Journal of Neonatal Surgery
ISSN(Online): 2226-0439
Vol. 14, Issue 32s (2025)
https://www.jneonatalsurg.com

OPEN ACCESS

Oral Medicine and Restorative Dentistry: The Importance of Dental Materials.

Aamir Shahzad[1], Talha Muhammad Kathia[2], Sadia Abbas[3], Muhammad Mohsin Kamal[4], Ehsan Rathore[5], Ayousha Iqbal[6]

[1]Associate Professor & HOD, Dental Materials Department, HBS Medical and Dental College, Islamabad, Pakistan

[2]House Officer, Department of Oral and Maxillofacial Surgery, Fatima Memorial Hospital College of Medicine and Dentistry, Lahore, Pakistan

[3]Demonstrator, Anatomy Department of Azra Naheed Dental College, The Superior University, Lahore, Pakistan

[4]Assistant Professor, Department of Community and Preventive Dentistry, Medical Superintendent, Fatima Memorial Dental Hospital, Shadman Lahore, Pakistan

[5]Associate Professor Oral Medicine, Department of Rahbar College of Dentistry, Lahore, Pakistan

[6]Head of Department of Dental Materials, Islamabad Medical and Dental College, Pakistan

Corresponding Author:

Ehsan Rathore,

Associate Professor Oral Medicine, Department of Rahbar College of Dentistry, Lahore, Pakistan

Cite this paper as Aamir Shahzad, Talha Muhammad Kathia, Sadia Abbas, Muhammad Mohsin Kamal, Ehsan Rathore, Ayousha Iqbal, (2025) Oral Medicine and Restorative Dentistry: The Importance of Dental Materials...*Journal of Neonatal Surgery*, 14, (32s) 9682-9688

ABSTRACT

Objective: To determine the levels of knowledge, attitudes, and clinical practices in dental practitioners concerning restorative dental materials and to determine factors related to evidence-based material selection.

Methodology: A cross sectional study involving 156 dental practitioners was conducted in Dental Materials Department. The sample size was chosen through multistage probability sampling of public hospitals, privately operated clinics as well as academic institutions. The data were gathered in the form of a structured self-administered questionnaire, which included the sections on demographic factors, knowledge about the frequently used restorative materials, attitudes toward the use of evidence-based selection and self-reported clinical practices. The SPSS version 25 was used to analyze the data. Descriptive statistics were used to summarize the knowledge, attitudes, and practices of the participants, and chi-square test and multivariate logistic regression were used to determine predictors of good knowledge. The statistical significance was predetermined as $p \leq 0.05$.

Results: Postgraduate-qualified dentists and dentists with over ten years of clinical experience showed higher knowledge as compared to the rest. The views on the evidence-based material choice and minimal invasive methods were good, but the practical implementation was uneven. Composite resin was the most widely used and the application of rubber dams and bioactive materials was not uniform. The analysis of multiple variables revealed that postgraduate qualification (AOR = 2.64), experience longer than 10 years (AOR = 2.11), and attendance at CPD regularly (AOR = 1.87) were important predictors of good knowledge.

Conclusion: The level of dental practitioners' knowledge on restorative materials is moderate to high and depends on education, experience, and CPD involvement. Material selection and clinical outcomes can be improved by enhancing postgraduate training and promoting the use of evidence-based practice..

.

Keywords: *Dental Materials, Restorative Dentistry, Knowledge, Attitudes, Clinical Practices, Evidence-Based Dentistry*

1. INTRODUCTION

The oral medicine and restorative dentistry are the key in preservation of oral functionality, aesthetics and general health of the teeth.(1) Due to the fact that the dental diseases are one of the most prevalent chronic illnesses of the world, there have been increasing needs to effectively restore the illnesses via restorative treatment.(2) Global reports indicate that oral diseases affect almost 3.5 billion individuals, the most common of them being dental caries, which causes a significant burden to both the healthcare systems and individuals. I(3)n restorative dentistry, the selection of the dental materials is a very important aspect that affects the clinical outcomes, the duration of the dental restoration, comfort to the patient, and cost-effectiveness.(4)

