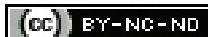


Prevalence of Partial Edentulism and Awareness to Restore the Same among the Patients Visiting a Tertiary Dental Care Centre in Ambala, Haryana, India: A Cross-sectional Study

SATVIKA PRASAD¹, SANDEEP GARG²

ABSTRACT

Introduction: Dental health is essential for overall well-being, affecting many aspects of an individual's life, including physical health, social interactions and self-esteem. One significant issue in dental health is partial edentulism, which is the condition characterised by the loss of one or more natural teeth. A comprehensive understanding of partial edentulism necessitates a thorough exploration of its epidemiology. These studies not only shed light on the extent of the issue but also provide valuable insights into demographic patterns, contributing factors and disparities that may exist across different populations.

Aim: To assess the prevalence of partial edentulism and the awareness of options for restoration among patients visiting a tertiary dental care centre in Haryana, India. Additionally, to evaluate the association of partial edentulism with socio-demographic factors, including age, gender, education level and total family income.

Materials and Methods: This cross-sectional study was carried out at MM College of Dental Sciences and Research, Mullana, Ambala, Haryana, India. The duration of the study was six months (June 2022 to November 2022). A total of 507 patients were

assessed. Questions regarding general information, economic status, reasons for the loss of teeth and the types of treatment taken for missing teeth were asked. Patients were also examined clinically for missing teeth and the type of prosthesis used. The collected data was then tabulated, analysed and subjected to a Chi-square test to evaluate the relationship of partial edentulism with socio-demographic factors.

Results: The prevalence of partial edentulism among the study population was 72.90%. The major reason for tooth loss was caries, followed by caries coupled with periodontal problems. Most of the partially edentulous patients were not using any prosthesis and the major reasons for this were a lack of awareness, the cost of treatment, or the patients not feeling any requirement for a prosthesis. The association of partial edentulism with age, education level and total family income per month was found to be statistically significant ($p < 0.05$), except for the gender of the patients.

Conclusion: It can be concluded that the prevalence of partial edentulism was 72.9% and a significant association was found between partial edentulism and socio-demographic factors. However, no association was observed in relation to gender.

INTRODUCTION

Dental health is integral to overall well-being, influencing various aspects of an individual's life, from nutrition and physical health to social interactions and self-esteem. A significant concern within the realm of dental health is partial edentulism, a condition characterised by the loss of one or more natural teeth [1]. Reasons for tooth loss usually include caries, traumatic injuries and periodontal disease. Apart from this, healthy teeth can also be extracted for prosthetic treatment modalities, impactions, orthodontic treatment, supernumerary teeth and cystic or neoplastic lesions. If tooth loss is not restored on time, it can lead to pathological changes such as occlusal discrepancies, loss of vertical dimension, loss of masticatory function and aesthetics, residual ridge resorption and temporomandibular disorders. Tooth loss, as a permanent disruption of the natural dental structure, is comparable to a chronic medical condition and has gained increased attention due to its prevalence and the challenges it presents to affected individuals. While various efforts have been made to prevent edentulism, the condition is still highly prevalent [2].

A comprehensive understanding of partial edentulism necessitates a thorough exploration of its epidemiology. Various epidemiological studies have been conducted globally to ascertain the prevalence,

distribution and associated factors of partial edentulism. These studies not only shed light on the extent of the issue but also provide valuable insights into demographic patterns, contributing factors and disparities that may exist across different populations. Examining the prevalence of partial edentulism becomes crucial in developing targeted interventions and public health strategies to address this widespread concern [3].

India, as a country with diverse cultures, traditions and demographic landscapes, provides valuable insights into the complex relationship between dental care and overall health outcomes. In India's complex healthcare system, oral health is crucial but often overlooked. While infectious diseases and maternal health have been the primary focus in public health discussions, the increasing challenges of chronic dental conditions, including partial edentulism, also need comprehensive attention. Research on partial edentulism has been conducted in various regions of India, including Kerala and Goa [4,5], as well as within institutional settings; however, little has been studied regarding the same in Haryana. In light of this, the present study was planned to evaluate the prevalence of partial edentulism and awareness of its restoration among patients visiting a tertiary dental care centre in Ambala, Haryana, India. By examining partial edentulism in Haryana, the present research provides new

insights into regional variations and their associations with socio-demographic factors. The present study will also explore the role of education and socio-economic factors in the contribution to partial edentulism. By understanding the dynamics of the present study, the authors can focus on early intervention, prevention and awareness, which will promote oral healthcare and the overall well-being of individuals across diverse populations.

