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A study of role of flexible dentures in prosthodontics, partial edentulism, smile and esthetics

Isha Rastogi[1]*

[1] *Dept. of Dental, Dr. KNS Memorial Institute Of Medical Sciences, Barabanki, Uttar Pradesh, India*

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ABSTRACT

Introduction: Replacing missing teeth is vital and mandatory for various daily functions of mouth. Conventional acrylic dentures have been used but now flexible dentures are the latest trends.
Aim: This study is done to evaluate knowledge and awareness of flexible dentures in dental professionals.
Materials and Methods: A questionnaire method was used to evaluate dental professionals' knowledge and awareness of flexible dentures in patients.
Results: Few dentists showed positive response and major were not aware of it. Few knew of advantages, disadvantages, uses and materials.
Conclusion: More research should be done in this field so as to utilize this recent option at the maximum for benefit of patients clinically.

1. Introduction

Tooth loss is a prevalent oral health concern globally, with significant implications for masticatory function, phonetics, and esthetics.[1] In India, where oral diseases are widespread and often neglected, the burden of tooth loss is particularly pronounced.[2] According to data from the Indian Council of Medical Research (ICMR), approximately 42% of the Indian population suffers from partial or complete edentulism.[3] This high prevalence underscores the urgent need for effective tooth replacement solutions that are accessible, affordable, and aesthetically pleasing.

Conventional approaches to tooth replacement, such as acrylic dentures, have long been the mainstay of prosthodontic treatment in India.[4] However, these traditional prostheses often present limitations in terms of comfort, stability, and esthetics, leading to suboptimal patient outcomes.[5] Moreover, disparities in access to dental care exacerbate the challenges faced by individuals seeking prosthetic rehabilitation, particularly in rural areas.[6]

In recent years, flexible dentures have emerged as a promising alternative to traditional acrylic dentures, offering several advantages that are particularly well-suited to the Indian context.[7] Flexible denture materials, such as nylon or polyvinyl chloride (PVC), provide enhanced affordability, durability, and ease of fabrication, addressing key barriers to access and acceptance.[8] Additionally, the natural appearance and flexible nature of these dentures offer improved comfort and esthetics, aligning with the preferences of Indian patients.[9]

Despite the potential benefits of flexible dentures, their adoption and utilization in India remain limited, primarily due to factors such as lack of awareness among dental professionals and patients, as well as challenges related to material availability and regulatory issues.[10] Moreover, the dearth of research examining the clinical efficacy and patient satisfaction with flexible dentures in the Indian context hampers their widespread acceptance and integration into clinical practice.

* *Corresponding author*.
E-mail address: excellent123@gmail.com (I. Rastogi).

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This study seeks to address these knowledge gaps by investigating the awareness, attitudes, and practices of dental professionals regarding flexible dentures in India. By assessing the current landscape and identifying barriers to adoption, this research aims to inform strategies for promoting the utilization of flexible dentures and improving the quality of prosthetic care provided to Indian patients with missing teeth.

2. Review of Literature

Flexible denture materials, primarily nylon and polyvinyl chloride (PVC), have been extensively studied for their mechanical properties and biocompatibility. Gupta et al. (2013) conducted a comprehensive review of flexible denture base materials, highlighting their advantages such as enhanced flexibility, durability, and biocompatibility compared to traditional acrylic dentures.[9] Similarly, Singhal et al. (2013) emphasized the esthetic potential of flexible denture materials for removable partial denture frameworks, particularly in cases requiring superior esthetics.[8]

Flexible dentures have emerged as a contemporary alternative to conventional acrylic dentures in prosthodontics, offering several advantages in terms of esthetics, comfort, and durability (Gulati et al., 2019; Singh et al., 2020). These dentures are typically fabricated from thermoplastic materials, such as nylon-based polymers like Valplast, which exhibit flexibility, allowing for better adaptation to the oral tissues and increased patient comfort.[11,12]

Studies have highlighted the clinical applications of flexible dentures, particularly in cases of partial edentulism where traditional dentures may be less suitable due to esthetic concerns or patient discomfort (Shah et al., 2018; Arora et al., 2021). Flexible dentures offer advantages such as improved esthetics, enhanced patient comfort, and increased durability compared to conventional dentures.[13,14]

However, despite their benefits, flexible dentures have some limitations, including higher material costs and limited repairability (Prakash et al., 2019; Choudhary et al., 2020).[15] Some patients may also experience discoloration or deformation of the flexible material over time, necessitating replacement or adjustment.[16,17]

Studies have shown that patients fitted with flexible dentures report higher levels of satisfaction and improved quality of life compared to those wearing conventional dentures.[14,15,17–19] This underscores the importance of flexible dentures in modern dental practice, despite some limitations.

