Content available at: https://www.ipinnovative.com/open-access-journals

IP Annals of Prosthodontics and Restorative Dentistry

Journal homepage: https://www.aprd.in/

Original Research Article

Assessment of dental bur sterilization awareness among general dentists in Uttarakhand

Jyotinayana Das[1], Nistha Chamola[1]*, Nishika Rawat[1], Anshdeep Singh[1], Arpit Arora[1], Anil Dhingra[1]

[1] *Dept. of Conservative Dentistry and Endodontics, Seema Dental College and Hospital, Rishikesh, Uttarakhand, India*

ARTICLE INFO

Article history:
Received 31-01-2024
Accepted 01-03-2024
Available online 16-03-2024

Keywords:
Dental burs
Sterilization
Infection control
Crosssectional study Keywords:
Dental burs
Sterilization
Infection control
Survey study

ABSTRACT

Aim: This study assesses general dentists' knowledge and adherence to dental bur sterilization practices in Uttarakhand, aiming to enhance patient safety and clinical precision by identifying implementation gaps.
Objectives: Evaluate practitioners' understanding of optimal sterilization protocols for burs, pinpoint areas for improvement, and establish a baseline of current practices in general dentistry.
Materials and Methods: A state-wide distribution of a structured questionnaire gathered responses from 237 general dentists. The survey focused on sterilization equipment usage, frequency, and compliance with industry guidelines. Quantitative data were analyzed for insights into current practices.
Results: Preliminary findings show varying awareness and adherence levels among practitioners. While a significant proportion demonstrated commendable knowledge, specific gaps and deviations were identified, suggesting areas for improvement.
Conclusion: Continuous education and reinforcement of best practices in bur sterilization are crucial within the general dentistry community. Addressing identified gaps can elevate the standard of care, ensuring patient safety and precision in dental procedures. Ongoing education and awareness campaigns are vital for sustained improvement in bur sterilization practices.

1. Introduction

Dental burs, indispensable tools in dentistry, wield crucial significance in procedures such as cavity preparation and crown adjustment, reflecting their versatile role. Their precise functionality directly impacts treatment quality, necessitating meticulous care and maintenance.[1–5] Used across specialties like restorative, endodontic, and surgical procedures, dental burs efficiently remove dental tissues, contributing to optimal clinical outcomes. However, their efficacy hinges on stringent sterilization practices to ensure patient safety and prevent cross-contamination in the dental operatory.[6]

The widespread use of dental burs, coupled with the risk of cross-contamination, underscores the importance of robust infection control measures, specifically tailored to their sterilization. The intricate design of burs requires meticulous attention during the sterilization process, making adherence to standardized protocols imperative for upholding the highest standards of patient care.[7,8]

This study aims to assess general dentists' knowledge and adherence to effective sterilization practices for dental burs in Uttarakhand. Recognizing the pivotal role dental burs play and the potential risks associated with improper sterilization, our research seeks to contribute valuable insights into current practices, identifying areas for improvement.[9] By enhancing awareness and education in bur sterilization, we aim to elevate patient safety

* *Corresponding author*.
E-mail address: chamolanistha@gmail.com (N. Chamola).

https://doi.org/10.18231/j.aprd.2024.004

and precision in dental procedures, fostering continuous improvement within the general dentistry community.[10]

As we delve into the multifaceted world of dental burs, exploring their applications and emphasizing the critical need for proper sterilization, this research endeavors to advance the ongoing dialogue on safe and effective utilization. The study's outcomes will not only benefit individual practitioners but also contribute to broader discussions on infection control in dental settings.[11–13]

2. Material and Methods

2.1. Study design and population

This cross-sectional study, conducted in Uttarakhand, India, aimed to assess general dentists' awareness and practices regarding bur sterilization. The study included practitioners from private practices, dental clinics, and dental college residents, allowing for a comprehensive snapshot of the current scenario.

2.2. Questionnaire

A meticulously designed structured questionnaire served as the primary data collection tool. The survey covered sterilization equipment usage, adherence to guidelines, and overall knowledge on bur sterilization. Questions accommodated diverse perspectives, considering both experienced practitioners and dental college residents. The questionnaire, distributed physically and electronically, ensured broad accessibility.

Duration and Ethical Considerations: The survey spanned for over three months. Prior to commencement, ethical considerations were paramount. An institutional review board approved the study, ensuring compliance with ethical guidelines. Informed consent was obtained from all participants, emphasizing voluntary participation and confidentiality.