Developments in dental materials have changed the practice over the years. Resin-based composites, ceramics, and bioactive materials have been replacing or supplementing traditional materials (amalgam, gold alloys, and glass ionomer cements).(5) The materials used have different mechanical, aesthetical, and biocompatibility characteristics, and the choice of the material is a significant clinical judgment. The overall dental restoratives market has been very active across the globe due to the rise in knowledge of oral health, need to have an aesthetic restorations and technological advancements.(6) Though such developments have occurred, there still remains an existence of differences in the knowledge and practice patterns as well as the choice of restorative materials in dental practitioners, particularly in developing countries.(7)

To enhance clinical outcomes, it is important to comprehend the factors that affect the choice of the material and the awareness of the clinicians, the training programs, the availability of the material, and the preference of the patients. In addition, local evidence is scarce on the selection of materials used by restorative dentists and oral medicine professionals in the day-to-day clinical practice and how it is consistent with the existing evidence-based recommendations.(8) This knowledge gap is an indication that more recent, region-focused studies are required to inform training and improve clinical decision-making.

The significance of the proposed research is that it will fill this gap in the knowledge by assessing the existing tendencies, preferences, and practices regarding the choice of dental materials among clinicians. A better understanding of these factors will help in promoting better material selection protocols to guarantee quality care and long-term restorations to the patients. Thus, this study will evaluate the knowledge, attitudes and practices of dental practitioners in terms of the significance and decisions of dental materials in oral medicine and restorative dentistry.

2. MATERIALS AND METHODS

The study design used was cross-sectional to determine the knowledge, attitude and practice of dental practitioners on the significance and choice of dental materials in oral medicine and restorative dentistry. The research was done in Dental Materials Department, and involved dentists in the dental hospitals, dental colleges, and private dental clinics. The duration of the study was from June 2024 to February 2025.

The sample size was calculated through OpenEpi. The study used the results of a study that was carried out in the past among dental practitioners in Lahore, Pakistan, on the techniques used in placing the extensive posterior composites restorations and found the proportion of the specific composite-use practices to have been 9.8% to calculate the sample size of the study.(9) The method of sampling was a non-probability consecutive sampling. Dentists with a minimum of four years of experience in practicing restorative dentistry or oral medicine at least with a Bachelor of Dental Surgery were also included upon signing informed consent. Students (dental interns) who were not treating patients independently and dental assistants who did not have restorative duties were left out. Practitioners who were not available due to long leaves or those who refused to take part were also left out.

A self-administered, structured questionnaire was used to collect data because the questionnaire was created based on the analysis of the relevant literature and tools that were previously tested. The survey included parts about demographic traits, understanding of most frequently used restorative materials, cognitive information about the preference of evidence-based material choice, and self-reported clinical practices. To promote clarity and validity a pilot test was done on 20 people out of the sample of the study. The required adjustments were also implemented according to the feedback, and the internal consistency of the knowledge and attitude items was also tested with the help of Cronbach alpha. The data was collected by using paper-based forms and an online version that is secure where possible. Each participant signed a written informed consent and had their confidentiality assured. Filled questionnaires were verified to be complete and entered into a secure database with data entry being done twice to ensure accuracy.

The analysis of data was done using SPSS version 25. Frequencies and percentages of categorical variables, mean ± standard deviation or median with interquartile range of continuous variables were created as descriptive statistics. Inferential analysis used chi-square test with categorical variables and independent t-test with continuous variables. The independent variables were identified to be the predictors of adequate knowledge and proper material selection practices using multivariate logistic regression, and the results were given as adjusted odds ratios and 95 percent confidence intervals. The $p \leq 0.05$ was taken as the statistical significance.

3. RESULTS

There were 156 dental practitioners in the study. The participants were mostly aged between 31 and 40 years in a very small margin over the males. Majority of participants had a BDS degree and about two-thirds had less than 10 years clinical experience. The participants were practicing in public hospitals, private clinics, and academic institutions and the highest percentage was represented by private clinics (Table 1).

