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INSIGHTS OF DENTAL PRACTITIONERS WITH RESPECT TO GENDER ON COMPOSITES AS A RESTORATIVE MATERIAL: REASONS FOR SELECTION AND CAUSES OF FAILURE

Original Research

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ABSTRACT

Background: Composite resin restorations have become the preferred choice in modern restorative dentistry due to their esthetic appeal, conservative preparation requirements, and reliable bonding to tooth structure. Despite these advantages, the selection of restorative material may be influenced by various practitioner-related factors, including clinical training, experience, and demographic variables such as gender. Understanding whether such factors affect clinical decision-making is vital for improving educational strategies and standardizing care.

Objective: To assess the association between the gender of dental practitioners and their reasons for selecting and perceived causes of failure of composite resin restorations.

Methods: A descriptive cross-sectional study was conducted at the College of Dentistry, Sharif Medical and Dental College, Lahore, over a one-year period from July 2020 to July 2021. A total of 150 dentists were enrolled using convenience sampling. Data were collected through a pre-validated structured questionnaire after obtaining ethical approval (SMDC/SMRC/199-21) and informed consent. Inclusion criteria required at least six months of clinical experience with composites. The association between gender and both the reasons for choosing and perceived failure causes of composite restorations was analyzed using the Fisher exact test via SPSS version 23, with a p-value ≤ 0.05 considered statistically significant.

Results: Out of 150 participants, 59% were male and 91% female. A statistically non-significant association was found between gender and the reason for choosing composites ($p = 0.457$). Most males (57.6%) and females (59.3%) selected composites due to tooth structure conservation. Similarly, polymerization shrinkage was identified as the leading cause of failure by 57.6% of males and 65.9% of females ($p = 0.580$).

Conclusion: Although no statistically significant gender-based differences were observed, both male and female dentists largely preferred composites for their conservative nature, and identified polymerization shrinkage as the main clinical challenge.

Keywords: Composite Resins, Dental Esthetics, Dental Restoration Failure, Dentists, Gender Identity, Polymerization, Tooth Conservation.

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INTRODUCTION

Composite resin has increasingly become the material of choice for dental restorations due to its capacity to conserve natural tooth structure, deliver superior esthetic outcomes, and allow for easier manipulation during placement (1,2). Furthermore, unlike amalgam restorations, composite materials do not carry the potential risk of mercury toxicity, which has long been a concern for both patients and healthcare professionals (3,4). However, despite these clinical advantages, the choice to use composite resins is not universal and is influenced by a number of factors that extend beyond their material properties (5). Clinical decision-making regarding restorative material selection is often dictated by the practitioner's protocols, prior experience, knowledge of the technique, specialty, and even gender (5-7). Among these, gender has emerged as a notable variable influencing professional preferences and decision-making patterns in dentistry. Evidence suggests that female dentists are more inclined to select composite resins compared to their male counterparts, primarily due to their focus on aesthetics, minimally invasive techniques, and higher patient satisfaction (8,9). This trend has been linked to enhanced knowledge of composite handling and technique sensitivity, as well as a more meticulous approach to detail during restorative procedures (9). On the other hand, male dentists are more likely to emphasize factors such as durability and strength when choosing a restorative material, often favoring longevity over cosmetic appeal (9). These gendered trends not only reflect preferences but also highlight different approaches in clinical execution and case management. Nonetheless, composite restorations present notable clinical challenges. Successful outcomes heavily rely on strict moisture control during placement, with any lapse in isolation significantly increasing the risk of dislodgement (10,11). Polymerization shrinkage remains a critical drawback, often resulting in marginal gaps, microleakage, and eventual restoration failure if not properly managed (12).

These technical limitations can influence a clinician's confidence and willingness to adopt composites, particularly in high-stress, load-bearing areas such as posterior teeth, where wear resistance becomes a concern (9,10). Interestingly, literature points to gender-based differences in how these challenges are addressed. Female dentists are reportedly more consistent in employing techniques such as incremental layering or using bulk-fill composites to mitigate polymerization shrinkage (13). They are also more likely to implement strategies that enhance marginal integrity and prevent microleakage, such as appropriate adhesive selection and careful finishing procedures (14,15). In contrast, male dentists may prioritize procedural speed and sometimes forego the use of isolation tools like rubber dams, potentially compromising the long-term success of the restoration (16). These contrasting approaches underscore a broader variability in clinical practice that may stem from differences in training emphasis, risk perception, or personal inclinations. Understanding how gender influences restorative material choices and clinical strategies can offer valuable insights into improving dental education and practice standards. Addressing these differences during undergraduate and postgraduate training may help bridge gaps in clinical consistency and lead to more predictable outcomes in restorative dentistry. Therefore, this study aims to explore the association between dentists' gender and their reasons for selecting composite resins, as well as the perceived causes of their failure in clinical settings.