2.3. Questionnaire details

The questionnaire encompassed key demographic information (name, age, qualification, and years of practice). Qualifications ranged from BDS students to MDS practitioners, with experience categorized into three groups. Questions assessed awareness of bur sterilization, preferences post-bur usage (sterilization or replacement), and the preferred method of sterilization (chairside, autoclave, ultrasonic bath). Additionally, respondents identified procedures causing faster wear and tear of burs and reported problems encountered during sterilization, such as rusting/corrosion and early burnout.

2.4. Validation

The questionnaire underwent a validation process involving dental professionals and experts to ensure content relevance and clarity. Pilot testing was conducted on a small sample, refining questions based on feedback. This process enhanced the instrument's reliability and validity.

2.5. Statistical analysis

Collected data underwent rigorous quantitative analysis using statistical tools. Descriptive statistics were employed to characterize the demographic profile of respondents, while inferential statistics were utilized to draw associations and identify patterns related to bur sterilization practices. The analysis aimed to provide a comprehensive overview of the current landscape, highlighting areas of strength and potential improvement in sterilization awareness and implementation.

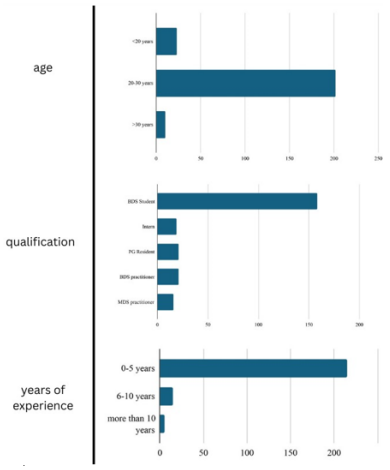

Figure 1:

