Department No., date of data collection, contact number, occupation, SES), and Psychosocial reasons (lack of awareness, high cost, fear of surgery, local oral reasons, aggressive periodontitis, poor quality and quantity of bone, inadequate space for implant, bruxism, conditions like uncontrolled diabetes, elderly, adolescence, survival after recent myocardial infarction, and immuno-suppression therapy).

The data was analysed on SPSS-24, quantitative variables were presented as Mean±SD, and qualitative variables as frequency and percentages. Chi-square test was applied to see association of various factors for preclusion of dental implants, and $p \leq 0.05$ was considered statistically significant.

RESULTS

Among 219 patients (mean age 41.79±12.5 years, range: 19–65 years), 74 (33.79%) were males and 145 (66.21%) were females. The main barriers to dental implants placement included lack of knowledge about dental implants (180, 82.19%), low SES (107, 48.86%), poor educational status (99, 45.20%) and high cost of the implant therapy (107, 48.85%). Low SES was seen in 107 (48.85%); middle SES in 53 (24.20%), and high SES was seen in 59 (26.94%) patients. Association of SES with gender was significant ($p=0.04$). (Table-1).

Table-1: Association of gender and SES among patients not opting for implant therapy [n (%)]

Socio Economic Status	Males	Females
Low	28 (37.83)	79 (54.48)
Middle	24 (32.43)	29 (20)
High	22 (29.72)	37 (25.51)
<i>p</i>	0.04	

There was significant association between education and time constraints for implant loading ($p=0.001$), with 10 (27.77%) postgraduates facing more immediate loading delays, i.e., 6–8 weeks, and 91 (49.72%) uneducated individuals delayed loading delays, i.e., 12–24 weeks. Majority (79, 54.85%) patients were females and unemployed (151, 68.94%). Lack of time was the factor responsible for preclusion in 36 (16.43%) patients, and in 28 (12.78%) fear of surgery was the factor for not opting for the dental implants. (Table-2).

Table-2: Association of educational status and time availability in patients not opting for implants [n (%)]

Educational Status	Immediate loading 6–8 weeks	Delayed loading 12–24 weeks
Uneducated	8 (22.22)	91 (49.72)
Primary	2 (5.55)	15 (8.19)
Secondary	7 (19.44)	48 (26.22)
Graduate	9 (25)	15 (8.19)
Postgraduate	10 (27.77)	14 (7.65)
<i>p</i>	0.001	

The fear of surgery (28, 12.78%) was significantly higher in females (25, 17.24%) than males (3, 4.05%), ($p < 0.01$), and lack of time (36, 16.43%) was slightly and non-significantly higher in females (20, 13.80%) than males (16, 21.62%) that led to preclusion of implants. (Table-3).

Table-3: Factors for preclusion of dental implants [n (%)]

Factors	Males	Females	Total	<i>p</i>
Lack of time	16 (21.62)	20 (13.80)	36 (16.43)	0.139
Fear of surgery	3 (4.05)	25 (17.24)	28 (12.78)	0.006

Thirty-four (15.52%) patients who did not opt for implants were unemployed/unskilled, while 18 (8.21%) were students, 12 (5.47%) were professionals, and 4 (1.82%) were businessmen. (Table-4).

Table-4: Occupational status of patients not opting for dental implants

Occupational status	n (%)
Unemployed	34 (15.52)
Students	18 (8.21)
Professionals	12 (5.47)
Businessmen	4 (1.82)

Among the local oral factors limiting the placement of dental implants, the most commonly observed by gender was inadequate buccolingual ridge width (<6 mm) (47, 21.46%), followed by insufficient mesiodistal space (<7 mm) (23, 10.50%), bruxism (13, 5.93%), reduced interarch space (<7 mm) (11, 5.02%), presence of soft or hard tissue cysts (3, 1.36%), a

history of aggressive periodontitis (1, 0.45%), and Type IV bone quality (1, 0.45%). Thus, while these factors variably influenced implant eligibility, no significant gender-based differences were observed, indicating a minimal role of gender in the distribution of local anatomical limitations for implant placement. Diabetes and active smoking were the most common ones among the systemic factors precluding dental implants along with others. (Table-5).

Table-5: Systemic health reasons that precluded implant therapy

Systemic factors	n (%)
Uncontrolled diabetes	26 (11.87)
Active smoking	15 (6.84)
Elderly/Frail	7 (3.19)
Adolescence	5 (2.28)
Anticoagulation medication	3 (1.36)
Total	56 (25.57)

DISCUSSION

This cross-sectional study investigated patient-related barriers to dental implant therapy. Dental implants are increasingly regarded as the gold standard for tooth replacement due to their high survival rates, functional advantages, and positive impact on quality of life, with long-term success rates exceeding 90%.²² Despite their clinical benefits, several patient-driven factors, psychosocial and clinical, limit their uptake and suitability.

