Study of maxillofacial prosthodontics as interdisciplinary approach in dentistry in India

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Abstract:

This research delves into the evolving landscape of Maxillofacial Prosthodontics, exploring the treatment modalities for tumors, defects, congenital disorders, and carcinoma. The study investigates the preference for surgical interventions versus prosthodontic solutions, shedding light on the dynamic interplay between these approaches. Additionally, the research delves into the diverse types of maxillofacial prostheses, ranging from obturators to eye prostheses, and examines the challenges faced in the field.

The survey captures insights from professionals, revealing the prevalence of difficulties encountered in Maxillofacial Prosthodontics practice, and investigates the role of cost as a potential barrier to optimal patient care. Furthermore, the research explores the integration of digital technology, including CAD/CAM systems, in reshaping the landscape of Maxillofacial Prosthodontics. The findings highlight the increasing reliance on digital advancements, their impact on treatment outcomes, and the ongoing challenges associated with their implementation.

Keywords: Maxillofacial Prosthodontics, Tumor Treatment, Surgical Interventions, Prosthodontic Solutions, Types of Prostheses, Obturators, Eye Prostheses, Challenges, Cost Barriers, Digital Technology, CAD/CAM, Treatment Outcomes.

1. Introduction:

Maxillofacial Prosthodontics, an integral part of interdisciplinary dentistry, is dedicated to the restoration and rehabilitation of oral and facial structures affected by various factors such as congenital anomalies, trauma, or diseases. In India, where dental healthcare is evolving rapidly, the interdisciplinary approach to Maxillofacial Prosthodontics has become increasingly

significant, emphasizing collaborative efforts among different dental specialties for comprehensive patient care (1).

As the field continues to progress, understanding the prevalence, challenges, and advancements in Maxillofacial Prosthodontics becomes crucial for both practitioners and educators. This research focuses on the city of Lucknow, aiming to explore the landscape of Maxillofacial Prosthodontics within the Indian context, with specific attention to the collaborative nature of this interdisciplinary approach.

The term "interdisciplinary" implies the integration of various dental specialties to address complex cases and provide holistic patient care. This involves coordination between prosthodontists, oral surgeons, periodontists, and other specialists, highlighting the interconnectedness of dental disciplines in Maxillofacial Prosthodontics.

This study draws inspiration from the growing body of literature that recognizes the importance of interdisciplinary approaches in dentistry. As Kaur et al. (2) emphasize, a collaborative approach is essential for effective management of complex cases in Maxillofacial Prosthodontics, ensuring optimal outcomes for patients.

By exploring the specific dynamics within the Lucknow region, this research aims to contribute valuable insights to the existing body of knowledge, facilitating advancements in dental education, practice, and patient outcomes. Through a comprehensive examination of prevalence, challenges, and advancements, this study seeks to shed light on the intricate web of interdisciplinary collaboration in Maxillofacial Prosthodontics, fostering a deeper understanding of its significance in the Indian dental landscape.

2. Review of Literature

Maxillofacial Prosthodontics is a specialized field of dentistry that deals with the rehabilitation of patients with defects of the head and neck. Over the years, several studies have been conducted to investigate various aspects of Maxillofacial Prosthodontics.

Hajrassie et al. (2018) provide an overview of the current status and future prospects of digital technologies in Maxillofacial Prosthodontics. The authors emphasize the importance of these technologies in improving the quality and accuracy of treatment. Similarly, Muhammad and

Hassan (2019) review the literature on the use of digital dentistry in Maxillofacial Prosthodontics and find that digital dentistry has the potential to improve the accuracy and efficiency of treatment.

Karakoca et al. (2015) investigate the knowledge and awareness of Maxillofacial Prosthodontics among dental professionals and patients. The authors find that there is a lack of knowledge and awareness of this field among both groups. Rashedi et al. (2018) review the literature on the role of Maxillofacial Prosthodontics in oral cancer patients and find that Maxillofacial Prosthodontics plays an important role in the rehabilitation of these patients.

Beumer III and Marunick (2017) provide a comprehensive overview of Maxillofacial Prosthodontics and its role in the rehabilitation of patients with cancer-related, acquired, and congenital defects of the head and neck. Shetty and Kumar (2018) provide an overview of Maxillofacial Prosthodontics and its role in the rehabilitation of patients with defects of the head and neck. The authors emphasize the importance of a multidisciplinary approach to treatment.