Table 1. Socio-Demographic Characteristics of Participants (n = 156)

Variable	Categories	n (%)
Age (years)	24–30	48 (30.8%)
	31–40	62 (39.7%)
	41–50	34 (21.8%)
	>50	12 (7.7%)
Gender	Male	84 (53.8%)
	Female	72 (46.2%)
Professional Qualification	BDS	98 (62.8%)
	MDS / FCPS	38 (24.4%)
	MSc / MPH / Other	20 (12.8%)
Years of Clinical Experience	<5 years	52 (33.3%)
	5–10 years	61 (39.1%)
	>10 years	43 (27.6%)
Practice Setting	Public hospital	64 (41.0%)
	Private clinic	78 (50.0%)
	Academic institution	14 (9.0%)

The knowledge evaluation of knowledge on restorative dental materials subject. The participants were best informed about the necessity of proper isolation during composite placement and the polymerization shrinkage of resin composites, but less of them were aware of the long-term strength benefits of amalgam or benefits of remineralization of bioactive materials (Table 2).

Table 2. Knowledge Regarding Restorative Dental Materials (n = 156)

Knowledge Item	Correct Response n (%)	Incorrect Response n (%)
Composite resin requires proper isolation to prevent contamination	132 (84.6%)	24 (15.4%)
Glass ionomer has fluoride-releasing properties	118 (75.6%)	38 (24.4%)
Amalgam offers higher long-term strength in posterior teeth	94 (60.3%)	62 (39.7%)
Resin composites show polymerization shrinkage	126 (80.8%)	30 (19.2%)
Bioactive materials enhance remineralization	101 (64.7%)	55 (35.3%)
Overall Knowledge Level	Good: 104 (66.7%)	Poor: 52 (33.3%)

About attitudes, overwhelming majority of the practitioners reported the idea is vital, and that cost affects the acceptability of restorative materials in patients. A reduced percentage of them were more concerned with aesthetic values rather than longevity and less than a third felt that new materials needed to replace old materials even where a long-term track record was not available (Table 3).

Table 3. Attitudes toward Evidence-Based Material Selection (n = 156)

Statement	Agree n (%)	Neutral n (%)	Disagree n (%)
Evidence-based guidelines improve material selection	138 (88.5%)	10 (6.4%)	8 (5.1%)
Aesthetic outcomes should be prioritized over durability	64 (41.0%)	29 (18.6%)	63 (40.4%)
Cost affects patients' acceptance of restorative materials	149 (95.5%)	3 (1.9%)	4 (2.6%)
Continuous training is essential for material selection	146 (93.6%)	6 (3.8%)	4 (2.6%)
Newer materials should replace older ones even without long-term evidence	42 (26.9%)	37 (23.7%)	77 (49.4%)

In terms of clinical practices, composite resin was the most commonly used material for Class II restorations, and the use of rubber dam during placement varied, with less than one-third always using it. Glass ionomer was the most preferred liner or base material, and visual shade guides were the predominant method for shade matching. Attendance at continuing professional development programs varied, with half of the participants attending occasionally (Table 4).

Table 4. Clinical Practices of Dentists Regarding Restorative Materials (n = 156)

Practice Variable	Categories	n (%)
Most commonly used material for Class II restorations	Composite resin	118 (75.6%)
	Amalgam	24 (15.4%)
	GIC	14 (9.0%)
Use of rubber dam during composite placement	Always	46 (29.5%)
	Sometimes	74 (47.4%)
	Never	36 (23.1%)
Preferred liner/base material	GIC	83 (53.2%)
	Calcium hydroxide	51 (32.7%)
	None	22 (14.1%)
Shade-matching method	Visual shade guide	103 (66.0%)
	Digital shade selection	29 (18.6%)
	Combined method	24 (15.4%)
Frequency of attending CPD on dental materials	Every year	52 (33.3%)
	Occasionally	78 (50.0%)
	Never	26 (16.7%)

The analysis of factors associated with good knowledge of dental materials indicated that clinical experience and educational qualification were significantly related to higher knowledge levels. Practitioners with more than ten years of experience were more likely to demonstrate good knowledge compared to those with fewer years of practice. Similarly, postgraduate-qualified dentists had higher knowledge scores than BDS-only practitioners. Gender was not significantly associated with knowledge levels, although male participants showed a slightly higher proportion of good knowledge compared to females. (Tables 5).

