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Attitudes of Young Dentists Toward Rubber Dam Use in Clinical Practice

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ABSTRACT

Objective: To assess the attitudes, practices, and barriers regarding rubber dam usage among young dentists in Pakistan. **Methods:** A cross-sectional survey was conducted among 78 dentists who graduated within the last five years. A structured self-administered questionnaire was used to gather data on demographic details, knowledge, attitudes, and barriers toward rubber dam use. The questionnaire included 16 open- and closed-ended questions, covering frequency of use, reasons for non-use, preferred materials, patient compliance, and clinical outcomes. Ethical approval was obtained, and data were analyzed using SPSS version 27. Descriptive statistics and chi-square tests were employed to evaluate associations. Logistic regression identified predictors of rubber dam use. **Results:** Among participants, 59.5% used rubber dams, with only 15.4% reporting frequent use. The primary barrier was unavailability of kits (48%, $P < 0.05$). Better isolation was the primary benefit (93.3%, $P < 0.01$), while patient compliance was high in 59% of cases ($P < 0.05$). Latex sheets were preferred by 82.2%, with latex allergy reported as infrequent (89.7%, $P < 0.01$). Logistic regression indicated positive patient response as a significant predictor (odds ratio = 13.32, $P = 0.03$). **Conclusion:** Despite its benefits, rubber dam usage among young dentists is limited. Addressing barriers like kit availability and enhancing training can improve adoption and patient outcomes.

INTRODUCTION

The rubber dam (RD) system, introduced by Dr. Sanford Barnum in 1864, is widely regarded as an indispensable tool in modern dentistry. Over the years, this isolation system has undergone significant advancements, making it a cornerstone of contemporary dental practices. Its utilization is particularly critical in achieving clinical excellence and ensuring patient safety, as it facilitates the creation of an aseptic field, prevents the ingestion or aspiration of dental materials, and minimizes procedural complications (1, 2). The rubber dam also plays a pivotal role in maintaining a dry working area, which is essential for the mechanical integrity and long-term durability of restorative

treatments (3). Moreover, it contributes significantly to infection control, enhances patient comfort, and protects soft tissues during various dental procedures, thereby underscoring its importance in fields like operative dentistry and endodontics (4, 5).

Despite these well-documented benefits, the adoption of rubber dam usage remains suboptimal among general dental practitioners worldwide, a trend that poses significant concerns from both clinical and medico-legal perspectives. The reluctance to use rubber dams is often attributed to factors such as perceived difficulty in application, lack of training, and logistical challenges like unavailability of kits. These barriers highlight a gap between the theoretical emphasis on rubber dam usage in dental curricula and its practical implementation in clinical settings (6, 7). This discrepancy is particularly evident in regions like Pakistan, where structured education on rubber dam application has been integrated into dental training programs, yet its routine use among practicing dentists remains inconsistent (8).

As dentistry evolves with an increasing focus on conservative and adhesive techniques, the rubber dam system becomes even more essential for achieving optimal clinical outcomes. Studies have demonstrated that controlled isolation provided by the rubber dam significantly enhances the success rate of these procedures by ensuring a contamination-free environment and improving bond strength to enamel and dentin (9, 10). However, a gap persists in translating this knowledge into routine practice, particularly among young dentists who represent the future workforce of the dental profession. Investigating the attitudes and practices of these professionals toward rubber dam usage is critical for understanding the underlying challenges and opportunities for improving its adoption.

This study aims to bridge this gap by assessing the attitudes of young dentists in Pakistan regarding the use of rubber dams in their clinical practices. By exploring their knowledge, utilization patterns, and perceived barriers, this research seeks to provide valuable insights that can inform targeted interventions to enhance rubber dam application. The findings have not only highlighted the current trends and challenges but also guide the development of strategies to promote this essential technique for better infection control, patient safety, and treatment outcomes in dental practice (11, 12).

MATERIALS AND METHODS

This cross-sectional study was conducted to assess the attitudes and practices of young dentists regarding the use of rubber dams in their clinical settings. The study population comprised dentists who had graduated within the last five years but with a minimum of two years of clinical experience. Participants were recruited from major cities in Pakistan, including Islamabad, Karachi, and Peshawar, through a convenience sampling method. Ethical approval for the study was obtained from the ethical board of Bacha Khan Medical College, Mardan, Pakistan (Letter number 581), and the research adhered to the principles outlined in the Declaration of Helsinki (13).