Our findings showed that a higher proportion of female patients sought consultation compared to males, aligning with previous studies that also reported a slightly higher female participation rate in dental care settings.^{23,24} This gender distribution may reflect cultural patterns in healthcare-seeking behaviour or greater aesthetic concern among female patients.

Educational and occupational status played a prominent role. The majority of patients were uneducated and unemployed. This is consistent with other studies indicating that low socioeconomic status is prevalent among those accessing public dental services.^{6,18,25} A statistically significant association between gender and socioeconomic status was observed, supporting previous findings that women in such contexts are often more socioeconomically disadvantaged.²⁴

The most frequently reported psychosocial barrier was a 'lack of awareness about dental implants', identified in 82.19% of participants. This proportion is notably higher than figures reported in earlier studies, which ranged from 50 to 70%.^{11,24-26} This discrepancy underscores the persistent gap in patient education within the population studied. Following basic counselling, the 'cost of treatment' emerged as the next major deterrent (48.9%), comparable to other studies identifying financial burden as a critical barrier to

implant acceptance.²⁶ 'Fear of surgery' was also prevalent and was significantly associated with gender ($p=0.006$), consistent with literature suggesting higher dental anxiety among female patients.²⁵ In contrast, 'lack of time'—although mentioned by some—did not show a significant association with gender ($p=0.139$), suggesting it may be a more generalized or logistical concern.²⁶

Clinical barriers further influenced treatment feasibility. Local oral conditions such as 'inadequate buccolingual (21.46%), mesiodistal (10.50%), and inter-arch space (5.02%)', as well as 'bruxism (5.02%)', were common limiting factors. These findings align with earlier reports that highlight the anatomical constraints and parafunctional habits as significant predictors of implant candidacy.²⁴ Less frequent but noteworthy conditions included aggressive periodontitis, cysts, and poor bone quality, echoing similar clinical profiles reported in South Asian populations.²⁴

Systemic health factors were also influential. Uncontrolled diabetes mellitus (11.87%), active smoking (6.84%), and frailty (3.19%) were the most reported medical conditions that contraindicated implant therapy. A strong association was found between smoking and gender ($p=0.000$), in agreement with prior data indicating higher smoking rates among males in the region.²⁴ Fewer participants reported anticoagulant use (1.36%) or adolescence (2.28%) as exclusionary factors. Notably, no patients had a history of chemotherapy or organ transplantation, likely reflecting either their low prevalence or patients being filtered out prior to referral for implant consultation.

The collective findings emphasize the need for enhanced patient education, cost-effective implant options, and comprehensive medical and dental screening. For example, the introduction of implant-retained mandibular overdentures, even supported by a single implant, could offer a viable and affordable alternative, especially in resource-limited settings.

This study is limited by its single-centre design, which may restrict generalizability. Future research should include multi-centre, large-scale studies to validate these results across broader demographic and geographic segments of the Pakistani population. Further studies incorporating the variable of governmental assistance may also give insight about its role in this matter. Both socioeconomic factors and systemic health play a critical role in determining candidacy for dental implant-supported prostheses.

CONCLUSION

Dental implant prosthesis is often not affixed to patients due to lack of knowledge, inferior level of education, low socioeconomic status, fear of surgery, lack of time for immediate as well as delayed loading, and high costs of implant therapy along with active smoking. To

address this issue, patients need to be educated about the benefits of dental implants, the consequences of tooth loss, and the importance of early prosthetic provision.

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Address for Correspondence:

Dr Ali Waqar Qureshi, Department of Prosthodontics, Shifa College of Dentistry, Rawalpindi, Pakistan. **Cell:** +92-321-4301833

Email: aliwaqarqureshi@gmail.com

Received: 6 Jun 2025

Reviewed: 7 Jul 2025

Accepted: 24 Jul 2025

Contribution of Authors:

R: Conceptualization, study design, data acquisition, manuscript writing

AWQ: Literature search, manuscript writing, review, supervision, study design, and final approval approval of version

AS: Data acquisition, manuscript writing and final approval of version

AEK: Concept and approval of final version, data interpretation and analysis and critical review

SHI: Concept, study design, data analysis, and review

SWB: Data collection, interpretation and drafting of article

Conflict of Interest: None

Funding: None