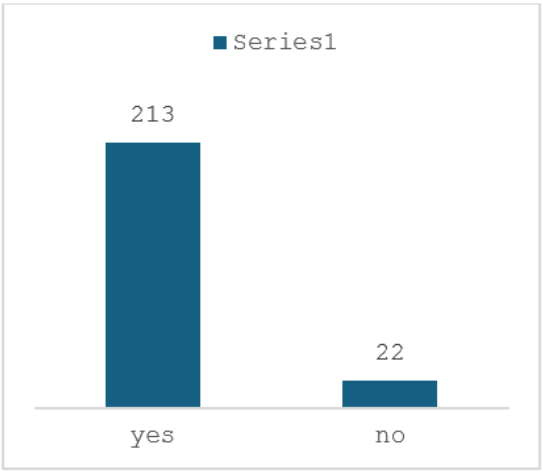

Figure 2: Awareness about bur sterilisation

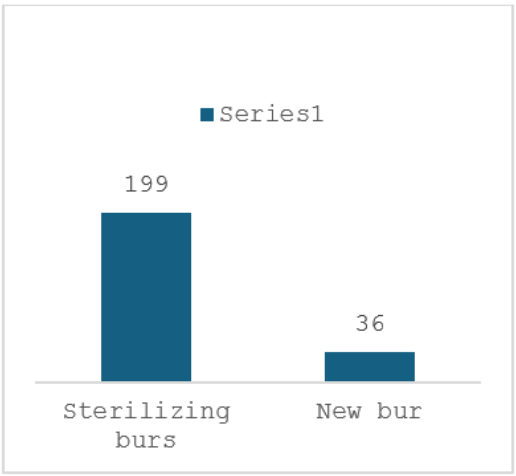

Figure 3: Preference

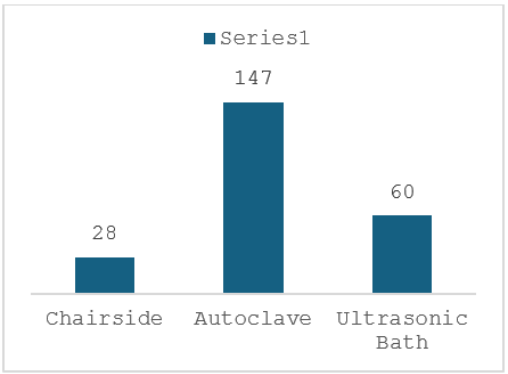

Figure 4: Sterilization method

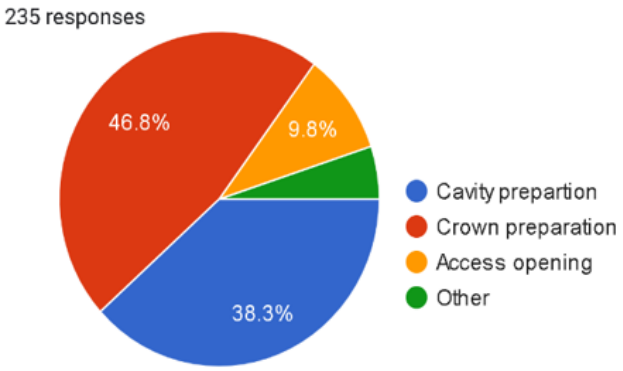

Figure 5: According to you, which dental procedure brings about faster wear and tear of burs?

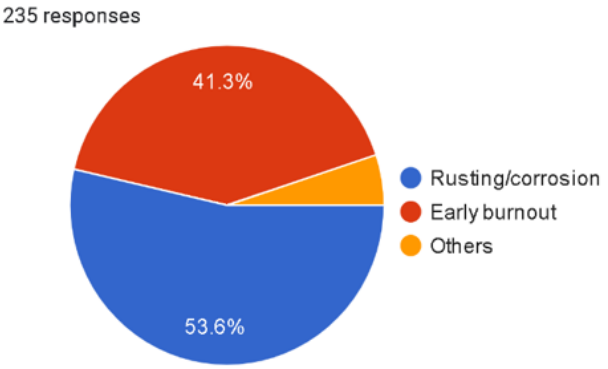

Figure 6: What problem do you often face with bur sterilization?

3. Results

Key findings from the survey conducted among dental practitioners in Uttarakhand revealed diverse levels of awareness and adherence to standardized sterilization procedures for dental burs. The data underscored specific areas of concern, indicating potential gaps in knowledge within the surveyed population. Notably, a significant portion of respondents demonstrated commendable awareness, while identified deviations highlighted the need for targeted educational interventions

1. Awareness Disparities: While a notable portion of practitioners displayed commendable awareness of sterilization procedures, the study identified variations in knowledge levels across the surveyed group.
2. Adherence Concerns: Deviations from standardized sterilization protocols were observed in certain practices, emphasizing the importance of consistent adherence to ensure optimal infection control.
3. Educational Needs: The findings underscored the necessity for targeted educational interventions to bridge knowledge gaps, particularly in areas where deviations from best practices were noted.

These key findings serve as a foundation for recommendations aimed at improving infection control measures in dental settings. By addressing identified disparities and emphasizing targeted educational initiatives, the study aims to contribute to the ongoing dialogue on enhancing bur sterilization practices in general dentistry, ultimately promoting patient safety and precision in dental procedures.

4. Discussion

This study delves into the critical intersection of infection control and dental care by examining bur sterilization practices within Uttarakhand's dental community. The findings shed light on varying degrees of awareness and

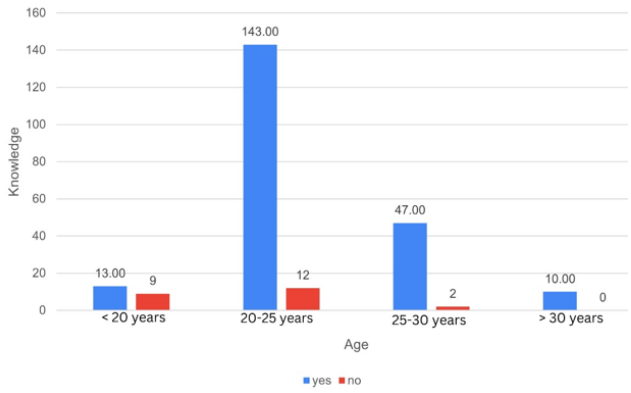

Figure 7: Variation of knowledge levels among various age groups

deviations from standardized sterilization procedures among practitioners, underlining the need for targeted educational interventions. The study's significance extends beyond mere assessments; it encompasses broader implications for patient safety and healthcare quality.[6]

Notably, the survey's key findings reveal that a substantial portion of practitioners exhibited commendable awareness of sterilization procedures. However, the identified deviations emphasize the importance of consistent adherence to best practices. The study underscores the imperative for targeted educational interventions to establish a more uniform understanding and implementation of sterilization protocols, particularly given the diverse levels of awareness observed.[8,14]

