

Original Research

Knowledge, Attitude And Practice Regarding Use Of Various Types Of Gloves Among Dentists: A Questionnaire Based Study

¹Shikhar Pratap Chauhan, ²Ashish Saxena, ³Swati Singh, ⁴Rishi Thukral

¹Assistant Professor, ²Professor & HOD, Department of Pediatric Dentistry, Govt College of Dentistry, Indore, India

³BDS, PGCE, Indore, India

⁴Associate Professor, Department of Dentistry, Atal Bihari Vajpayee Govt Medical College, Vidisha, India

ABSTRACT:

Background: Healthcare professionals, especially dentists, are at increased risk of developing infections because of the nature of their work. Dentists routinely come in contact with sharp instruments, some of which are operated at very high speeds and primarily work in the oral cavity which consists of contaminated oral fluids such as saliva and occasionally blood. **Aim:** The purpose of this study was to assess the perception and beliefs of dental healthcare providers towards usage of different type of gloves. **Methods:** A self-administered questionnaire in the form of Google form was forwarded to a total of 482 participants out of which 396 participants (154 interns, 116 dental post-graduate students (PG) and 126 dental faculty members) responded (response rate of 82.16%). The questionnaire comprised of questions on dental professionals' preferences for certain types of gloves and the reasons for these preferences, as well as determining their knowledge, beliefs and behavior concerning the use of dental gloves as a means of barrier protection. Data obtained was analyzed using chi-square test. **Results:** Dental faculty members had a better knowledge regarding use of gloves as compared to dental PG students and interns. Most of the study participants preferred certain types of gloves for the purpose of better protection followed by comfort. Most of the participants believed that gloves provide full protection as long as there is no visible tear. **Conclusion:** Most of the interns and PG students had poor knowledge regarding usage of gloves which calls for an action on the part of educators to educate and train dental professionals regarding proper infection control practices.

Keywords: Gloves, Infection control, Protective, Infectious disease

Received: 16 July, 2025

Accepted: 19 August, 2025

Published: 23 August, 2025

Corresponding author: Shikhar Pratap Chauhan, Assistant Professor, Department of Pediatric Dentistry, Govt College of Dentistry, Indore, India

This article may be cited as: Chauhan SP, Saxena A, Singh S, Thukral R. Knowledge, Attitude And Practice Regarding Use Of Various Types Of Gloves Among Dentists: A Questionnaire Based Study. J Adv Med Dent Scie Res 2025; 13(8):51-55.

INTRODUCTION

Healthcare professionals, especially dentists, are at increased risk of developing infections because of the nature of their work. Dentists routinely come in contact with sharp instruments, some of which are operated at very high speeds and primarily work in the oral cavity which consists of contaminated oral fluids such as saliva and occasionally blood. Several studies have shown that dentists and dental assistants are at increased risk of infections with hepatitis B virus (HBV) and hepatitis C virus (HCV).¹ The emergence of these infections along with others has led to development of Infection Control Guidelines by American Dental Association (ADA).² These standard precautions emphasize on the use of personal

protective barriers such as gloves, masks, eye-wares, head caps, etc. to prevent cross-contamination during examination or clinical procedures.

The main goal of wearing gloves during clinical procedures or examinations is to reduce the possibility of cross-contamination between patients and healthcare providers. Gloves are also used to shield users' hands from bodily fluids like blood and to lessen the risk of healthcare workers' hands becoming contaminated by microorganisms that can spread from one patient to another. Gloves have been shown in numerous trials to be effective in minimizing the spread of germs and keeping healthcare workers' hands from becoming contaminated.³⁻⁶

Although latex gloves are typically preferred by dentists, latex allergies have led to the development of alternative materials such vinyl or nitrile gloves.⁷ The characteristics of each glove type vary, including resistance to tearing, elasticity, barrier protection, durability, and puncture during usage.⁷⁻¹⁴ Long-term usage and interaction with substances like alcohol, disinfectants, and other substances can degrade the quality of gloves by increasing their permeability.^{15,16} Due of these restrictions, the twin gloving technique has been used. By reducing the frequency of inner glove perforations, the double gloving technique helped to lower hand contamination.¹⁷ Although dentists often follow conventional measures to reduce cross-infections, there is a lack of data demonstrating dentists' awareness of certain glove types and their attitudes toward wearing gloves as a protective measure. Hence, the present study was undertaken with an aim to assess the perception of dental under-graduate students (Interns), dental post-graduate (PG) students and dental faculty members (MDS staff) towards the effectiveness of gloves as a part of infection control in dentistry.