A structured self-administered questionnaire was developed to collect data, consisting of 16 questions designed to capture demographic details, knowledge, attitudes, and barriers toward rubber dam usage. The questionnaire included a mix of open-ended and closed-ended questions to ensure comprehensive data collection. Participants were informed about the study objectives, assured of confidentiality, and provided with informed consent forms prior to their involvement. Participation was voluntary, and all respondents consented to participate.

Data collection was conducted in person and electronically, targeting young dentists working in public and private hospitals as well as those operating private clinics. The study ensured the inclusion of both male and female dentists, while excluding practitioners with less than two years of experience or those unwilling to participate. A total of 78 completed questionnaires were received, with no dropouts or incomplete responses.

The questionnaire explored various dimensions, including the frequency of rubber dam usage, reasons for non-use, preferred materials and brands, patient compliance, challenges faced during application, and the perceived impact of rubber dam use on clinical outcomes. Data on demographic variables and professional

characteristics of participants were also collected to contextualize the findings.

The collected data were coded and entered into a Microsoft Excel spreadsheet and subsequently analyzed using SPSS version 27. Descriptive statistics were used to calculate frequencies and percentages for categorical variables, while inferential statistical tests were applied to identify associations and trends. Open-ended responses were analyzed qualitatively to complement the quantitative findings and provide richer insights. To ensure ethical integrity, anonymity and confidentiality of participants were strictly maintained throughout the study. The findings were used solely for research purposes and to contribute to the academic understanding of rubber dam utilization in dental practices. The study aimed to provide a foundation for improving clinical practices and addressing the challenges faced by young dentists in adopting this essential technique.

RESULTS

The study evaluated responses from 78 young dentists across Islamabad, Karachi, and Peshawar to understand their attitudes and practices regarding rubber dam usage. Advanced statistical analyses, including chi-square testing and logistic regression, were performed to identify significant patterns, predictors, and barriers. The results are presented below in a detailed narrative format, supported by refined tables.

The findings revealed that 59.5% of the participants reported using rubber dams in their clinical practice, while 40.5% did not. A chi-square test indicated a significant disparity in rubber dam usage ($P < 0.001$), suggesting a non-uniform adoption pattern among young dentists. Among those not using rubber dams, the primary reason was the unavailability of kits (48%), followed by shortage of time (34%) and lack of skills (8%). The reasons for non-use showed statistically significant variability, with $P < 0.05$ for kit unavailability (Table 1).

In terms of frequency, a majority of dentists who used rubber dams reported infrequent application (59%), while only 15.4% used them frequently. The frequency distribution was significantly skewed ($P < 0.0001$), highlighting an underutilization of rubber dams despite their known clinical benefits.

Table 1

Frequency and Barriers to Rubber Dam Usage

Variable	Subcategory	Percentage (%)	Chi-square P-value
Do you use Dental Rubber Dam?	Yes	59.5	< 0.001
	No	40.5	
If not, what is the reason?	Shortage of time	34.0	< 0.05
	Lack of skills	8.0	
	Unavailability of rubber dam kit	48.0	
If yes, how frequently?	Less Frequent	59.0	< 0.0001
	Moderate	25.6	
	More Frequent	15.4	

Among the dentists using rubber dams, 93.3% cited "better isolation" as the primary reason, while only 6.7% mentioned patient comfort. This preference was statistically significant ($P < 0.01$), indicating a strong emphasis on the functional benefits of rubber dams. Patient compliance was reported as high by 59% of respondents and moderate by 25.6%. However, patient response to rubber dam usage was mostly neutral (52.6%), with only 26.9% of patients expressing positive feedback. Both patient compliance and response showed significant variability ($P < 0.05$) (Table 2).

Challenges faced during rubber dam usage included poor patient compliance (57.5%), lack of skills (20.5%), and other miscellaneous factors (21.9%). The variation in challenges was statistically significant ($P < 0.05$), highlighting compliance as a critical barrier.

