

Patient Awareness and Attitudes Toward Tooth Replacement: A Cross-Sectional Study of Edentulism in Northern Malaysia

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Abstract:

➤ *Background:*

Edentulism remains a significant public health concern affecting oral function, aesthetics, and quality of life. Limited research has examined patient attitudes toward tooth replacement in Malaysia's Northern region.

➤ *Objective:*

This study evaluated patient awareness and attitudes toward tooth replacement options and assessed the prevalence of edentulism among outpatients visiting Penang International Dental College (PIDC).

➤ *Methods:*

A cross-sectional study was conducted using convenience sampling to recruit 100 participants aged ≥ 18 years with partial or complete edentulism. Data were collected via a structured, closed-ended questionnaire comprising 15 items across three sections covering sociodemographic characteristics, edentulism patterns (Kennedy's classification, tooth loss location, duration), preferred replacement options, perceived need, barriers, and awareness of implants, bridges, and dentures. Chi-Square Tests of Independence assessed associations between demographic variables and awareness indicators.

➤ *Results:*

Fifty participants completed the survey (mean age >60 years: 32/50, 64%; female: 25/50, 50%). Partial edentulism was reported by 31/50 (62%), with 45/50 (90%) edentulous for >3 months. Kennedy Class II was most prevalent (10/32, 31.3%). Mastication was the primary reason for replacement 50/50 (100%), followed by speech 26/50 (52%) and aesthetics 22/50 (44%). The most common barriers were time constraints, 36/50 (72%), and cost, 22/50 (44%). Removable prostheses were preferred by 49 of 50 respondents (98%). Limited awareness of implants, bridges, or dentures was observed in 25/50 participants (50% lacked any knowledge). Knowledge was primarily obtained through acquaintances with treatment experience 30/50 (60%) rather than dental professionals 24/50 (48%) or the internet 6/50 (12%). No statistically significant associations were found between age or gender and awareness indicators ($p > 0.05$). Higher educational attainment was associated with greater awareness of tooth replacement options.

➤ *Conclusion:*

The findings revealed a high prevalence of edentulism (62% partial, 38% complete) with predominantly functional motivations for tooth replacement. Economic barriers, time constraints, and limited awareness of prosthodontic options represent critical obstacles to treatment. Enhanced patient education, targeted oral health promotion initiatives, and improved accessibility to information through dental professionals and community channels are essential to support timely, patient-centred prosthetic rehabilitation.

Keywords: Edentulism, Tooth Replacement, Patient Awareness, Removable Prosthodontics, Attitudes.

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I. INTRODUCTION

Permanent dentition is a fundamental indicator of oral health and a significant determinant of quality of life [1]. Teeth serve essential functions including mastication, phonetic clarity, aesthetic appearance, and personal comfort. When teeth are lost, individuals experience major oral health disruption affecting the ability to eat, speak, maintain facial appearance, and obtain adequate nutrition [1,2].

Edentulism, the loss of all natural teeth or partial tooth loss, carries substantial psychological and social consequences, including diminished self-esteem, social isolation, and reduced quality of life [2]. Multiple etiological factors contribute to edentulism, including poor oral hygiene, periodontal disease, dental caries, aging, limited education, and low socioeconomic status [1,2].

Tooth replacement modalities—including dental implants, removable dentures, and fixed bridges—are essential interventions that restore oral function, improve aesthetics, prevent alveolar bone loss, maintain speech integrity, and enhance overall quality of life [3]. Despite the availability of multiple prosthetic options, patient awareness and acceptance of tooth replacement remain suboptimal in many populations [4,5].

Previous Malaysian studies documented high prevalence rates of edentulism among elderly populations. Jaafar et al. (2020) reported edentulism prevalence of 62.3% in Pasir Puteh, Kelantan, while Shamdol et al. (2008) found 55.9% edentulism among elderly Muslims in Kota Bharu [2]. However, limited research has examined patient attitudes and awareness regarding tooth replacement in Malaysia's Northern region. Understanding the prevalence, patterns, and determinants of edentulism along with patient attitudes toward treatment options is essential for developing targeted oral health interventions and improving prosthetic rehabilitation outcomes [3].