MATERIALS AND METHODS

This cross-sectional study was conducted at MM College of Dental Sciences and Research in Mullana, Ambala, Haryana, India. For the present study, a total of 507 patients were assessed over a duration of six months (from June 2022 to November 2022). A written informed consent was obtained from each subject before the start of the study. Ethical clearance was also secured from the Institutional Ethical Committee before beginning the study (No. IEC-2253, dated 27-05-2022).

Inclusion and Exclusion criteria: The minimum age for patients selected was 18 years, regardless of their gender and no completely edentulous patients were included in the study. Patients who had lost only their third molars were also not included in the partial edentulism category.

Study Procedure

Patients who reported to the Department of Oral Medicine and Radiology were assessed using a questionnaire [ANNEXURE 1] and a clinical examination. The questionnaire was designed with 14 questions regarding general information, economic status, the reasons for tooth loss and the type of treatment taken for missing teeth, among other topics. Data was recorded by a single operator to maintain uniformity in the recording of questions posed and answers interpreted. The patients were also examined clinically for missing teeth and the type of prosthesis used by the same operator.

STATISTICAL ANALYSIS

The collected data was then tabulated and analysed using statistical software, specifically Statistical Package for Social Sciences (SPSS) software version 25.0, while maintaining a significance level of 95% confidence interval and an 80% power for the study. The Chi-square test and binomial test were also used to evaluate the association of partial edentulism with socio-demographic factors.

RESULTS

A total of 507 patients were assessed, which included 261 (51.48%) females and 246 (48.52%) males. Out of these, 196 (38.66%) patients were in the age range of 18-30 years, 123 (24.26%) were in the age range of 31-45 years and 46-60 years, whereas 65 (12.82%) were in the age range of 60 years and above. Among these, 203 patients were employed, 56 (11.05%) were unemployed, while 248 (48.92%) were from other categories such as housewives, students, or retired personnel.

Regarding their educational status, the majority of patients were graduates, comprising 214 (42.22%), followed by postgraduates, whereas the minimum number were those who had never attended school, totalling 14 (2.76%). Concerning family income per month, 157 (30.97%) of the patients had an income of more than ₹30,000, 92 (18.15%) had a family income in the range of ₹15,001 - ₹30,000 per month, 102 (20.11%) had an income in the range of ₹5001 - ₹15,000 per month, 43 (8.48%) an income of up to ₹5,000, whereas 113 (22.29%) did not disclosed their income [Table/Fig-1].

Out of these patients, 370 were partially edentulous. Regarding the reasons for tooth loss, 36 (9.73%) lost their teeth due to periodontal reasons, 207 (55.95%) lost their teeth due to caries, 67 (18.11%) lost their teeth for both caries and periodontal reasons

Parameters	n (%)
Gender	
Female (F)	261 (51.48%)
Male (M)	246 (48.52%)
Age (years)	
Group-A (18-30)	196 (38.66%)
Group-B (31-45)	123 (24.26%)
Group-C (46-60)	123 (24.26%)
Group-D (Above 60)	65 (12.82%)
Educational status	
Illiterate	14 (2.76%)
Primary school	18 (3.55%)
Middle school	39 (7.69%)
Secondary school	75 (14.79%)
Senior secondary school	90 (17.75%)
Graduate	214 (42.22%)
Postgraduate	57 (11.24%)
Occupation	
Employed	203 (40.04%)
Unemployed	56 (11.05%)
Others (housewives, students or retired personnel)	248 (48.92%)
Family income per month	
Up to ₹5,000	43 (8.48%)
₹5,001 - ₹15,000	102 (20.11%)
₹15,001 - ₹30,000	92 (18.15%)
More than ₹30,000	157 (30.97%)
Not disclosed	113 (22.29%)

[Table/Fig-1]: Demographic details of participating subjects.

and 60 (16.21%) lost their teeth due to trauma and other reasons. Among these partially edentulous patients, 316 (85.40%) were aware of the various treatment options available to restore their teeth, while 54 (14.59%) were not aware.

Regarding the use of prosthesis, 131 (35.41%) individuals were wearing or had previously worn an oral prosthesis, while 239 (64.59%) individuals were neither wearing nor had worn any prosthesis earlier. Out of these 239 subjects, 54 (22.59%) were not wearing or had not worn a prosthesis due to lack of awareness, 49 (20.50%) were aware but not wearing due to economic reasons, 123 (51.46%) felt no deficiencies and 13 (5.44%) had a fear of treatment. Among the 131 subjects who were wearing or had worn any oral prosthesis earlier, 52 (39.70%) were using removable prosthesis, 78 (59.54%) were wearing or had worn fixed prosthesis, whereas only 1 (0.76%) individual was using or had used both removable and fixed prosthesis.