Clinical studies evaluating the performance of flexible dentures have reported favorable outcomes in terms of patient comfort, retention, and durability. However, research comparing the clinical efficacy of flexible dentures to conventional acrylic dentures remains limited, particularly in the Indian context. Prithviraj et al. (2018) conducted an in vitro study assessing the flexural strength of heat-cured polymethylmethacrylate denture resin reinforced with ultra-high molecular weight polyethylene fibers, demonstrating potential improvements in mechanical properties with fiber reinforcement.[10] Nonetheless, further clinical trials are warranted to validate these findings and establish the long-term performance of flexible dentures in diverse patient populations.

Patient satisfaction with flexible dentures has been explored through qualitative studies examining preferences for tooth replacement options. Gupta et al. (2017) conducted a qualitative study among Indian patients, revealing a preference for cost-effective and esthetically pleasing tooth replacement solutions.[20] Flexible dentures, with their natural appearance and affordability, emerged as a favorable option among respondents, highlighting the potential for widespread acceptance in diverse cultural contexts.

Awareness and adoption of flexible dentures among dental professionals have been assessed through surveys evaluating knowledge, attitudes, and practices. Jain et al. (2015) conducted a survey among dental practitioners in India, revealing a limited awareness of flexible dentures and a need for further education and training in this area.[21] These findings underscore the importance of ongoing professional development initiatives to enhance the competency of dental professionals in providing comprehensive prosthetic care.

3. Materials and Methods

A cross-sectional survey was conducted in Lucknow, India, to assess the awareness and knowledge of flexible dentures among dental professionals. A sample size of 80 participants was determined based on the population of dental practitioners in the area. Convenient sampling was utilized to select participants from various dental clinics and hospitals in Lucknow.

A structured questionnaire was developed to collect data on participants' awareness and knowledge of flexible dentures. The questionnaire included multiple-choice questions covering various aspects of flexible dentures, such as their advantages, disadvantages, indications, and materials used in fabrication.

Trained research assistants distributed the questionnaires to participating dental professionals in Lucknow. Participants were briefed about the study's purpose and assured of confidentiality. They were requested to complete the questionnaire voluntarily and return it within a specified time frame.

Descriptive statistics, including frequencies and percentages, were used to analyze the survey responses. The awareness and knowledge of flexible dentures among dental professionals were assessed based on their responses to the questionnaire items. Data analysis was conducted

using statistical software such as SPSS.

Ethical approval was obtained from the Institutional Review Board, and informed consent was obtained from all participants before their participation. Confidentiality of participants' responses was maintained throughout the study.

The study's limitations included the convenience sampling method, which may not fully represent the population of dental professionals in Lucknow, as well as potential biases associated with self-reporting and recall.

4. Result

The results indicate a generally high level of awareness among dental professionals regarding flexible dentures, with the majority answering affirmatively to most of the questions.

All respondents (100%) indicated that they were aware of flexible dentures, suggesting widespread knowledge of this prosthodontic option among the surveyed professionals.

A large proportion (86.25%) of respondents reported giving flexible dentures in their practice, demonstrating a considerable implementation of this treatment modality.

Similarly, a majority (89%) expressed a willingness to advise patients for flexible dentures in the future, indicating a positive attitude towards recommending this treatment option.

Regarding knowledge of the advantages and disadvantages of flexible dentures, a higher proportion of respondents were aware of the advantages (59%) compared to the disadvantages (51%).

Knowledge about the other uses of flexible dentures and their indications was relatively lower, with only 40% and 41.8% of respondents being aware of these aspects, respectively.

Awareness of the dental materials used in flexible dentures, specifically flexible resins, was the lowest among the surveyed professionals, with only 36.7% indicating knowledge in this area.

Overall, the results suggest a need for further education and training to enhance awareness and knowledge regarding flexible dentures, particularly concerning their disadvantages, alternative uses, indications, and the materials used in their fabrication. This would enable dental professionals to make more informed decisions and provide comprehensive care to their patients.

4.1. Interpretation

The correlation analysis revealed several significant relationships between different aspects of awareness and knowledge of flexible dentures among dental professionals.

First, there was a strong positive correlation between awareness of flexible dentures and the practice of providing them ($r = 0.881$, $p < 0.05$). This suggests that dental professionals who are aware of flexible dentures are more likely to offer them to their patients in practice.

Second, a moderate positive correlation was found between awareness of flexible dentures and the likelihood of advising patients for them in the future ($r = 0.654$, $p < 0.05$). This indicates that dental professionals who are aware of flexible dentures are more inclined to recommend them to their patients.

Third, there was a moderate positive correlation between awareness of flexible dentures and knowledge of their advantages ($r = 0.577$, $p < 0.05$). This suggests that dental professionals who are more aware of flexible dentures are also more likely to be knowledgeable about their benefits.