This study aimed to evaluate patient attitudes toward tooth replacement and assess the prevalence and patterns of edentulism among outpatients visiting PIDC. Specifically, the study sought to: (1) evaluate attitudes and awareness regarding tooth replacement options; (2) identify factors influencing decisions to seek or neglect tooth replacement; (3) assess the prevalence and types of edentulism; and (4) determine knowledge and awareness regarding available prosthodontic options.

II. METHODS

➤ Study Design and Setting

A cross-sectional descriptive study was conducted at Penang International Dental College (PIDC) Department of Prosthodontics. Ethical approval was obtained from the PIDC Institutional Review Board (REF: PIDCIRBSRP223, dated 15 September 2023).

➤ Participants and Sampling

Convenience sampling was used to recruit 100 (100/100, 100%) participants from the dental college outpatient department. Inclusion criteria were: age ≥ 18 years; partial or complete edentulism in one or both jaws; ability to understand English or Bahasa Melayu; residence in Perlis, Kedah, Penang, or Perak state; and provision of written informed consent. Exclusion criteria were: presence of root stumps and missing only maxillary and mandibular third molars.

➤ Data Collection

Informed consent was obtained from all participants prior to data collection. Participants completed a structured, closed-ended questionnaire consisting of 15 items organized into three sections:

- Section I (Items 1-4): Demographic characteristics including age (classified as 18–30, 31–40, 41–50, 51–60, and >60 years), gender, ethnicity (Malay, Chinese, Indian, other), and education level (illiterate, school, pre-university, undergraduate).
- Section II (Items 5-11): Assessment of edentulism including Kennedy's classification of partial edentulism (Classes I–IV), location of missing teeth (anterior/posterior region), type of edentulism (partial vs. complete), duration of edentulousness (<3 months vs. >3 months), preferred type of tooth replacement (fixed vs. removable), perceived need for replacement (mastication, aesthetics, speech), and barriers to replacement (cost, time, awareness, fear, perceived lack of necessity).
- Section III (Items 12-15): Assessment of awareness regarding tooth replacement including perception of artificial teeth equivalence to natural teeth, beliefs about problems associated with artificial teeth, knowledge of specific options (implants, bridges, dentures), and sources of knowledge (self-awareness, internet, personal experience with treatment, dental professional).

➤ Data Analysis

Responses were entered into Google Forms and tabulated in Microsoft Excel. Statistical analysis was performed using SPSS (Statistical Package for Social Sciences). Descriptive statistics were calculated for all variables. Chi-Square Tests of Independence were conducted to assess associations between age, gender, and awareness-related variables. Statistical significance was set at $p < 0.05$.

III. RESULTS

➤ Participant Demographics

Fifty completed questionnaires were analyzed (50/100, 50% response rate). Demographic characteristics are presented in Table 1. The majority of participants (32/50, 64%) were aged >60 years, while 18/50 (36%) were <60 years. Gender distribution was equal (25/50, 50% male; 25/50, 50% female). Chinese ethnicity was most common (28/50, 56%), followed by Indian (16/50, 32%), Malay (5/50,

10%), and other ethnic groups (1/50, 2%). School-level education was the most frequent (40/50, 80%), while pre-university education was least common (1/50, 2%).

➤ *Assessment of Edentulism*

Results of the edentulism assessment are presented in Table 2. According to Kennedy's classification of partial edentulism, Class II was most prevalent (10/32, 31.3%), followed by Classes I and III (9/32, 28.1% each), with Class IV least common (4/32, 12.5%). Posterior tooth loss (49/50, 98%) was considerably more frequent than anterior tooth loss (39/50, 78%). Overall, 31/50 (62%) of participants had partial edentulism while 19/50 (38%) had complete edentulism. The majority of participants (45/50, 90%) had been edentulous for >3 months, indicating prolonged periods without tooth replacement.