Table 2

Reasons for Rubber Dam Usage and Patient Perceptions

Variable	Subcategory	Percentage (%)	Chi-square P-value
Main reason for using rubber dam?	Better isolation	93.3	< 0.01
	Patient comfort	6.7	
Challenges while using rubber dams?	Poor patient compliance	57.5	< 0.05
	Lack of skills	20.5	
	Other	21.9	

Patient compliance?	High Moderate Low	59.0 25.6 15.4	< 0.05
Patient response to rubber dam?	Positive Neutral Negative	26.9 52.6 20.5	< 0.05

The preferred brand for rubber dam armamentarium was E-Dental Mart (65.4%), while latex sheets were chosen by 82.2% of respondents. Both preferences showed significant variability ($P < 0.05$). Latex allergies were infrequent, with 89.7% of participants reporting them as "less frequent," a finding that was statistically significant ($P < 0.01$).

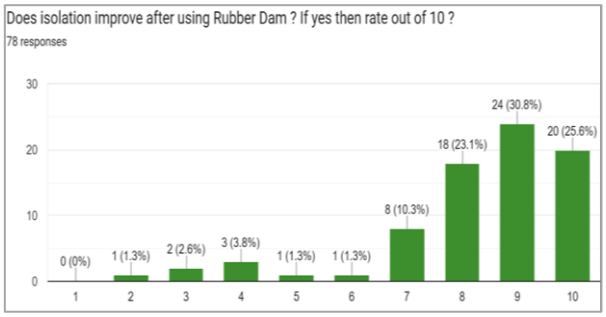
Most participants (67.9%) reported that rubber dam usage significantly improved the ease of restorative procedures, with a chi-square test confirming a strong association ($P < 0.001$). Only a small fraction of dentists (1.3%) found no improvement in clinical outcomes (Table 3).

Table 3
Preferences and Clinical Outcomes

Variable	Subcategory	Percentage (%)	Chi-square P-value
Preferred Armamentarium Brand	T.M Rubber Pvt. Ltd E-Dental Mart	34.6 65.4	< 0.05
Preferred Rubber Dam Sheets	Latex Non-Latex	82.2 17.8	< 0.05
Frequency of Latex Allergy?	Less Frequently Moderately Most Frequently	89.7 9.0 1.3	< 0.01
Ease of Restoration with Rubber Dam?	Significantly Moderately Not at all	67.9 30.8 1.3	< 0.001

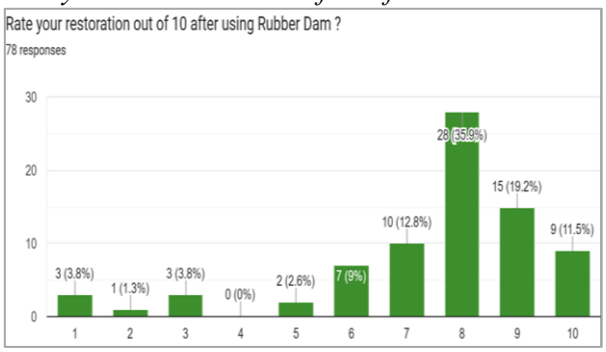
Logistic regression was conducted to identify predictors of rubber dam usage, incorporating factors such as kit availability, skills, usage frequency, and patient response. A positive patient response significantly predicted rubber dam usage ($P = 0.03$) with an odds ratio of 13.32. Frequency of use trended toward significance ($P = 0.09$), suggesting a potential relationship. Other predictors, including skills and availability, were not statistically significant due to multicollinearity.

Figure 1
Impact of Isolation on Improvement after Rubber Dam



The majority of respondents rated the improvement in isolation after using a rubber dam highly, with 30.8% assigning a score of 9 and 25.6% assigning a perfect 10 out of 10. Scores of 8 and above were given by 79.5% of participants, indicating a strong consensus on the effectiveness of rubber dams for isolation.

Figure 2
Rate your restoration out of 10 after Rubber Dam



Similarly, in terms of restoration outcomes after using a rubber dam, the most frequent score was 8 out of 10, provided by 35.9% of respondents, followed by 9 (19.2%) and 10 (11.5%). Combined, 66.6% of respondents rated restoration outcomes at 8 or higher. These results underscore the high perceived utility of rubber dams in enhancing isolation and restoration quality during dental procedures.

The results emphasize the critical barriers to rubber dam adoption, including logistical challenges and patient compliance issues. While dentists recognize the clinical benefits, such as improved isolation and restorative outcomes, the frequency of usage remains suboptimal. Statistical analyses underscore the need for targeted interventions, including improved kit availability, enhanced training, and strategies to address patient

concerns. These findings highlight the importance of systematic efforts to integrate rubber dam usage into routine dental practice.