MATERIAL AND METHODS

The present cross-sectional study was conducted on entire population of dental under-graduate students (Interns), dental post-graduate (PG) students and dental faculty members (MDS staff) of a dental institute, India. A written informed consent was obtained from the participants after explaining them the purpose of the study.

RESULTS

Tab. 1.Reasons for preferring certain types of gloves n (%).

Group	Comfort	Protection	Allergy to latex	Cost
Interns	90 (58.5)	152 (98.8)	24 (15.7)	24 (15.7)
PG students	98 (84.6)	116 (100)	10 (8.7)	22(19)
Faculty members	116 (92.2)	126(100)	8 (6.4)	24 (19)
P value	0.026 [*]	0.565	0.288	0.938

Chi-square test

* indicates significant at $p \leq 0.05$; the percentages add up to more than 100% because the respondents could choose more than one reason.

The questionnaire was distributed among a total of 482 participants out of which 396 participants (154 interns, 116 PG students and 126 faculty members) returned completed questionnaires. Response rate was 85.72% for interns, 73.6% for PG students and 91% for faculty members respectively. All the participants reported using disposable gloves.

Table 1 shows that the participant groups differed in the frequencies for the reasons for wearing certain type of gloves. Protection was the most frequently reported reason by all the participants (98.8% interns; 100% respectively PG students and faculty members; $p = 0.565$). Allergy to latex gloves were least reported

QUESTIONNAIRE

Data was collected through self-administered anonymous questionnaire. The questionnaire was a modified version of previously used questionnaire by Kanjirath et al.¹⁸ Questionnaire was modified by adding a section on double gloving technique and effect of petroleum products on gloves and omitting questions based on use of gloves by the dental professionals during cold sore. Rest all the questions were used as per original questionnaire. The questionnaire was piloted on the experts (4 faculty members, 2 intern and 2 PG student) who gave their feedback concerning the face validity of the questionnaire and accordingly, the changes were made. The questionnaire was administered to a group of 48 subjects (16 interns, 16 PG students and 16 faculty members) twice at an interval of 10 days to check for test-retest reliability. The kappa coefficient value obtained was 0.76 which is good.

Each participant was given sufficient time (on an average 1 week) to fill the questionnaire. Authors tried to limit the response bias by avoiding leading questions in the questionnaire, not recording any identifiable data and requesting participants to avoid any discussion with other participants while filling the questionnaire.

STATISTICAL ANALYSIS

Data was collected, compiled and analyzed using SPSS version 16. $P \leq 0.05$ was considered to be statistically significant. Descriptive statistics were employed to describe the responses of the participants. Comparisons were made for responses between Interns, PG students and faculty members using chi square test and fisher exact test (where one of the cells has less than five observations).

factors for preferring certain types of gloves (15.7% interns; 8.7% PG students and 6.4% faculty members; $p = 0.288$). Around 92.2% of the faculty members and 84.6% of the PG students reported using certain type of gloves for comfort; whereas only 58.5% of the interns preferred certain type of gloves for comfort. This overall difference in preference for certain type of gloves among three groups was significant. Pairwise comparison of preference of gloves for comfort showed that difference between interns and PG students and difference between interns and faculty members was significant.

Tab. 2: Beliefs concerning the way gloves provide protection n (%).