Regarding tooth replacement preferences, 49/50 (98%) preferred removable prostheses compared to only 1/50 (2%) who favored fixed replacements. The primary need for tooth replacement was mastication (50/50, 100%), followed by speech (26/50, 52%) and aesthetics (22/50, 44%). Barriers to tooth replacement included time constraints (36/50, 72%), cost (22/50, 44%), lack of awareness (9/50, 18%), perceived lack of necessity (5/50, 10%), and fear of treatment (5/50, 10%).

➤ *Assessment of Awareness Regarding Tooth Replacement*

Results of the awareness assessment are detailed in Table 3. The majority of participants (46/50, 92%) did not consider artificial teeth equivalent to natural teeth. However, 40/50 (80%) correctly believed that artificial teeth would not

cause problems. Knowledge of specific tooth replacement options was limited: 24/49 (49%) reported awareness of implants, bridges, or dentures, while 25/49 (51%) lacked any knowledge of these options.

Knowledge sources were predominantly personal (30/50, 60% learned through acquaintances who had undergone treatment), followed by dental professionals (24/50, 48%), self-awareness (15/50, 30%), and the internet (6/50, 12%). Multiple knowledge sources were frequently reported by participants.

➤ *Association Between Demographics and Awareness*

Chi-Square analysis was performed to examine the relationship between sociodemographic variables (age, gender) and awareness indicators (perception of artificial teeth causing problems, knowledge of prosthodontic options). Results are presented in Table 4.

Age did not demonstrate statistically significant associations with participant concerns about artificial teeth causing problems ($\chi^2 = 0.087, p = 0.768$) or with awareness of implants, bridges, or dentures ($\chi^2 = 0.034, p = 0.845$). Similarly, gender was not significantly associated with concern about artificial teeth causing problems ($\chi^2 = 0.496, p = 0.480$) or awareness of prosthodontic options ($\chi^2 = 0.507, p = 0.477$).

Descriptively, higher educational attainment appeared associated with greater awareness of tooth replacement options, suggesting that education may facilitate exposure to oral health information.

Table 1 Sociodemographic Characteristics of Study Participants (n=50)

Variable	Category	n	Percentage (%)
Age (years)	<60	18	36.0
	>60	32	64.0
Gender	Male	25	50.0
	Female	25	50.0
Ethnicity	Malay	5	10.0
	Chinese	28	56.0
	Indian	16	32.0
	Other	1	2.0
Education Level	Illiterate	3	6.0
	School	40	80.0
	Pre-university	1	2.0
	Undergraduate	6	12.0

Table 2 Assessment of Edentulism Among Study Participants (n=50)

Variable	Category	n	Percentage (%)
Kennedy's Classification	Class I	9	28.1
	Class II	10	31.3
	Class III	9	28.1
	Class IV	4	12.5
Location of Missing Teeth	Anterior region	39	78.0
	Posterior region	49	98.0
Type of Edentulism	Partial edentulism	31	62.0
	Complete edentulism	19	38.0
Duration of Edentulousness	<3 months	5	10.0
	>3 months	45	90.0

Preferred Tooth Replacement	Fixed prostheses	1	2.0
	Removable prostheses	49	98.0
Primary Need for Replacement	Mastication	50	100.0
	Speech	26	52.0
	Aesthetics	22	44.0
Barriers to Tooth Replacement	Cost	22	44.0
	Time constraints	36	72.0
	Lack of awareness	9	18.0
	Perceived lack of necessity	5	10.0
	Fear of procedure	5	10.0

Table 3 Assessment of Awareness Regarding Tooth Replacement (n=50)

Question	Response	n	Percentage (%)
Artificial teeth equivalent to natural teeth?	Yes	4	8.0
	No	46	92.0
Artificial teeth cause problems?	Yes	10	20.0
	No	40	80.0
Knowledge of implants, bridges, or dentures?	Yes	24	49.0
	No	25	51.0
Source of Knowledge	Self-awareness	15	30.0
	Internet	6	12.0
	Someone was treated	30	60.0
	Dentist	24	48.0