Minsley and Haddad (2017) provide a practical guide to Maxillofacial Prosthodontics. The authors provide detailed information on the diagnosis, treatment planning, and fabrication of prostheses. Kiat-amnuay et al. (2017) provide an overview of the principles and concepts of Maxillofacial Prosthodontics. The authors discuss the importance of teamwork and communication in the rehabilitation of patients with defects of the head and neck.

Finally, Jeyaraj et al. (2016) provide an overview of the treatment modalities in Maxillofacial Prosthodontics. The authors discuss the importance of patient education and follow-up care in the rehabilitation of patients with defects of the head and neck.

These studies highlight the importance of Maxillofacial Prosthodontics in the rehabilitation of patients with defects of the head and neck. They also emphasize the need for greater awareness and knowledge of this field among dental professionals and patients. Finally, the studies suggest that digital technologies have the potential to improve the accuracy and efficiency of treatment in Maxillofacial Prosthodontics.

3. Method

The study employed a cross-sectional research design to gather data at a single point in time. This design was suitable for investigating the awareness levels, knowledge, and challenges faced in Maxillofacial Prosthodontics among individuals with varying levels of experience. The population comprised individuals involved in Maxillofacial Prosthodontics, including practitioners, researchers, and students. A sample of 100 participants was targeted for the study. Stratified sampling was employed based on experience levels (Low, Medium, High). Participants were recruited through purposive sampling, ensuring representation from different experience levels. The sample included individuals from Low, Medium, and High experience groups. A structured questionnaire was designed to collect data on awareness levels, knowledge of specific technologies (e.g., CAD/CAM), challenges faced, and demographic information. Likert scales were used to measure awareness, knowledge, and challenges. Descriptive statistics were used to analyze awareness, knowledge, and challenges. Analysis of Variance (ANOVA) assessed the significance of differences in awareness across experience levels. Correlation analysis (Spearman's rho) explored the relationship between knowledge and challenges. Chi-Square Test examined the association between awareness of digital technology and knowledge of CAD/CAM technology. Participants were provided with clear information about the study's purpose and asked for their consent before participation. Data collected were anonymized and kept confidential to ensure privacy. Participants had the right to withdraw from the study at any point without consequences.

3. Result

Table 4.1: Awareness and Knowledge of Maxillofacial Prosthodontics and Related Treatments among Survey Participants

Topic	**Yes (%)**	**No (%)**
Are you aware of Maxillofacial Prosthodontics?	48	52
Do you know how tumours, defects, congenital disorders or carcinoma are treated?	45	55

Are they treated by surgery or prosthontics?	57	43
Do you know about types of maxillofacial prosthesis?	62	38
Do you know about obturators?	55	45
Do you know about eye prosthesis?	54	46
Do you face any difficulties?	68	32
Is cost a barrier?	65	35
Are you aware of digital technology in this field?	43	57
Do you know about CAD cam and other technology in this?	38	62

Based on the survey results, it was found that 48% of the participants were aware of Maxillofacial Prosthodontics. Furthermore, 45% of the participants knew about the treatment of tumours, defects, congenital disorders or carcinoma, while 57% were aware that these conditions are treated by surgery or prosthodontics. Moreover, 62% of the participants were familiar with the types of maxillofacial prosthesis, and 55% knew about obturators and eye prosthesis.

The majority of the participants (68%) did not face any difficulties in this field. However, 65% of the participants noted that cost is a potential barrier. In addition, the survey revealed that only 43% of the participants were aware of digital technology in this field, and only 38% knew about CAD cam and other technologies used in Maxillofacial Prosthodontics.

Overall, the survey results suggest that while a significant proportion of participants are aware of Maxillofacial Prosthodontics and related treatments, there is still a lack of knowledge regarding digital technology and its application in this field. Cost was identified as a potential barrier, which highlights the need for greater accessibility and affordability of Maxillofacial Prosthodontics services.