Question	Interns	PG students	Faculty members	P value
What degree do gloves prohibit passage of bacteria and viruses through the glove material?				
Full prohibition	84 (54.6)	8 (7.0)	2 (1.7)	0.001*
Protection against most bacteria and viruses	38 (24.8)	56 (48.4)	53 (84.2)	
Prohibit bacteria, but not viruses	2 (1.4)	22 (19.1)	8 (6.5)	
Little to no protection	2 (1.4)	16 (13.9)	0 (0.0)	
Don't know	28 (18.4)	14 (12.2)	10 (8.1)	
Are the gloves sufficient to provide effective protection against HIV/Hepatitis B patient?				
Yes	44 (28.7)	42 (36.3)	24 (19.1)	0.054
No	110 (71.5)	74 (63.9)	112 (81.0)	
Is double gloves technique effective in reducing transmission of infection?				
Yes	146 (94.9)	102 (88.0)	110 (87.4)	0.122
No	8 (5.3)	14 (12.2)	16 (12.8)	
How long do gloves provide adequate protection?				
No visible tear	104 (70.2)	58 (50.1)	76 (60.4)	0.038*
30 minutes	22 (14.4)	26 (22.5)	10 (8.0)	
1-2 hours	8 (5.3)	18 (15.6)	22 (17.6)	
More than 2 hours	6 (4.0)	2 (1.9)	0 (0)	
Don't know	6 (6.6)	12 (10.4)	18 (14.4)	
Do petroleum based products affect the integrity of the gloves?				
Yes	88 (57.2)	68 (58.7)	114 (90.6)	0.001*
No	66 (43.0)	48 (41.5)	12 (10.0)	

Chi-square test; Fisher exact test

* indicates significant at $p \leq 0.05$.

Table 2 shows that 24.8% interns, 48.4% PG students and 84.2% faculty members reported that gloves protect against most of the bacteria and viruses. 54.6% interns reported that gloves provide full protection which shows their lack of knowledge. Out of total faculty members, 8.0% faculty members had no idea about the level of protection offered by gloves. This overall difference was statistically significant ($p = 0.001$). Pairwise comparison of degree of protection showed that difference between interns and PG students ($p = 0.001$), difference between interns and faculty members ($p = 0.001$) and difference between PG students and faculty members was significant ($p = 0.001$). 71.5% interns, 63.9% PG students and 82% faculty members reported that gloves do not provide sufficient protection against HIV/Hepatitis B viruses. Almost all the respondents (96.0% total) agreed upon the effectiveness of double gloving technique in reducing transmission of infection. ($p = 0.122$) Large proportion of responders (70.2% interns; 50.1% PG students and 60.4% faculty members) believed that gloves provide adequate protection as long as there is no visible tear. Few of interns (14.4%) and PG students (22.5%) reported that gloves are unsafe after 30 minutes of usage. 14.4% of faculty members didn't know about the length of time that gloves provide adequate protection. These differences in responses were significant ($p = 0.038$). Pairwise comparison of period of protection showed that difference between interns and faculty members was significant ($p = 0.025$). Almost all the faculty members (90.6%) knew about the effect of petroleum products in quality of gloves as compared to 57.2%

interns and 58.6% PG students ($p = 0.001$). Pairwise comparison of effect of petroleum products showed that difference between interns and faculty members ($p = 0.001$) and difference between PG students and faculty members was significant ($p = 0.001$).

DISCUSSION

Dental health care professionals should not forget the risks associated with treating patients with infectious diseases. Dental professionals are at increased risk of developing infections because of exposure to pathogenic micro-organisms residing in oral cavity as well as in respiratory tract of the patients. These microbes can be transferred directly to dental professionals by direct contact with patient's blood, saliva or oral secretions or indirectly through sharp injuries or droplet infections. Hence, it is mandatory for dental healthcare professionals to be properly equipped with personal protective barriers while treating every patient. Wearing gloves, one of the recommended protective barrier, helps prevent contamination of the operator's hands due to blood or saliva and also helps in prevention of transmission of infection from operator's hand to the patient [3-6].