Additionally, a strong positive correlation was observed between awareness of flexible dentures and knowledge of their disadvantages ($r = 0.786$, $p < 0.05$). This indicates that dental professionals who are aware of flexible dentures are also likely to be knowledgeable about their drawbacks.

Furthermore, a weak positive correlation was found between awareness of flexible dentures and knowledge of their other uses ($r = 0.314$, $p < 0.05$). This suggests that awareness of flexible dentures may be associated with some degree of knowledge about their alternative applications.

Similarly, there was a weak positive correlation between awareness of flexible dentures and knowledge of their indications ($r = 0.322$, $p < 0.05$). This implies that awareness of flexible dentures may be associated with some degree of knowledge about when they are indicated for use.

Lastly, a weak positive correlation was observed between awareness of flexible dentures and knowledge of the materials used in their fabrication ($r = 0.290$, $p < 0.05$). This suggests that awareness of flexible dentures may be associated with some degree of knowledge about the materials used in their construction.

Correlation analysis revealed significant positive relationships between awareness and various aspects of knowledge regarding flexible dentures among dental professionals. These findings underscore the importance of awareness in facilitating knowledge acquisition and decision-making related to the use of flexible dentures in clinical practice. Further research and educational interventions may be warranted to enhance awareness and understanding of flexible dentures among dental professionals.

5. Discussion

The study aimed to evaluate the knowledge and awareness of flexible dentures among dental professionals. The findings from the survey reveal various insights into the understanding and practices related to flexible dentures in prosthodontics, addressing partial edentulism, smile, and esthetics.

The results indicate a high level of awareness among dental professionals regarding flexible dentures, with all

Table 1: Frequency distribution of knowledge and awareness towards flexible dentures.

Variables		Yes	No
1.	Do you know of flexible dentures?	79	0
2.	Do you give flexible dentures in Practice	69	10
3.	Will you advise patients for flexible dentures in future	71	8
4.	Do you know about advantages of flexible dentures? Esthetic/ no metal clasp/comfort/strength/provisional dentures/accuracy/biocompatible?	59	20
5.	Do you know about disadvantages of flexible dentures? Stress distribution/discoloration/deboning of teeth/interact space/repair relining definitive prosthesis	51	28
6.	Do you know other uses of flexible dentures? In Sleep Apnea/night guards/trauma/injuries/disease?	32	48
7.	Do you know that flexible dentures are indicated in undercuts/tilted teeth/deranged occlusion/tongue lessons ulcers	33	46
8.	Do you know about dental materials used in flexible denture as flexible resins.	29	50