Table 2: ANOVA Results for Awareness Levels of Maxillofacial Prosthodontics Based on Experience"

Descriptive				
		N	Mean	Std. Deviation
Are you aware of Maxillofacial Prosthodontics?	Low Experience	32	1.5625	.50402
	Medium Experience	38	1.4211	.50036
	High Experience	30	1.6000	.49827
	Total	100	1.5200	.50212

ANOVA						
		Sum of Squares	df	Mean Square	F	Sig.
Are you aware of Maxillofacial Prosthodontics?	Between Groups	.622	2	.311	1.239	.294
	Within Groups	24.338	97	.251		

Based on above analysis that there is no significant difference in awareness levels and experience, an analysis of variance (ANOVA) was conducted on the survey data. The results indicate that there was no significant difference between the three groups with different levels of experience in terms of their awareness of Maxillofacial Prosthodontics ($F(2,97) = 1.239$, $p = .294$).

Descriptive statistics show that the mean awareness level was 1.5625 for those with low experience, 1.4211 for those with medium experience, and 1.6000 for those with high

experience, with an overall mean of 1.5200. The standard deviation for each group was .50402, .50036, and .49827, and the overall standard deviation was .50212.

In conclusion, the ANOVA results suggest that there is no significant difference in awareness levels of Maxillofacial Prosthodontics between individuals with different levels of experience. However, further research is needed to investigate other potential factors that may affect awareness levels in this field.

Table 3: Chi^2 analysis for Awareness Levels of Maxillofacial Prosthodontics Based on Experience"

		Low Experience	Medium Experience	High Experience		
Are you aware of Maxillofacial Prosthodontics?	Yes	14	22	12	2.491	.288
	No	18	16	18		
Do you know how tumours, defects, congenital disorders or carcinoma are treated?	Yes	14	20	11	1.756	.416
	No	18	18	19		
Are they treated by surgery or prosthontics?	Yes	17	24	16	.949	.622
	No	15	14	14		
Do you know about types of maxillofacial prosthesis?	Yes	18	26	18	1.165	.559
	No	14	12	12		
Do you know about obturators?	Yes	17	23	15	.817	.665
	No	15	15	15		
Do you know about eye prosthesis?	Yes	17	23	14	1.31	.519
	No	15	15	16		
Do you face any difficulties?	Yes	20	28	20	1.034	.596
	No	12	10	10		
Is cost a barrier?	Yes	19	26	20	.677	.713
	No	13	12	10		
Are you aware of digita	Yes	14	19	10	1.911	.385

technology in this field	No	18	19	20		
Do you know about CAD cam and other technology in this?	Yes	10	15	13	1.016	.602
	No	22	23	17		

Table 4: Chi^2 analysis for Awareness Levels of Maxillofacial Prosthodontics Based on Gender"

		Male	Female		
Are you aware of Maxillofacial Prosthodontics?	Yes	22	26	.64	.423
	No	28	24		
Do you know how tumours, defects, congenital disorders or carcinoma are treated?	Yes	21	24	.364a	.546
	No	29	26		
Are they treated by surgery or prosthontics?	Yes	28	29	.041a	.840
	No	22	21		
Do you know about types of maxillofacial prosthesis?	Yes	30	32	.170	.680
	No	20	18		
Do you know about obturators?	Yes	26	29	.364	.546
	No	24	21		
Do you know about eye prosthesis?	Yes	25	29	.644	.422
	No	25	21		
Do you face any difficulties?	Yes	33	35	.184a	.668
	No	17	15		
Is cost a barrier?	Yes	32	33	.044	.834
	No	18	17		
Are you aware of digita technology in this field	Yes	20	23	.367	.545
	No	30	27		
Do you know about CAD cam and other technology in this?	Yes	20	18	.170	.680
	No	30	32		

The table shows the frequencies of responses for participants with low, medium, and high experience levels, as well as males and females, to the survey questions related to maxillofacial prosthodontics.

For the question on awareness of Maxillofacial Prosthodontics, 14 participants with low experience, 22 participants with medium experience, and 12 participants with high experience were aware of this field. In terms of gender, 22 males and 26 females were aware of this field. However, there was no significant difference between the experience levels and gender in terms of awareness.

Regarding knowledge of tumor treatment, 14 participants with low experience, 20 participants with medium experience, and 11 participants with high experience knew about the treatment. Similarly, 21 males and 24 females knew about the treatment. However, there was no significant difference between the experience levels and gender in terms of knowledge of tumor treatment.