One significant revelation pertains to awareness disparities, especially among dental college residents. This signals a critical need for early educational interventions to instill a robust foundation for infection control practices from the onset of practitioners' careers. Recognizing the diverse experience levels of participants, categorized into BDS students, interns, PG residents, BDS practitioners, and MDS practitioners, further enhances the study's ability to provide nuanced insights.[15]

The stratified sampling approach and collaboration with dental associations and institutions ensure the study captures a diverse representation of Uttarakhand's dental landscape. This inclusivity not only strengthens the generalizability of the findings but also enables interventions tailored to the unique challenges faced by different practitioner groups and across various settings.[16]

The meticulous design of the questionnaire, encompassing aspects from equipment usage to adherence with guidelines, facilitates a nuanced examination of the factors influencing sterilization practices. Findings reveal practitioners' preferences for sterilization methods, with variations observed among chairside, autoclave, and ultrasonic bath methods. Perceptions on dental procedures leading to faster wear and tear of burs provide valuable insights into practitioners' perspectives, further contributing to the study's depth.[9]

Practical challenges during bur sterilization, such as rusting/corrosion and early burnout, were also explored, offering a holistic understanding of the barriers faced by practitioners. This comprehensive approach allows for the development of targeted and effective interventions, addressing specific challenges identified in the study.[10,11]

Beyond the specific findings, this research significantly contributes to ongoing discussions on infection control in dental settings. Rigorous sterilization practices resonate with broader discussions on patient safety and healthcare quality, emphasizing the pivotal role in maintaining high standards of patient care and clinical precision. By addressing identified gaps and building upon existing strengths, the dental community in Uttarakhand can collectively elevate its infection control practices, fostering a safer and more robust healthcare environment. This study serves as a catalyst for ongoing education and awareness initiatives, encouraging a culture of responsibility and excellence within the dental profession, ultimately contributing to a safer and more robust healthcare environment for practitioners and patients alike.[12]

5. Conclusion

In conclusion, this study serves as a crucial exploration of the integral link between infection control and dental care, with a specific focus on bur sterilization practices in Uttarakhand. The observed diversity in awareness levels among practitioners underscores the necessity for targeted educational interventions, particularly among dental college residents who represent a key demographic. The comprehensive survey approach, inclusive questionnaire design, and meticulous statistical analysis collectively provide valuable insights into the current state of bur sterilization practices in the region.

The practical implications of these findings for dental practice in Uttarakhand are far-reaching. The identified gaps in awareness and adherence to standardized sterilization procedures suggest a need for immediate and focused educational initiatives. For dental college residents, early integration of robust infection control education into their training programs is essential to establish a strong foundation for responsible clinical practices.

Based on the study's conclusions, several recommendations can be proposed to enhance infection control practices in the region. Firstly, the development and implementation of targeted educational programs, specifically tailored to address the identified knowledge gaps, should be prioritized. These programs can encompass regular workshops, seminars, and continuous education sessions to ensure ongoing awareness and skill development among practitioners.

Additionally, collaborative efforts between dental associations, institutions, and regulatory bodies can play a pivotal role. By fostering partnerships, these entities can collectively work towards establishing standardized guidelines and protocols for bur sterilization. This collaborative approach ensures a unified commitment to maintaining the highest standards of infection control across different dental settings in Uttarakhand.

Moreover, the study emphasizes the need for continuous monitoring and evaluation of sterilization practices. Regular audits and assessments can help identify evolving challenges and ensure the sustained effectiveness of implemented interventions. This proactive approach not only contributes to the immediate improvement of practices but also establishes a culture of ongoing improvement within the dental profession.

In essence, the study's findings advocate for a comprehensive and sustained effort towards enhancing infection control practices in Uttarakhand's dental community. By addressing the identified gaps through targeted education, collaborative initiatives, and continuous monitoring, the dental profession in the region can fortify patient safety, elevate clinical precision, and contribute significantly to broader healthcare quality discussions. The study serves as a catalyst for positive change, promoting a culture of responsibility and excellence within the dental profession in Uttarakhand.