Table 5. Factors Associated With Good Knowledge of Dental Materials (n = 156)

Variable	Good Knowledge n (%)	Poor Knowledge n (%)	p-value
Gender			
Male (n=84)	60 (71.4%)	24 (28.6%)	0.182
Female (n=72)	44 (61.1%)	28 (38.9%)	
Experience			
<5 years (n=52)	28 (53.8%)	24 (46.2%)	0.031
5–10 years (n=61)	43 (70.5%)	18 (29.5%)	
>10 years (n=43)	33 (76.7%)	10 (23.3%)	
Qualification			
BDS only (n=98)	57 (58.2%)	41 (41.8%)	0.012
Postgraduate (n=58)	47 (81.0%)	11 (19.0%)	

Multivariable logistic regression further confirmed these associations while controlling for other factors. A postgraduate qualification was a strong independent predictor of good knowledge, with practitioners holding advanced degrees being more than two and a half times as likely to possess good knowledge compared to those with only a BDS degree. Practitioners with over ten years of clinical experience were approximately twice as likely to demonstrate good knowledge. Regular attendance at continuing professional development programs was also significantly associated with higher knowledge, whereas working in an academic setting did not show a statistically significant effect. (Tables 6).

Table 6. Multivariable Logistic Regression for Predictors of Good Knowledge

Predictor	Adjusted Odds Ratio (AOR)	95% CI	p-value
Postgraduate qualification	2.64	1.32–5.27	0.006
>10 years of experience	2.11	1.01–4.40	0.047
Regular CPD attendance	1.87	1.09–3.22	0.021
Working in academic setting	1.42	0.66–3.04	0.34

4. DISCUSSION

In this study, most dental practitioners demonstrated a relatively high level of knowledge about restorative materials, particularly concerning composite isolation and polymerization shrinkage. It is consistent with the findings of a 2023 cross-sectional study in Central India, in which 83.5 percent of postgraduate dentists and 76.9% of endodontists reported using composite resin in the posterior restorations because of its aesthetic and patient demand.(10) On the same note, the transition to esthetic and tooth-colored material is also not a new phenomenon in Pakistan: Nayab et al. (2022) stated that despite the lingering use of amalgam, composite was often chosen instead of amalgam in Pakistan.(11)

The fact that the more experienced practitioners and highly qualified practitioners (postgraduate) were found to know much better is not new to us considering that this was found in previous studies. Indicatively, a Kuwaiti study on over 1,000 posterior restorations has found that clinicians of more years of experience were more inclined to use amalgam in selected clinical cases, whereas younger clinicians (≤ 30 years) were less inclined to use it.(12) This is similar to our multivariate outcomes, in which experience of over 10 years of experience was associated with increased odds of good knowledge. Similarly, in a pilot study in Greece, choice of resin based materials was highly determined by experience of practitioners, procurement issues, and clinical requirements.(13)

In relation to using more updated material, our research revealed a favorable position on evidence-based selection but still has reservations, particularly when it comes to price and long-term statistics. This is highly echoed when a recent cross-sectional survey of Pakistani dentists and students revealed that although 87% of dentists and students had heard of bioactive restorative materials, cost and lack of clinical performance was a significant issue of concern.(14) Furthermore, in another survey on the same subject, a survey of advances in bioactive dental composites (2025) indicated among 250 dental

practitioners that the important features of bioactive composites (ion-release and remineralization) were valued, handling considerations, cost and lack of long-term data were cited as the most notable barriers.(15)

Our data on clinical practice (like the percentage of those who always use rubber dam, or the percentage of those who use the choice of liner) overlap with teaching and decision making trend on the subject of restoration repair versus replacement. A cross-sectional study by Munir Khan et al. (2022) in Pakistan investigated the management of defective direct composite restorations by dental students and residents, with an overall preference to repair, particularly with flowable composites, but did not find a fit between theoretical and practical use.(16) Likewise, Divya et al. (2022) surveyed 351 dentists in Makkah, Saudi Arabia, and found that 92% of the dentists applied composite systems in repair citing preservation of tooth structure and cost effectiveness as the key factors.(17) These findings are in line with our results and indicate that good theoretical knowledge is susceptible to practical choices due to real world limitations, such as cost, training, and clinical practices.