METHODS

This cross-sectional descriptive study was conducted over a period of one year, from July 2020 to July 2021, at the College of Dentistry, Sharif Medical and Dental College, Lahore. The study aimed to explore the association between dentists' gender and their reasons for selecting composite resins, along with the perceived causes of their failure. A total of 150 dentists participated in the study. Ethical approval was obtained from the institutional ethical review board (Reference No. SMDC/SMRC/199-21), and written informed consent was obtained from all participants prior to inclusion in the study. Dentists of all genders, specialties, and age groups were eligible to participate, provided they had more than six months of clinical experience and had previously worked with composite restorative materials. Dentists who did not meet these criteria were excluded to ensure the responses reflected informed and practical clinical experience. The sampling technique employed was convenience sampling, allowing for inclusion of a diverse group of practitioners actively engaged in restorative procedures. Data collection was conducted using a structured and pre-validated questionnaire adapted from previously published literature (17). The questionnaire assessed the participants' reasons for selecting composite materials, their experiences with composite failures, and whether these perceptions varied based on gender. The total sample size was set at 150 and calculated using an online sample size calculator, applying a 95% confidence level, 5% precision, and a referenced prevalence estimate

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for composite use by dentists (17). Statistical analysis was performed using SPSS version 23. The Fisher exact test was applied to assess associations between gender and both the reasons for composite material selection and the causes of restoration failure. A p-value ≤ 0.05 was considered statistically significant.

RESULTS

A total of 150 dental practitioners participated in the study, with a mean age of 26.66 ± 4.51 years. Among the participants, 59% were male (n = 59) and 91% were female (n = 91). The primary objective was to assess whether gender influenced the reasons for selecting composite resin as a restorative material and the perceived causes of its failure in clinical practice. Regarding the rationale behind selecting composite materials, a statistically non-significant association was observed between gender and the reasons for choosing composite restorations (p = 0.457). The majority of both male (57.6%) and female (59.3%) dentists selected composites due to their conservative cavity design, which helps preserve natural tooth structure. Esthetic appeal was the second most frequently cited reason, reported by 28.8% of males and 23.1% of females. Other factors such as ease of the procedure, patient preference, and enhanced clinical skills in using composites were selected less frequently across both groups. In terms of reasons for failure of composite restorations, no significant association was found with gender (p = 0.580). The leading cause of failure reported by both male and female practitioners was polymerization shrinkage, cited by 57.6% and 65.9%, respectively. The next most commonly reported issue was inadequate isolation during placement, reported by 20.3% of male and 15.4% of female respondents. Other reported causes included microleakage (10.2% males, 12.1% females), wear (8.5% males, 3.3% females), and contact point issues (3.4% males, 3.3% females).

Table 1: Reason for choosing composite restoration among dental practitioners with respect of gender

		Reason For Choosing					Total	P value
		Easy Procedure	Esthetics	Conservation Of Tooth Structure	Patient's Preference	Better Skills in Composite Restorations		
Gender	Male	3 (5.1%)	17 (28.8%)	34 (57.6%)	5 (8.5%)	0 (0%)	59 (100%)	0.457
	Female	4 (4.4%)	21 (23.1%)	54 (59.3%)	7 (7.7%)	5 (5.5%)	91 (100%)	

Table 2: Reasons of failure of Composite restorations according to dentists with respect to gender

		Concerns For Posterior Composites					Total	P value
		Wear	Microleakage	Polymerization Shrinkage	Contact Point	Isolation		
Gender	Male	5 (8.5%)	6 (10.2%)	34 (57.6%)	2 (3.4%)	12 (20.3%)	59 (100%)	0.580
	Female	3 (3.3%)	11 (12.1%)	60 (65.9%)	3 (3.3%)	14 (15.4%)	91 (100%)	