DISCUSSION

The findings of this study revealed critical insights into the attitudes and practices of young dentists in Pakistan regarding rubber dam usage. Despite its well-documented clinical benefits, including improved isolation, infection control, and enhanced patient safety, a substantial proportion of dentists did not routinely incorporate rubber dams into their clinical workflows. This underutilization aligns with previous studies conducted in Saudi Arabia, where only 41% of practitioners reported rubber dam usage (14), and in Turkey, where the adoption rate was as low as 27.3% (15). These similarities across regions underscore a pervasive global challenge in integrating rubber dams into routine dental practice, even among those recently trained.

One of the primary barriers identified in this study was the unavailability of rubber dam kits, reported by 48% of participants. This finding aligns with similar observations from Tamil Nadu, where logistical issues significantly impacted rubber dam usage (16). Other barriers, such as time constraints (34%) and lack of skills (8%), mirrored trends observed in Ukraine, where 31% of dentists cited procedural difficulties as a deterrent (17). However, it is worth noting that these issues might reflect a gap in clinical training and resource allocation rather than an inherent complexity of rubber dam application.

Participants overwhelmingly acknowledged the value of rubber dams, with 93.3% citing better isolation as the primary benefit. This aligns with findings from studies in Turkey, where the majority of dentists favored rubber dams for providing a fluid-free operative field (20). Despite these positive perceptions, the frequency of use was low, with only 15.4% of respondents reporting frequent usage. These results suggest that while dentists recognize the theoretical advantages, practical implementation remains limited. This disconnect between knowledge and practice has been highlighted in previous literature, emphasizing the need for targeted interventions to bridge this gap (18).

Patient compliance and perception emerged as significant factors influencing rubber dam usage. While 59% of participants reported high patient compliance, the majority of patients exhibited neutral responses (52.6%) to rubber dam application. These findings were consistent with studies in Saudi Arabia, where 72.2% of patients reported no objection to the use of rubber dams (18). However, the neutral and negative attitudes observed in some patients may reflect a lack of awareness or insufficient communication regarding the benefits of rubber dam usage.

The preference for latex rubber dam sheets was notable, with 82.2% of participants favoring latex despite the potential for allergies. The infrequent occurrence of latex allergies reported by 89.7% of respondents may have contributed to this preference. These findings align with similar studies where latex rubber dams were predominantly used, likely due to their affordability and availability (20).

One of the strengths of this study was its focus on young dentists, who represent the future dental workforce. By targeting this demographic, the study provided insights into the potential trajectory of rubber dam usage in clinical practice. However, the reliance on a convenience sampling method and the inclusion of only three major cities limited the generalizability of the findings. Additionally, the self-reported nature of the data may have introduced response bias, as participants might have overstated their usage or compliance rates.

The results highlighted the importance of addressing logistical and educational barriers to improve the adoption of rubber dams. Ensuring the availability of affordable kits, integrating hands-on rubber dam training into dental curricula, and providing continuing education opportunities were key recommendations. Furthermore, enhancing patient communication strategies to address misconceptions and emphasize the benefits of rubber dams could improve patient acceptance and compliance.

Future studies could explore the long-term impact of targeted interventions, such as resource provision and training programs, on the frequency and effectiveness of rubber dam usage. Expanding the scope of research to include diverse geographic regions and varying levels of clinical experience would also provide a more comprehensive

understanding of this issue. By addressing these limitations and implementing evidence-based recommendations, the dental profession can move toward the widespread adoption of rubber dams, ensuring improved clinical outcomes and patient safety.

CONCLUSION

This study highlighted significant gaps in the routine use of rubber dams among young dentists in Pakistan, despite their well-recognized clinical benefits in ensuring infection control, improving isolation, and enhancing treatment outcomes. The primary barriers, including the unavailability of kits, limited skills, and patient compliance issues, underscore the need for targeted interventions such as improved resource availability, enhanced training, and patient education. Addressing these challenges could lead to more widespread adoption of rubber dams, directly contributing to improved procedural safety and clinical efficiency. In the broader context of human healthcare, the adoption of such evidence-based practices is crucial for elevating the standards of dental care and ensuring patient safety across diverse clinical settings.

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