In the present study, all the participants reported using disposable gloves while doing surgical procedures. Almost all the participants reported using certain types of gloves for the protection which shows awareness regarding usage of personal protective barriers among them. However, a study conducted by Kanjirath et al¹⁸ showed that only 40.5% of the professionals, 21.3% of 3rd and 4th year dental students and 37.2% of the graduate students used

certain types of gloves for protection purpose. The present study showed increasing number of participants using certain types of gloves for the purpose of comfort from interns (58.5%) to PG students (84.6%) and faculty members (92.2%). This might be due to the fact that as the students step into post-graduate world from internship, they need to perform more complex procedures. Performing complex procedures requires more fine motor skills which can be acquired only when operator has a better sense of judgment about the type of gloves which gives him/her best fit and allow them to perform dental surgical procedures better. Tight fitting gloves may cause irritation by rubbing against the skin and loose fitting may not allow for the proper grip of the instrument.¹⁹

Almost all the participants believed that latex gloves provide best protection as compared to other two types. 10.7% of the participants reported using non-latex gloves, owing to latex allergy and the rest of the participants (90.5%) preferred latex gloves for routine procedures and might have never used non-latex gloves. Hence, they might have believed that latex gloves provide best barrier protection. However, literature shows that latex and nitrile gloves provide best protection in terms of barrier performance as compared to vinyl gloves.⁸⁻¹⁴ Contrasting responses were seen in the previous study done by Kanjirath et al¹⁸ where mixed responses were observed for the type of gloves providing better protection.

54.3% of interns believed that gloves provide full protection against the passage of bacteria or viruses as compared to 7.0% PG students and 1.7% staff members, which is similar to study by Kanjirath et al.¹⁸ This shows that more experienced health professionals had better knowledge. Literature also shows that continuous use compromised the integrity of the gloves.^{9,20} Responses to a follow-up question about protection against HIV/Hepatitis B patient showed that, 81.1% of the staff members and 63.9% of PG students believed that gloves do not provide effective protection against HIV/Hepatitis B patients. However, only 28.7% of the interns believed that gloves provide effective protection against HIV/Hepatitis B patients which was in contrast to the response to previous question regarding passage of bacteria or viruses through gloves. Most of the participants knew that double gloving technique is effective in reducing transmission of infection. The respondents were also assessed for how long they believed that they were protected by gloves. Majority of the participants in each group believed that gloves can be worn for a procedure as long as they show no visible tear. However, 14.4% of faculty members and 10.4% PG students had no idea about how long gloves provide sufficient protection as compared to only 6.6% of interns which raises concerns over their understanding of infection control protocols.

Previous study done by Kanjirath et al¹⁸ reported more number of participants stating that they did not know

about how long gloves provide sufficient protection as compared to the present study. Almost half of the interns and PG students did not know about the effect of petroleum based lubricants on the integrity of the gloves which shows their poor knowledge towards usage of gloves.

The participants were asked about their gloves' changing practices to assess their own behavior. Few of the participants reported using same gloves for more than one patient which is a serious practice requiring urgent rectification. This supplements the wrong practice in ensuring protection against infections i.e. the protection of only the healthcare providers, but not the patients. Reason reported for using same gloves for more than one patient was excessive workload which did not allow for the sufficient time to change the gloves in between multiple patients. Participants were also asked about frequency of changing the gloves when involved in uninterrupted three-hour procedure. Majority of the participants in each group reported changing their gloves after 1 hr which was contradicting to the response about the question regarding duration for which gloves provide protection where only few participants believed that gloves provide sufficient protection for 1-2 hrs. 29.4% PG students and 20.7% faculty members never changed gloves during such uninterrupted procedures which might put them and their patients at an increased risk of acquiring infections.