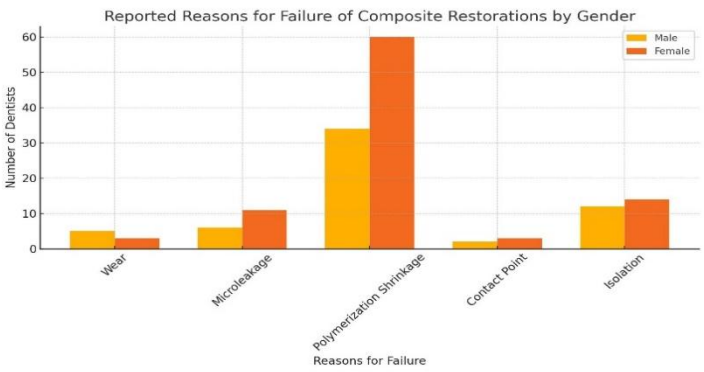

Figure 1 Reported Reasons for Failure of Composite Restorations by Gender

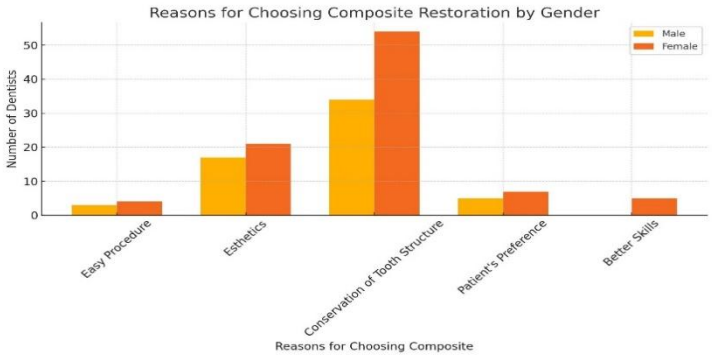

Figure 2 Reasons for Choosing Composite Restoration by Gender

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DISCUSSION

The present study aimed to explore the association between gender and the reasons for selecting composite resins as restorative materials, as well as the perceived causes of their clinical failure. The findings demonstrated a statistically non-significant association between gender and the rationale behind choosing composites ($p = 0.457$), with a majority of both male (57.6%) and female (59.3%) practitioners prioritizing tooth conservation. Esthetics emerged as the second most common reason across both groups. These preferences align with previously reported findings, which emphasized that the minimally invasive nature and esthetic benefits of composite resins make them the material of choice for anterior and smaller posterior restorations (18). Similar observations were documented in studies that reported a lack of significant gender-based differences in material selection, where most dentists opted for composites due to their superior esthetics and conservative nature (19). The results further revealed that the reasons for failure of composite restorations did not significantly vary between genders ($p = 0.580$). Polymerization shrinkage was cited as the most frequent cause of failure by both male (57.6%) and female (65.9%) dentists. This observation is consistent with prior research indicating that polymerization shrinkage is a major concern among clinicians, as it induces internal stress, leading to marginal gap formation and eventual microleakage (20). The clinical implications of this issue are critical, as compromised marginal integrity can result in postoperative sensitivity, secondary caries, and restoration failure (21). The second most frequently reported cause of failure was improper isolation during placement, with 20.3% of males and 15.4% of females identifying this as a contributing factor. Existing literature corroborates this, with studies demonstrating that inadequate isolation contributes to restoration failure due to compromised bond strength resulting from moisture contamination (22). A follow-up over five years showed failure rates ranging between 17% and 21% when isolation protocols were not adequately maintained (23). This issue can be mitigated effectively through the routine use of rubber dams, which provide optimal control of the operative field and enhance clinical outcomes (24).

One of the key strengths of this study lies in its focused evaluation of the influence of gender on material selection and failure analysis, an area that remains relatively underexplored in existing dental literature. By identifying gender-based patterns in clinical decisions, the findings offer practical insights that can be translated into targeted improvements in dental education and clinical training protocols. These insights are particularly relevant for designing training modules that emphasize the technical nuances of composite handling and the importance of isolation in restorative procedures. However, studying is not without limitations. The use of a single-center sample and a relatively modest sample size may limit the generalizability of the results to broader populations. Moreover, variables such as the level of clinical expertise, academic training, and area of specialty were not explored in depth in relation to restoration success or failure, which could have added further value to the findings. A larger, multicenter study involving stratified random sampling and inclusion of more demographic and professional variables would likely yield more comprehensive results. Despite these constraints, the study adds to the growing discourse on the practical challenges faced in restorative dentistry and how they intersect with practitioner characteristics. Understanding these patterns can be instrumental in tailoring more effective training interventions and standardizing protocols to ensure consistent clinical performance across different practitioner profiles. The integration of feedback from both male and female practitioners can serve as a foundational step toward enhancing the overall quality and predictability of composite-based restorative procedures.

CONCLUSION

This study concluded that while the gender of dental practitioners did not show a statistically significant association with the reasons for selecting composite resins or the perceived causes of their failure, clear patterns in clinical preference and perception were observed across both groups. Dentists, regardless of gender, predominantly favored composites for their conservative and minimally invasive nature, highlighting a shared clinical value placed on preserving tooth structure. Similarly, polymerization shrinkage emerged as the most commonly recognized challenge, reflecting a widespread concern about the long-term integrity of composite restorations. These findings underscore the need for continued emphasis on training protocols that address these common concerns and reinforce best practices, ultimately contributing to more consistent and predictable restorative outcomes.

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AUTHOR CONTRIBUTION

Author	Contribution
Fatimah Imran	Substantial Contribution to study design, analysis, acquisition of Data Manuscript Writing Has given Final Approval of the version to be published
Maryam Tehreem	Substantial Contribution to study design, acquisition and interpretation of Data Critical Review and Manuscript Writing Has given Final Approval of the version to be published
Kainat Razzaq	Substantial Contribution to acquisition and interpretation of Data Has given Final Approval of the version to be published
Fahad Naeem	Contributed to Data Collection and Analysis Has given Final Approval of the version to be published
Nimra Nadeem	Contributed to Data Collection and Analysis Has given Final Approval of the version to be published
Eesha Khalid	Substantial Contribution to study design and Data Analysis Has given Final Approval of the version to be published
Hira Butt*	Contributed to study concept and Data collection Has given Final Approval of the version to be published

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