The other point of comparison that is relevant is dental education. Sibain et al. (2023) discovered that out of the sample of undergraduate dental students in Saudi Arabia, 77.8% of the respondents stated they were taught restoration repair and 77.2% had practiced restoration repair; most of them favoured repair over replacement as the least invasive choice to obtain the maximum benefit.(18) The present trend in education highlights the increasing congruence of the academic curriculum and minimally invasive and bioactive dentistry, trends that are apparently reflected in the attitudes of our practitioners towards more recent materials and evidence-based practice.

These comparisons in combination provide a couple of themes. To begin with, the tendency of dentists to use composite restorations is widely converged, due to the aesthetic considerations and increasing knowledge of the disadvantages of amalgam. Second, experience and advanced qualification remain an important factor in material knowledge, which implies that postgraduate training and continuing professional development (CPD) are good levers to enhance evidence-based practice. Third, bioactive materials are known and accepted, but full integration is constrained by financial issues, supply, and doubts regarding long-term statistics. Finally, repair rather than replacement of defected restorations is also becoming popular, which is in line with minimally invasive dentistry, but also hints at the clinical practice falling behind teaching.

The results of this study revealed that advanced education and continuing professional development are vital in enhancing knowledge and evidence-based practices of dentists on the use of restorative dental materials. Clinical decision-making and patient outcomes may be greatly improved with the help of postgraduate training, CPD programs and specialized workshops on bioactive materials, restoration repair, and minimally invasive techniques. In addition, taking such issues into dental curriculum at undergraduate and postgraduate levels is likely to assure future professionals that they are physically equipped to make the right choices when it comes to materials in accordance to their durability, biocompatibility, and aesthetic needs. The gap between theory and practice by promoting evidence-based practice with appropriate isolation methods, choice of materials and repair options can close the gap between theory and clinical practice that will result in better quality of restorative care.

Although this study will have useful insights, it has some limitations that must be taken into consideration when analyzing the findings. Being a cross-sectional survey, it provides the knowledge, attitudes and self-reported practices of the participants at one time and thus unable to connect causality. Response bias has been a possibility where more informed, motivated or conscientious dentists might have participated more likely thus overestimating the degree of knowledge and compliance with best practices. Also, the use of self-reported data, including frequency of using rubber dam, choice of material and decision-making on repairing a restoration, might not represent the actual clinical practice because of the social desirability or recall bias. Lastly, the research was restricted to practitioners in particular areas and this could influence the application of the findings to all dental practitioners in other geographic or resource constrained areas.

Future research must take into consideration longitudinal research or prospective audits of the effects of material selection and restorative practices on long-term clinical outcomes, such as restoration longevity, failure rates, and patient satisfaction. These studies may have a more solid evidence on the connection between knowledge and attitudes and real patient outcomes. Moreover, the qualitative research design (focus group discussions or in depth interviews) might investigate the obstacles and facilitators to the implementation of bioactive materials and evidence-based repair methods, especially in the context of resource-limiting settings. A research on the factors including cost, availability, training gap, and institutional policies may therefore be used to provide actionable information in order to strengthen the restorative dentistry practices through specific interventions and policy making.

5. CONCLUSION

The research shows that although the majority of dental practitioners have a good level of understanding restorative dental materials, they have a high level of variation in terms of the years of clinical experience, level of education and the activity on the continuing professional development. The main predictors of evidence-based practice were established as postgraduate training and frequent attendance of CPD, which is why advanced education and lifelong learning are so critical. Minimally invasive techniques and bioactive materials were well received in general, but the practical use depends on their cost, availability, and clinical practices. The results of these investigations point to the necessity to intensify the postgraduate syllabus, to advertise specific workshops, and to make the implementation of evidence-based recommendations more

consistent to have more restorative results. The future research, which puts emphasis on longitudinal outcomes and qualitative evaluation of barriers to material adoption, will contribute to the enhancement of clinical practice and patient care

REFERENCES

[1] Bulancea B, Costin L, Cioloca CH, Budala DG, Vasluianu RI, Cretu C, et al. RESTORING THE AESTHETIC FUNCTION IN ORAL REHABILITATION. Romanian Journal of Medical and Dental Education. 2024;13(1).