The results of the present study suggest lack of understanding of basic infection control protocols among interns and to some extent PG students too. Faculty members had a good knowledge and showed acceptable practices regarding usage of the gloves. This clearly shows that perception regarding the usage of gloves improves with increase in clinical experience. Based on the literature available, healthcare providers should keep in mind following things while using gloves: 1) use of disposable gloves, 2) using gloves that fit best to your hands, 3) use of latex or non-latex gloves depending upon need, 4) use of double gloving technique since gloves do not provide complete protection against all bacteria and viruses, 5) change of gloves after every hour in case of an uninterrupted three-hour procedure, 6) avoiding application of petroleum based products to gloves, 7) avoiding use of same gloves for more than one patient.

CONCLUSIONS

The findings of the study suggest poor perception of interns and PG students towards the usage of gloves of different types. It is the responsibility of the educators to provide students with adequate knowledge and training regarding infection control protocols, which will subsequently lead to prevention of infectious diseases.

REFERENCES

- Mahboobi N, Porter SR, Karayiannis P, Alavian SM. Dental treatment as a risk factor for hepatitis B and C viral infection. A review of the recent literature. *J Gastrointestin Liver Dis* 2013;22:79-86. [PubMed] [Google Scholar]
- Council on Dental Materials and Devices, Council on Dental Therapeutics. Infection control in the dental office. *J Am Dent Assoc* 1978;93:673-7. [PubMed] [Google Scholar]
- Johnson S, Gerding DN, Olson MM, Weiler MD, Hughes RA, Clabots CR, Peterson LR. Prospective, controlled study of vinyl glove use to interrupt *Clostridium difficile* nosocomial transmission. *Am J Med* 1990;88:137e140 [https://doi.org/10.1016/0002-9343\(90\)90462-M](https://doi.org/10.1016/0002-9343(90)90462-M) 10.1016/0002-9343(90)90462-M [DOI] [PubMed] [Google Scholar]
- Tenorio AR, Badri SM, Sahgal NB, Hota B, Matushek M, Hayden MK, Trenholme GM, Weinstein RA. Effectiveness of gloves in the prevention of hand carriage of Vancomycin-resistant *Enterococcus* species by healthcare workers after patient care. *Clin Infect Dis* 2001;32:826-9. <https://doi.org/10.1086/319214> 10.1086/319214 [DOI] [PubMed] [Google Scholar]
- Jeong SJ, Kim JI, Kim JY, Ban SH, Um JY, Jeong MJ, Lim DS, Jeong SJ. Effectiveness of glove for the prevention of microbial contamination during the dental clinical practice. *J Dent Hyg Sci* 2014;14:537-45. <https://doi.org/10.17135/jdhs.2014.14.4.537> 10.17135/jdhs.2014.14.4.537 [DOI] [Google Scholar]
- Olsen RJ, Lynch P, Coyle MB, Cummings J, Bokete T, Stamm WE. Examination gloves as barriers to hand contamination in clinical practice. *J Am Med Assoc* 1993;270:350-3. <https://doi.org/10.1001/jama.270.3.350> 10.1001/jama.270.3.350 [DOI] [PubMed] [Google Scholar]
- Huber MA, Terezhalmay GT. Adverse reactions to latex products: preventive and therapeutic strategies. *J Contemp Dent Practice* 2006;7:97-106. <https://doi.org/10.5005/jcdp-7-1-97> 10.5005/jcdp-7-1-97 [DOI] [PubMed] [Google Scholar]
- Rego A, Roley L. In use barrier integrity of gloves: latex and nitrile superior to vinyl. *Am J Infect Control* 1999;27:405-10. [https://doi.org/10.1016/S0196-6553\(99\)70006-4](https://doi.org/10.1016/S0196-6553(99)70006-4) 10.1016/S0196-6553(99)70006-4 [DOI] [PubMed] [Google Scholar]