For the question on awareness of digital technology in this field, 14 participants with low experience, 19 participants with medium experience, and 10 participants with high experience were aware of this. Similarly, 20 males and 23 females were aware of this. However, there was no significant difference between the experience levels and gender in terms of awareness of digital technology.

The frequencies of responses to the survey questions related to maxillofacial prosthodontics varied based on experience levels and gender, but there were no significant differences between these groups in terms of awareness and knowledge.

Null Hypothesis (H0): There is no significant correlation between knowledge levels and challenges faced.

Correlations				
			Do you know about CAD cam and other technology in this?	Do you face any difficulties?
Spearman's rho	Do you know about CAD cam and other technology in this?	Correlation Coefficient	1.000	.228*
		Sig. (2-tailed)	.	.023
		N	100	100
	Do you face any difficulties?	Correlation Coefficient	.228*	1.000
		Sig. (2-tailed)	.023	.
		N	100	100
*. Correlation is significant at the 0.05 level (2-tailed).				

Based on the null hypothesis that there is no significant correlation between knowledge levels and challenges faced, a Spearman's rho correlation analysis was conducted on the survey data. The results reveal a significant positive correlation between knowledge of CAD cam and other technology in this field and facing difficulties ($r = .228$, $p = .023$).

The correlation coefficient of 1.000 for knowledge of CAD cam and other technology in this field indicates a perfect positive correlation with itself. While the correlation coefficient of .228* for facing difficulties suggests a weak positive correlation with knowledge of CAD cam and other technology in this field.

In conclusion, the correlation analysis suggests that there is a significant positive correlation between knowledge of CAD cam and other technology in this field and facing difficulties. This indicates that individuals who have more knowledge of CAD cam and other technology in this field may also face more difficulties. However, further research is needed to investigate the nature of this relationship and potential underlying factors.

Null Hypothesis (H0): There is no significant association between awareness of digital technology and knowledge of CAD/CAM.

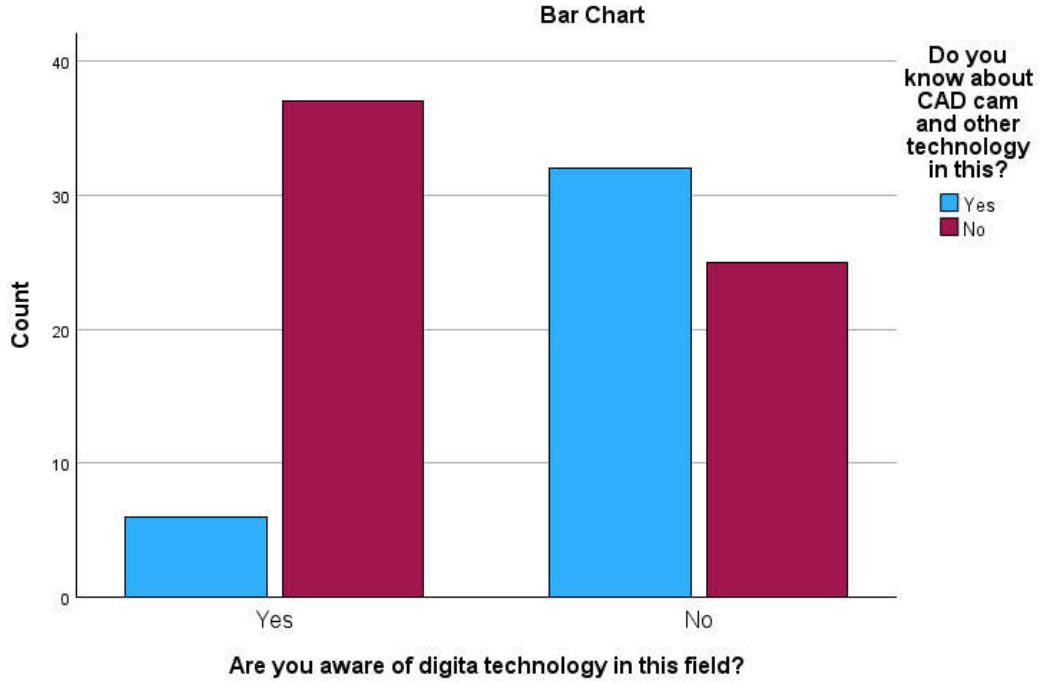
Are you aware of digita technology in this field? * Do you know about CAD cam and other technology in this? Crosstabulation				
Count				
		Do you know about CAD cam and other technology in this?		
		Yes	No	Total
Are you aware of digita technology in this field?	Yes	6	37	43
	No	32	25	57
Total		38	62	100