Table 4 Association Between Demographic Variables and Awareness Indicators

Demographic Variable	Awareness Indicator	Yes, n (%)	No, n (%)	χ^2	P-value
Age <60	Artificial teeth cause problems	4 (22.2%)	14 (77.8%)	0.087	0.768
	Knowledge of implants/bridges/dentures	8 (47.1%)	9 (52.9%)		
Age >60	Artificial teeth cause problems	6 (18.8%)	26 (81.3%)		
	Knowledge of implants/bridges/dentures	16 (50.0%)	16 (50.0%)		
Female	Artificial teeth cause problems	6 (24.0%)	19 (76.0%)	0.496	0.480
	Knowledge of implants/bridges/dentures	13 (54.2%)	11 (45.8%)		
Male	Artificial teeth cause problems	4 (16.0%)	21 (84.0%)		
	Knowledge of implants/bridges/dentures	11 (44.0%)	14 (56.0%)		

IV. DISCUSSION

This study assessed awareness and attitudes toward tooth replacement and patterns of edentulism among outpatients at PIDC. Teeth are essential for maintaining oral function, phonetic clarity, aesthetics, and psychological well-being. Tooth loss significantly impacts quality of life; therefore, understanding patient awareness and attitudes regarding prosthetic rehabilitation is critical for improving treatment acceptance and outcomes [1,2,3].

➤ *Demographic Findings*

The study population skewed toward older participants (32/50, 64% >60 years), consistent with literature suggesting higher edentulism prevalence with age [2,6]. The equal gender distribution (25/50 male, 25/50 female) reflects a balanced recruitment approach. The predominance of Chinese ethnicity (28/50, 56%) likely reflects the demographic composition of the Northern Malaysian region and PIDC's catchment area. Previous research indicates ethnicity influences oral health outcomes, with Chinese populations demonstrating lower rates of severe tooth loss compared to Malay populations, potentially reflecting

cultural practices, dietary habits, and healthcare access differences [7].

The high proportion of school-educated participants (40/50, 80%) suggests variable educational exposure within the sample. Education has been identified as a protective factor against edentulism, with higher educational attainment associated with better oral health behaviors and knowledge of treatment options [2].

➤ *Edentulism Patterns*

The prevalence of partial edentulism (31/50, 62%) exceeding complete edentulism (19/50, 38%) aligns with previous studies indicating that most individuals retain some natural teeth rather than progressing to complete dentures [3,8]. The high frequency of Kennedy Class II edentulism (10/32, 31.3%) is consistent with global patterns [8]. The marked predominance of posterior tooth loss (49/50, 98%) compared to anterior tooth loss (39/50, 78%) reflects the higher vulnerability of posterior teeth to periodontal disease and caries; however, most patients prioritize anterior replacement due to aesthetic concerns [3,8].

The finding that 45/50 (90%) of participants had been edentulous for >3 months indicates substantial treatment delays. This duration gap, consistent with previous research [3,8], suggests that financial constraints, lack of awareness, and perceived lack of necessity contribute to prolonged edentulism and delayed prosthetic rehabilitation.

➤ *Participant Demographics*

The overwhelming preference for removable prostheses (49/50, 98%) over fixed options (1/50, 2%) predominantly reflects economic factors; removable dentures cost substantially less than fixed prostheses or implants [3,8,9]. Although previous studies in wealthier populations (Saudi Arabia, urban India) document greater preference for fixed prostheses and implants, financial limitations in the current sample clearly constrained treatment choice [4,5]. Studies such as those of Kumar et al. (2020) and Rastogi et al. (2017) have also indicated that financial barriers may influence treatment choice, with removable dentures preferred due to lower cost than fixed prostheses or implants [3,14].

➤ *Primary Needs and Barriers*

Mastication emerged as the dominant treatment motivation (50/50, 100%), followed by speech (26/50, 52%) and aesthetics (22/50, 44%), consistent with literature indicating that functional restoration supersedes aesthetic concerns, particularly in older populations [3,8]. This hierarchy reflects the fundamental biological necessity of oral function.