Regarding the distribution of partially edentulous subjects based on the reasons for seeking treatment, out of 370 subjects, the majority, i.e., 247 (66.76%), sought treatment for functional reasons, while the least sought treatment for psychological reasons such as self-esteem, social interaction and self-perception [Table/Fig-2].

Parameters	n (%)
Frequency of partial edentulism	
Partially edentulous	370 (72.98%)
Completely dentulous	137 (27.02%)
Reasons for loss of teeth	
Periodontal	36 (9.73%)
Caries	207 (55.95%)
Caries+periodontal	67 (18.11%)
Trauma and others	60 (16.21%)

Awareness regarding various treatments options available	
Yes	316 (85.40%)
No	54 (14.59%)
Use of prosthesis	
Yes	131 (35.41%)
No	239 (64.59%)
Reasons for not using prosthesis	
Lack of awareness	54 (22.59%)
Aware, but economic reasons	49 (20.50%)
Felt no deficiencies	123 (51.46%)
Fear of treatment	13 (5.44%)
Type of prosthesis used	
Removable prosthesis	52 (39.70%)
Fixed prosthesis	78 (59.54%)
Both	1 (0.76%)
Reason associated to seek the treatment	
Aesthetics	90 (24.32%)
Mastication	247 (66.76%)
Aesthetics+Mastication	24 (6.49%)
Psychological	3 (0.81%)
Others	6 (1.62%)
Frequency of dental visits	
Once in 6 months	34 (9.19%)
Once in a year	52 (14.05%)
Not regular, only when necessary	284 (76.76%)

[Table/Fig-2]: Frequency of partial edentulism and type of prosthesis used for same.

The association of partial edentulism with age, gender, education level and total family income per month was also evaluated and all the parameters were found to be statistically significant ($p < 0.05$), except for the gender of the patients ($p = 0.640$) [Table/Fig-3,4].

Parameters	n (%)	p-value	Chi-square value
Age			
18-30 years	98 (26.5%)	0.004*	13.351
31-45 years	96 (25.9%)		
45-60 years	112 (30.3%)		
Above 60 years	64 (17.3%)		
Education level of subjects			
Illiterate	11 (3.0%)	<0.001	190.832
Primary school	18 (4.9%)		
Middle school	38 (10.3%)		
Secondary school	63 (17.0%)		
Senior secondary school	73 (19.7%)		
Graduate	131 (35.4%)		
Postgraduate	36 (9.7%)		
Family income per month			
Up to ₹5,000	41 (11.1%)	<0.001	25.730
₹5,001-₹15,000	87 (23.5%)		
₹15,001-₹30,000	80 (21.6%)		
More than ₹30,000	97 (26.2%)		
Not disclosed	65 (17.6%)		

[Table/Fig-3]: Association of partial edentulism with age, education level and family income.

*p-value <0.05 signifies statistically significant; *Chi-square test

DISCUSSION

Oral health is essential for overall well-being. Good oral health is not just about having a bright smile; it directly influences an individual's ability to eat, speak and socialise comfortably. Neglecting oral care

Gender	n (%)	p-value
Male	190 (51.4%)	0.640
Female	180 (48.6%)	

[Table/Fig-4]: Association of partial edentulism with gender (with binomial test).

*p-value <0.05 signifies statistically significant

can lead to various complications that not only affect oral function but also contribute to systemic health problems. Oral health is a multidimensional concept commonly influenced by various factors such as age, sex, education and geographical regions [1,3].

Epidemiological surveys in oral health serve as crucial tools to systematically study and understand the patterns of oral diseases in the population. These surveys help identify the scope and nature of tooth loss, assess underlying causes and evaluate the success and longevity of provided treatments. By employing such approaches, dentists can gather valuable data on the oral health of the population and contribute to the refinement of treatment protocols.

Despite the widespread availability of dental facilities, dental care appears to be underutilised by many. Reasons for this may include commuting challenges, insufficient information and/or misconceptions about the importance of regular visits to the dentist. Social support and networks also play a role in influencing overall health; however, the specific mechanisms of this influence remain poorly understood. Similarly, oral health is linked to the social environment, transcending age and gender boundaries and thereby influencing health status throughout an individual's lifetime [4].