6. Ethical Considerations

Before initiating data collection, ethical approval was obtained from an institutional review board to ensure compliance with established ethical guidelines. Participants were informed about the study's purpose, procedures, and potential risks, and their voluntary participation was emphasized. Informed consent was obtained from all respondents, affirming their willingness to take part in the survey. To safeguard participant confidentiality, all collected data were anonymized and securely stored, ensuring that individual responses remained confidential.

7. Conflicts of Interest

There are no conflicts of interest.

8. Source of Funding

None.

References

1. Bentley EM. The value of ultrasonic cleaner in dental practice. *Br Dent J*. 1994;177(2):53–6.
2. Crawford JJ, Whitacre RJ, Middaugh DG. Current status of sterilization instruments, devices and method for the dental office. *J Am Dent Assoc*. 1981;102(5):683–9.
3. Morrison A, Susan C. Dental burs and endodontic files: are routine sterilization procedures effective. *J Can Dent Assoc*. 2009;75(1):39.
4. Sheriteh Z, Tasnim H, Martyn S, Martin C. Decontamination procedures for tungsten carbide debonding burs: a cross sectional survey of hospital based orthodontic departments. *J Orthod*. 2010;37(3):174–80.
5. Harkness N, Davies EH. The cleaning of dental diamond burs. *Br Dent J*. 1983;154(2):42–5.
6. Patterson CJ, Mclundie AC, Mackay AM. The effect of ultrasonic cleaning and autoclaving on tungsten carbide burs. *Br Dent J*. 1988;164(4):113–5.
7. Whitworth CL, Martine MV, Gallagher M, Worthington HV. A comparison of decontamination methods used for dental burs. *Br Dent J*. 2004;197(10):635–40.
8. Surender L, Nirmala S, Reddy N, Chukka RR, Reddy SD, Naresh K, et al. Sterilization of New Endodontic Hand Files Stored in Dental Office Inventory: An In Vitro Study. *Cureus*. 2023;15(3):e36116. doi:10.7759/cureus.36116.
9. Kumar KV, Kumar K, Supreetha S, Raghu KN, Veerabhadrappa AC, Deepthi S, et al. Pathological evaluation for sterilization of routinely used prosthodontic and endodontic instruments. *J Int Soc Prev Community Dent*. 2015;5(3):232–6.
10. Offner D, Brisset L, Musset AM. Cleaning of dental handpieces: A method to test its efficiency, and its evaluation with a washer-disinfector-lubricator-dryer. *Dent Open J*. 2016;3(1):10–6.
11. Ranganathan S, Renukanath CK. Comparison of Various Cold Sterilization Techniques on Routinely used Carbide Burs and Diamond Points. *Int J Prosthodont Restor Dent*. 2011;7(3):97–102.
12. Mathivanan A, Saisadan D, Manimaran P, Kumar CD, Sasikala K, Kattack A, et al. Evaluation of Efficiency of Different Decontamination Methods of Dental Burs: An In vivo Study. *J Pharm Bioallied Sci*. 2017;9(1):37–40.
13. Sreekumar S, Varghese K, Abraham JP, Jaysa JJ. An in vitro evaluation of the efficiency of various disinfection and sterilization methods to decontaminate dental handpieces. *J Dent Res Rev*. 2018;5:50–3.
14. Schutt RW, Starsiak WJ. Glass bead sterilization of surgical dental burs. *Int J Oral Maxillofac Surg*. 1990;19(4):250–1.
15. Yenni M, Bandi S, Avula SS, Margana PG, Kakarla P, Amrutavalli A, et al. Comparative evaluation of four different sterilization methods on contaminated endodontic files. *CHRISMED J Health Res*. 2017;4(3):194–7.
16. Mascarenhas. An in-vivo experimental study on evaluating the most efficacious methods of pre-sterilizing endodontic files in paediatric dentistry. *Int J Pedo Rehab*. 2022;7(1):57–62.

Author biography

Jyotinayana Das, Under Graduate Student

Nistha Chamola, Under Graduate Student https://orcid.org/0009-0006-5913-9236

Nishika Rawat, Under Graduate Student

Anshdeep Singh, Professor

Arpit Arora, Senior Lecturer

Anil Dhingra, HOD

Cite this article: Das J, Chamola N, Rawat N, Singh A, Arora A, Dhingra A. Assessment of dental bur sterilization awareness among general dentists in Uttarakhand. *IP Ann Prosthodont Restor Dent* 2024;10(1):17-21.