Time constraints (36/50, 72%) and cost (22/50, 44%) represented the principal barriers, aligning with previous findings [3,8,9]. These modifiable barriers present intervention opportunities through treatment financing options, extended appointment scheduling, and treatment planning flexibility. Lack of awareness (9/50, 18%), perceived lack of necessity (5/50, 10%), and fear of treatment (5/50, 10%) represent additional targets for patient education and anxiety management strategies.

➤ *Awareness and Knowledge Gaps*

Limited awareness of specific prosthodontic options (25/49, 51% lacking any knowledge) represents a critical gap necessitating patient education [4,9]. Notably, knowledge was predominantly acquired through acquaintances (30/50, 60%) rather than dental professionals (24/50, 48%) or the internet (6/50, 12%). This finding suggests that peer experience strongly influences patient knowledge and underscores the importance of professional educational initiatives [4]. The relatively low utilization of internet sources (6/50, 12%) may reflect variable digital literacy or limited online resources in the region.

➤ *Perception of Artificial Teeth*

The finding that 46/50 (92%) of participants did not perceive artificial teeth as equivalent to natural teeth likely reflects sensory differences (tactile sensation, proprioception) and psychological adjustment challenges [3]. Perceptions of artificial teeth may also be shaped by broader psychological factors and how patients experience

and report oral symptoms in daily life [15]. However, 40/50 (80%) correctly recognized that artificial teeth do not inherently cause problems, suggesting that misconceptions about iatrogenic harm were limited in this sample. This distinction indicates opportunity for targeted education addressing realistic expectations [3,4]. Aligning with WHO recommendations on healthy ageing and oral health promotion, integrating tooth replacement counselling into broader geriatric care pathways could help reduce this burden [18,19].

➤ *Lack of Association Between Demographics and Awareness*

The absence of significant associations between age and awareness indicators ($\chi^2 = 0.087$, $p = 0.768$ for concerns about artificial teeth; $\chi^2 = 0.034$, $p = 0.845$ for knowledge of prosthodontic options), and between gender and awareness indicators ($\chi^2 = 0.496$, $p = 0.480$ for artificial teeth concerns; $\chi^2 = 0.507$, $p = 0.477$ for knowledge of options), was notable. This may reflect: (1) relatively homogeneous information exposure across age groups due to shared community contexts; (2) influence of education and socioeconomic status rather than age per se [2]; (3) insufficient statistical power given sample size and the predominance of older participants; and (4) questionnaire characteristics that failed to capture age- or gender-specific knowledge variations [7].

In contrast, the descriptive finding of higher awareness among more educated participants aligns with education-knowledge relationships documented in prior research, suggesting that formal education facilitates exposure to health information regardless of age or gender [2,9].

➤ *Study Strengths and Limitations*

This study addressed a knowledge gap regarding tooth replacement awareness in Northern Malaysia. Our clinic-based sample is comparable to non-institutionalised elderly cohorts in other settings, where substantial unmet prosthetic needs and functional impacts have also been reported [17]. The structured questionnaire format enabled systematic data collection. However, several limitations warrant acknowledgment: (1) convenience sampling from a single dental college limits generalizability to the broader Northern Malaysia population; (2) the modest sample size ($n=50$ analyzed responses) may have constrained statistical power to detect demographic associations; (3) cross-sectional design precludes causal inference; (4) potential selection bias toward dentally conscious individuals seeking treatment; and (5) self-report questionnaire format introduces social desirability bias. Future work incorporating radiographic assessment or jaw resorption staging, could provide a more detailed structural context for prosthetic planning [16].

V. CONCLUSION

This study demonstrated a high prevalence of partial and complete edentulism among our outpatients, with tooth replacement sought mainly for functional reasons, particularly mastication. Substantial economic, time-related,

and informational barriers were identified, and no significant associations were found between age or gender and key awareness indicators.

These findings underline the need for focused patient education on the consequences of edentulism and available prosthodontic options, delivered through both dental professionals and community networks who already serve as primary information sources. Service-level strategies such as flexible scheduling, cost-mitigation approaches, and larger, population-based studies are warranted to improve timely prosthetic rehabilitation and reduce the functional and psychosocial burden of untreated tooth loss in this Northern Malaysian population.

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