Partial edentulism, the condition of having one or more missing teeth while retaining others, is a multifaceted phenomenon influenced by various socio-demographic factors, including age, gender, educational level, socio-economic status, cultural background and geographical area. Understanding the association between these variables and partial edentulism can provide valuable insights into the complex interplay of these factors in oral health disparities. By considering all these factors, the present study was planned to assess the prevalence of partial edentulism and awareness of available restorative options among patients visiting a tertiary dental care centre in Ambala, Haryana, India.

A total of 507 patients were assessed, out of which 370 patients were partially edentulous. The prevalence of partial edentulism among patients visiting the tertiary dental care centre was 72.90%. A similar prevalence of partial edentulism was reported in studies by D'Souza KM and Aras M (76.12%), Goutham G et al., (73.1%) and Vadavadi SV et al., (75%) [Table/Fig-5] [5-7]. Regarding the reasons for tooth loss, 36 patients lost their teeth due to periodontal reasons, 207 lost their teeth due to caries, 67 lost their teeth due to both caries and periodontal reasons, while 60 lost their teeth due

Author's name	Prevalence	Gender association	Age	Educational level	Total family income
Present study	72.90%	Not significant	Majority of younger population	Majority were graduates and post graduates	Majority were from decent income group
D'Souza KM and Aras M [5]	76.12%	Male predilection	Majority of younger population	Majority were from basic group	Majority were from medium income group
Goutham G et al., [6]	73.1%	Female predilection	-	-	Majority were from upper and middle class
Vadavadi SV et al., [7]	75%	Male predilection	-	-	Majority were from upper and middle class

[Table/Fig-5]: Comparison of the results from various studies [5-7].

to trauma and other causes. These results are in accordance with findings by Shashidhar MP and Gowda EM, who identified caries as the leading cause of tooth loss [8]. Nayar S et al., Reddy NS et al., and Rastogi I et al., also reported similar results in their studies [9-11], whereas Goutham G et al., Vadavadagi SV et al., and Saha MK et al., found periodontal disease to be a major reason for partial edentulism in their studies [6,7,12].

Regarding age, the younger population was more prone to partial edentulism than the elderly population in the present study. A similar association was observed by D'Souza KM and Aras M, Agrawal R et al., and Fayad MI et al., who concluded that younger individuals, being more aware and capable of affording treatment due to increased income, led to a higher footfall of younger patients compared to older patients [5,13,14]. Conversely, Marimuthu S et al., and Basnyat SKC et al., found that elderly individuals were more likely to be partially edentulous due to age-related changes or systemic health conditions, which contribute to greater partial edentulism among older adults [15,16].

Regarding gender, no association was found with partial edentulism in the present study. These results contrast with those of Prajapati A et al., and Rahman MS, who found a female predilection in their studies [17,18]. In contrast, D'Souza KM and Aras M, Vadavadagi SV et al., and Agrawal R et al., concluded that males were more likely to be partially edentulous than females, as they were more likely to smoke or use tobacco products and participate in activities or sports that increased the risk of dental trauma, which could lead to tooth loss [5,7,13].

Regarding the association of partial edentulism with education level, individuals who were more educated, specifically graduates and postgraduates, were observed more frequently, while patients with lower levels of education were seen less often in the present study. A similar association was noted by Rahman MS, Manandhar P et al., and Shetty KB et al., who found that people with higher educational levels were more aware and had better access to dental care. Conversely, individuals with lower levels of education had limited knowledge, awareness and financial stability, which made them less capable of seeking treatment in a timely manner [18-20].

Regarding the association between partial edentulism and family income per month, patients with a decent family income had a greater frequency of visits for dental care than those in the low-income group in the present study. Similar results were seen by D'Souza KM and Aras M, Shetty KB et al., and Kahar AR et al., who reported that the maximum number of patients in their studies were from the middle-income group. As people's earnings increased, their awareness of various treatment options grew, enabling them to afford dental healthcare [5,20,21].

Out of 370 partially edentulous patients, only 131 were wearing oral prosthesis, while 239 were not wearing any prosthesis. Among these 239 subjects, 54 were not wearing any prosthesis due to a lack of awareness, 49 were aware but not wearing one due to economic reasons, 123 felt no deficiencies and 13 had a fear of treatment. Similar results were found by Kahar AR et al., who discovered that the majority of people were not wearing any prosthesis, with the possible reasons being a lack of awareness and motivation among the patients [21]. Nayar S et al., and Makkasare S et al., also reported similar findings in their studies [9,22].