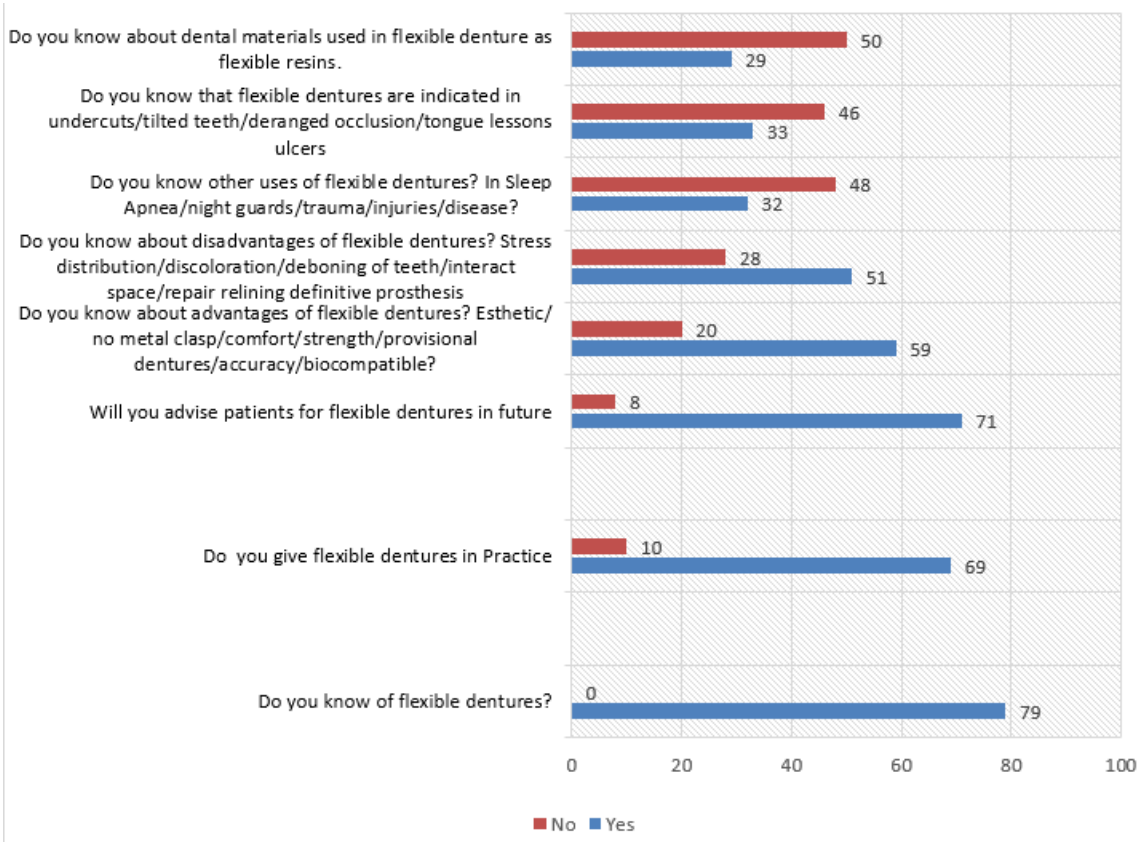

Figure 1: Chart title

Table 2: Correlation test of knowledge and awareness towards flexible dentures.

	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8
Q1	1							
Q2		1						
Q3		0.88174	1					
Q4		0.653863	0.576537	1				
Q5		0.513785	0.453025	0.785769	1			
Q6		0.314124	0.276976	0.480413	0.611392	1		
Q7		0.322443	0.284311	0.493136	0.627584	0.9742	1	
Q8		0.289928	0.255641	0.443407	0.564297	0.922971	0.899158	1

respondents stating their knowledge of this treatment option. However, while the majority reported giving flexible dentures in their practice and expressing a willingness to advise patients for them in the future, there were discrepancies in actual implementation. This suggests that while awareness is high, there may be barriers to the full adoption of flexible dentures in clinical practice.

The survey revealed that a significant proportion of respondents were aware of the advantages of flexible dentures, such as their esthetic appeal, comfort, and biocompatibility. However, the awareness of disadvantages, including issues like stress distribution, discoloration, and debonding of teeth, was comparatively lower. This highlights the importance of enhancing education and training programs to ensure that dental professionals have a comprehensive understanding of both the benefits and drawbacks associated with flexible dentures.

The study found that awareness of the alternative uses of flexible dentures, such as in sleep apnea, night guards, and trauma cases, was relatively low among respondents. Similarly, knowledge of the indications for flexible dentures, including undercuts, tilted teeth, and tongue lesions, was also limited. These findings underscore the need for increased awareness and education regarding the diverse applications and clinical scenarios where flexible dentures can be beneficial.

The survey revealed a lack of knowledge among dental professionals regarding the materials used in flexible dentures, particularly flexible resins. This gap in understanding suggests a need for additional training and education to familiarize dental professionals with the materials used in flexible denture fabrication, their properties, and their implications for clinical outcomes.

Overall, the findings of this study have important implications for clinical practice in prosthodontics. They highlight the need for ongoing education and training programs to enhance awareness, knowledge, and implementation of flexible dentures among dental professionals. Improving understanding of the advantages, disadvantages, alternative uses, indications, and materials associated with flexible dentures can lead to better treatment outcomes and patient satisfaction.

It's important to acknowledge the limitations of this study, including its small sample size and single-location focus. Future research could involve larger, multi-center studies to provide a more comprehensive understanding of knowledge and awareness levels regarding flexible dentures among dental professionals across different regions. Additionally, qualitative studies exploring the factors influencing the adoption of flexible dentures in clinical practice could provide valuable insights into barriers and facilitators to implementation.

6. Conclusion

The study aimed to evaluate the knowledge and awareness of flexible dentures among dental professionals, focusing on their role in prosthodontics, addressing partial edentulism, smile, and esthetics. The findings provide valuable insights into the understanding and practices related to flexible dentures, highlighting both strengths and areas for improvement within the dental community.

Overall, the results indicate a high level of awareness among dental professionals regarding flexible dentures, with all respondents reporting familiarity with this treatment option. However, while awareness was high, there were discrepancies in the implementation of flexible dentures in clinical practice. While a majority of respondents reported giving flexible dentures and expressing a willingness to advise patients for them in the future, actual implementation varied, suggesting potential barriers to adoption in clinical settings.

Furthermore, while respondents demonstrated good awareness of the advantages of flexible dentures, such as esthetic appeal, comfort, and biocompatibility, there was relatively lower awareness of the associated disadvantages, such as stress distribution and discoloration. Additionally, knowledge of alternative uses and indications for flexible dentures, as well as the materials used in their fabrication, was limited among respondents.

These findings underscore the importance of ongoing education and training initiatives to enhance awareness, knowledge, and implementation of flexible dentures among dental professionals. Improving understanding of both the benefits and drawbacks of flexible dentures, as well as their diverse applications and materials, can lead to better treatment outcomes and patient satisfaction in prosthodontic care.

7. Source of Funding

None.

8. Conflict of Interest

None.

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Author biography

Isha Rastogi, Associate Professor

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