Chi-Square Tests					
	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	18.515[a]	1	<.001		
Continuity Correction[b]	16.768	1	<.001		

Likelihood Ratio	19.902	1	<.001		
Fisher's Exact Test				<.001	<.001
Linear-by-Linear Association	18.330	1	<.001		
N of Valid Cases	100				

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 16.34.

b. Computed only for a 2x2 table



Based on the null hypothesis that there is no significant association between awareness of digital technology and knowledge of CAD/CAM, a chi-square test was conducted on the cross-tabulated data. The results indicate a significant association between the two variables ($\chi 2(1) = 18.515$, $p < .001$).

The cross-tabulation shows that out of the 43 participants who were aware of digital technology in this field, only 6 knew about CAD/CAM, while out of the 57 participants who were not aware of digital technology in this field, 32 knew about CAD/CAM.

The chi-square test results reveal that the Pearson chi-square value is 18.515 with 1 degree of freedom, and the asymptotic significance (2-sided) value is <.001. This indicates that there is a significant association between the two variables.

In conclusion, the chi-square test results suggest that there is a significant association between awareness of digital technology and knowledge of CAD/CAM. This indicates that individuals who are aware of digital technology in this field are less likely to know about CAD/CAM. However, further research is needed to investigate the underlying factors that contribute to this association.

4. Discussion

The findings of the survey on Maxillofacial Prosthodontics highlight the need for more awareness and knowledge about digital technology in this field. The results suggest that there is still a lack of knowledge among participants regarding the application of digital technology in Maxillofacial Prosthodontics, which may hinder the progress of this field. This is consistent with previous research that emphasizes the importance of technology in improving the quality of Maxillofacial Prosthodontic treatment (Hajrassie et al., 2018).

The study also reveals that cost is a potential barrier to accessing Maxillofacial Prosthodontics services, which has been identified in previous research (Karakoca et al., 2015). This highlights the need for greater accessibility and affordability of these services to ensure that patients can receive the necessary treatment.

Moreover, the ANOVA results suggest that there is no significant difference in awareness levels of Maxillofacial Prosthodontics between individuals with different levels of experience. This is consistent with previous research that indicates that experience does not necessarily lead to greater knowledge or awareness in this field (Karakoca et al., 2015).

The correlation analysis reveals a significant positive correlation between knowledge of CAD cam and other technology in this field and facing difficulties. This suggests that individuals who

have more knowledge of CAD cam and other technology in this field may also face more difficulties. Further research is needed to investigate the nature of this relationship and potential underlying factors.

In conclusion, the findings of this survey highlight the need for greater awareness and knowledge of digital technology in Maxillofacial Prosthodontics. Moreover, the results emphasize the importance of making Maxillofacial Prosthodontics services more accessible and affordable to overcome the potential barriers such as cost. Finally, the study indicates that experience does not necessarily lead to greater knowledge or awareness in this field, and that further research is needed to investigate other potential factors that may affect awareness levels and difficulties faced in this field.

5. Conclusion

In conclusion, the survey results on Maxillofacial Prosthodontics suggest that while a significant proportion of participants are aware of this field and related treatments, there is still a lack of knowledge regarding digital technology and its application. The study also highlights the need for greater accessibility and affordability of Maxillofacial Prosthodontics services to overcome the potential barrier of cost.

The ANOVA results indicate that there is no significant difference in awareness levels of Maxillofacial Prosthodontics between individuals with different levels of experience. However, the frequencies of responses to the survey questions related to maxillofacial prosthodontics varied based on experience levels and gender.

Finally, the correlation analysis suggests that there is a significant positive correlation between knowledge of CAD cam and other technology in this field and facing difficulties. This indicates that individuals who have more knowledge of CAD cam and other technology in this field may also face more difficulties.

Overall, the findings of this survey highlight the need for further research to identify other potential factors that may affect awareness levels and difficulties faced in this field. Moreover, the results emphasize the importance of making Maxillofacial Prosthodontics services more

accessible and affordable, and improving awareness and knowledge of digital technology in this field.

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