Out of the 131 subjects who were wearing oral prosthesis, 53 were using removable prosthesis, while 78 were using fixed prosthesis. Similar results were found by D'Souza KM and Aras M, who evaluated the correlation between partial edentulism and socio-demographic factors in the Goan population [5]. They found that the majority of people were wearing or had worn fixed prosthesis. The probable reasons for this could be the education and income levels of the population; as these increased, people became more aware and able to access and afford fixed dental treatment.

Regarding the reasons for seeking treatment, the majority of patients sought treatment for functional reasons, while the least sought treatment for psychological reasons, such as self-esteem, social interaction and self-perception. Similar results were found by Rastogi I et al., who evaluated the prevalence and awareness of partial edentulism in the population of Lucknow [11]. She also observed that rural individuals did not shy away from social interactions or feel embarrassed due to missing teeth, whereas a majority of urban residents, especially females, smiled less after tooth loss, felt self-conscious in social situations and consequently avoided going out.

Vadavadagi SV et al., found in their study that the majority of people who lost their teeth were concerned about both aesthetics and mastication [7], while Shetty KB et al., observed that most of the population was concerned about aesthetics when deciding to undergo treatment [20].

Regarding the motivation behind their decision to seek treatment, 298 patients were self-motivated, 56 subjects received advice from relatives or friends and 16 subjects were guided by attending dentists or medical practitioners. Concerning the frequency of dental visits, 34 patients scheduled their dental visits once every six months, 52 scheduled their visits once a year and 284 scheduled their visits only when necessary.

Limitation(s)

Participants may under-report or over-report their dental problems due to social desirability, leading to biased results. The limited sample size and time period prevent broad generalisations to the wider population. Large-scale studies are required to gather baseline oral health data to enhance the planning of prosthodontic services for the community.

CONCLUSION(S)

Within the limitations of the present study, it can be concluded that the prevalence of partial edentulism was notably high among the surveyed population. Although individuals were knowledgeable about various treatment options available, only a small percentage pursued treatment. The study found a significant association between partial edentulism and socio-demographic factors such as age, education level and monthly family income. However, no significant association was observed with gender.

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PARTICULARS OF CONTRIBUTORS:

1. Postgraduate Student, Department of Prosthodontics, MM College of Dental Sciences and Research, Mullana, Ambala, Haryana, India.
2. Professor and Head, Department of Prosthodontics, MM College of Dental Sciences and Research, Mullana, Ambala, Haryana, India.

NAME, ADDRESS, E-MAIL ID OF THE CORRESPONDING AUTHOR:

Dr. Satvika Prasad,
B-6/1, Trihari Residences, Kedarpur, Mothorowala,
Dehradun-248001, Uttarakhand, India.
E-mail: satvikaprasad4029@gmail.com

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QUESTIONNAIRE: ANNEXURE-1

1. **Name:**
2. **Age:** a) 18-30 years b) 31-45 years
c) 45-60 years d) Above 60 years
3. **Sex:** Male/Female
4. **Address:**
5. **Occupation:** a) Employed b) Unemployed c) Others
6. **Education:** a) Illiterate b) Primary school
c) Middle school d) Sec. School
e) Senior Sec. School f) Graduate
g) Postgraduate h) Others
7. **How much is your total family income per month?**
a) Up to ₹5,000 b) ₹5,001 - ₹15,000
c) ₹15,001 - ₹30,000 d) More than ₹30,000
e) Not disclosed
8. **Do you have any missing tooth/teeth?**
a) Yes b) No
9. **If yes, what is the reason for loss of tooth/teeth?**
a) Periodontal b) Caries
c) Caries+Periodontal d) Trauma e) Others
10. **Are you aware of various treatment options available for restoration of same?**
a) Yes b) No
11. **If yes, are you currently wearing an oral prosthesis or have you worn any one in past?**
a) Yes b) No
12. **(A) If no, then please specify the reasons for that**
a) Lack of awareness b) Aware, but economic reasons
c) Felt no deficiencies d) Fear of treatment
12. **(B) If yes, then what type of prosthesis are you wearing?**
a) Removable Prosthesis b) Fixed Prosthesis
13. **What was the main reason associated with edentulism which made you seek treatment?**
a) Aesthetics b) Mastication
c) Phonetics d) Psychological e) Others
14. **How often do you visit dentist?**
a) Once in 6 months b) Once in a year
c) Not regular, only when necessary