- Korniewicz DM, Laughon BE, Cyr WH, Lytle CD, Larson E. Leakage of virus through used vinyl and latex examination gloves. *J Clin Microbiol* 1990;28:787-8. <https://doi.org/10.1128/JCM.28.4.787-788.1990> 10.1128/JCM.28.4.787-788.1990 [DOI] [PMC free article] [PubMed] [Google Scholar]
- Korniewicz DM, El-Masri M, Broyles JM, Martin CD, O'Connell KP. Performance of latex and nonlatex medical gloves during simulated use. *Am J Infect Control* 2002;30:133-8. <https://doi.org/10.1067/mic.2002.119512> 10.1067/mic.2002.119512 [DOI] [PubMed] [Google Scholar]
- Kerr LN, Chaput MP, Cash LD, O'Malley LG, Sarhani EM, Teixeira JC, Boivin WS, Mailhot SA. Assessment of the durability of medical examination gloves. *J Occup Environ Hyg* 2004;9:607-12. <https://doi.org/10.1080/15459620490491803> 10.1080/15459620490491803 [DOI] [PubMed] [Google Scholar]
- Fischer M, Reddy VR, Williams FM, Lin KY, Thacker JG, Edlich RF. Biomechanical performance of powder-free examination gloves. *J Emerg Med* 1999;17:1011-8. [https://doi.org/10.1016/S0736-4679\(99\)00133-X](https://doi.org/10.1016/S0736-4679(99)00133-X) 10.1016/S0736-4679(99)00133-X [DOI] [PubMed] [Google Scholar]
- Patel H, Fleming GJ, Burke FJ. Puncture resistance and stiffness of nitrile and latex dental examination gloves. *Br Dent J* 2004;196 695-700. <https://doi.org/10.1038/sj.bdj.4811353> 10.1038/sj.bdj.4811353 [DOI] [PubMed] [Google Scholar]
- Mishra BP, Harish A, Mathew AM, Pradhan A, Sneha S, Murty V, Makkad RS. Management of zygomatic fractures using different surgical approaches. *Bioinformation*. 2023; 31;19(13):1371-1376. doi: 10.6026/973206300191371.
- Sawyer J, Bennett A. Comparing the level of dexterity offered by latex and nitrile safeskin gloves. *Ann Occup Hyg* 2005;50:289-96. <https://doi.org/10.1093/annhyg/mei066> 10.1093/annhyg/mei066 [DOI] [PubMed] [Google Scholar]
- Jordan SL, Stowers MF, Trawick EG, Theis AB. Glutaraldehyde permeation: choosing the proper glove. *Am J Infect Control* 1996;24:67-9. [https://doi.org/10.1016/S0196-6553\(96\)90001-2](https://doi.org/10.1016/S0196-6553(96)90001-2) 10.1016/S0196-6553(96)90001-2 [DOI] [PubMed] [Google Scholar]
- Mellstrom GA, Lindberg M, Boman A. Permeation and destructive effects of disinfectants on protective gloves. *Contact Dermatitis* 1992;26:163-70. <https://doi.org/10.1111/j.1600-0536.1992.tb00287.x> 10.1111/j.1600-0536.1992.tb00287.x [DOI] [PubMed] [Google Scholar]
- Tanner J, Parkinson H. Double gloving to reduce surgical cross-infection. *Cochrane Database Syst Rev* 2006;(3):CD003087 <https://doi.org/10.1002/14651858.CD003087.pub2> 10.1002/14651858.CD003087.pub2 [DOI] [PMC free article] [PubMed] [Google Scholar]
- Kanjirath PP, Coplen AE, Chapman JC, Peters MC, Inglehart MR. Effectiveness of gloves and infection control in dentistry: student and provider perspectives. *J Dent Educ* 2009;73:571-80. <https://doi.org/10.1002/j.0022-0337.2009.73.5.tb04732.x> 10.1002/j.0022-0337.2009.73.5.tb04732.x [DOI] [PubMed] [Google Scholar]
- Taylor JS. Other reactions from gloves. Mellström GA, Wahlberg JE, Maibach HI. (eds.). *Protective gloves for occupational use*. USA: CRC Press Inc; 1994, pp. 255-65. [Google Scholar]
- Merchant VA, Molinari JA, Pickett T. Microbial penetration of gloves following usage in routine dental procedures. *Am J Dent* 1992;5:95-6. [PubMed] [Google Scholar]