[2] Budala DG, Martu M-A, Maftei G-A, Diaconu-Popa DA, Danila V, Luchian I. The role of natural compounds in optimizing contemporary dental treatment—Current status and future trends. Journal of Functional Biomaterials. 2023;14(5):273.

[3] Organization WH. Global oral health status report: towards universal health coverage for oral health by 2030: World Health Organization; 2022.

[4] Qin X, Zi H, Zeng X. Changes in the global burden of untreated dental caries from 1990 to 2019: A systematic analysis for the Global Burden of Disease study. Heliyon. 2022;8(9).

[5] Bompolaki D, Lubisich EB, Fugolin AP. Resin-based composites for direct and indirect restorations: clinical applications, recent advances, and future trends. Dental Clinics. 2022;66(4):517-36.

[6] Seif A, Jarry CR, Chauvel AM. The new 'golden age'of dentistry: a highly desirable profession with unprecedented global opportunities in industry settings. Journal of the California Dental Association. 2024;52(1):2324979.

[7] Bingül A, Nezir M, Atilla AO, Özcan S, Evis Z. A Review: Resin-Based Dental Materials and Their Characterization. Polymers for Advanced Technologies. 2025;36(6):e70239.

[8] 8. Littlewood A. Developing a framework for priority-setting in evidence synthesis: a case study of Cochrane Oral Health: The University of Manchester (United Kingdom); 2022.

[9] Shafqat F, Mirza W, Liaqat M, Bajwa UM, Jamil F, Babary DF, et al. Techniques Used by Dental Specialists for Extensive Posterior Composite Restorations. Pakistan Journal of Medical & Health Sciences. 2023;17(02):472-.

[10] MULE AE, WARHADPANDE MM, DAKSHINDAS DM. Assessment of Knowledge, Attitude and Practice among Dental Professionals in Central India regarding Amalgam Restoration and Composite Restoration as Posterior Restorative Material: A Questionnaire Based Study. Journal of Clinical & Diagnostic Research. 2023;17(7).

[11] Nayab T, Atif M, Ayub U, Bajwa SJ, Khan MA, Babar BZ, et al. Attitudes and Knowledge of dentists in Pakistan regarding the use of Dental Amalgam as a restorative material. Pakistan Journal of Medical & Health Sciences. 2022;16(02):102-.

[12] Khalaf ME, Alomari QD, Omar R. Factors relating to usage patterns of amalgam and resin composite for posterior restorations–a prospective analysis. Journal of dentistry. 2014;42(7):785-92.

[13] Kontakou Zoniou A, Antoniadou M, Saridou S. Selection of Resin-Based Dental Restorative Materials: A Pilot Study on Professional Characteristics, Knowledge, and Selection Criteria. Applied Sciences. 2025;15(14):7987.

[14] Ahsan Z, Bashir A, Imran T, Siddiqui FA, Muhammad IA, Dar M, et al. Knowledge, Attitude, and Perspective of Dental Students Related to Green Dentistry: A Cross-Sectional Study. International Journal of Endorsing Health Science Research. 2024;12(2):58-64.

[15] Shelke GS, Saleem A, Shukla D, Arjumand B. Advances In Bioactive Dental Composites. Metallurgical and Materials Engineering. 2025:972-81.

[16] Asma Munir k. Perception regarding the management of defective composite restorations in dental colleges of Pakistan: Repair versus Replacement; a Cross-sectional study. Journal of Population Therapeutics and Clinical Pharmacology. 2022;29(03):227-35.

[17] Divya K, Alshareef NN, Alluhaybi JH, Issa ZO, Shaheen RM, Shaikh K, et al. Knowledge, Attitude, and Practice of Dentists in Managing the Defective Direct Composite Restorations: A Questionnaire Survey. CODS-Journal of Dentistry. 2022;13(2):36-9.

[18] Sibai N, AlFadhel R, AlSaleh L, Durayhim SB, AlMthen H, AlSewailem L. Knowledge and Clinical Practice of Restoration Repair among Dental Undergraduate Students in the Kingdom of Saudi Arabia. The Open Dentistry Journal. 2023;17(1)..