

# AWARENESS OF CROSS-INFECTION AND ITS CONTROL MEASURES AMONG PATIENTS ATTENDING A TERTIARY DENTAL HOSPITAL IN NEPAL

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## ABSTRACT

### Introduction

Dental procedures frequently lead to exposure to blood and saliva which can carry a variety of pathogens. Aerosols produced during dental treatment procedures can further facilitate the transmission of these infectious agents. It is equally important for the patients to be aware of cross-infection and measures taken to prevent it in a dental setting.

### Objectives

The main objective of this study was to assess the awareness of cross-infection and its control measures among patients attending College of Dental Surgery, B.P. Koirala Institute of Health Sciences (BPKIHS).

### Methodology

A cross-sectional study was carried out among 362 patients who attended College of Dental Surgery, BPKIHS. Data was collected by administering a questionnaire that consisted of 4 questions intended to collect sociodemographic information and 10 close-ended questions designed to assess awareness of cross-infection and its control measures. The data was entered and analyzed using SPSS® software for Windows®.

### Result

The majority of the participants were aware that there was a chance for an infection to be transmitted from a dentist to a patient (82%), from a patient to a dentist (80.4%), and in between patients attending the same dental clinic (70%). Most of the participants considered wearing gloves (94.4%) and face mask (86%) by the dentist to be important. Only 40.3% of participants were aware of better methods of sterilization other than boiling in water. Awareness was higher among participants with higher education ( $p < 0.05$ ).

### Conclusion

The majority of the participants were aware that there was a chance for an infection to be transmitted from a dentist to a patient. However, the dental healthcare professionals should educate people about the possible risks of cross-infection and the importance of infection-control practices in dental clinics. Modern mass media and social media can be used to spread awareness to a large segment of the population.

## KEYWORDS

Awareness, cross-infection, dentistry, infection control, sterilization



## INTRODUCTION

Cross-infection can be defined as the transmission of infectious agents between patients and staff within a clinical environment.<sup>1</sup> A dental clinic invariably carries the risk of cross-infection due to the nature of its procedures which involves frequent exposure to body fluids and handling of sharp instruments.<sup>2</sup> Pathogenic microorganisms such as hepatitis B virus (HBV), hepatitis C virus (HCV), human immunodeficiency virus (HIV), herpes simplex virus types 1 and 2, *Mycobacterium tuberculosis*, streptococci, and staphylococci have been associated with cross-infection in dental setting.<sup>3</sup> Infective agents can be transmitted via blood, saliva, aerosol, and contaminated instruments by direct contact, inhalation, or inoculation.<sup>4</sup> Dental healthcare professionals routinely use gloves, masks, spectacles, and autoclave dental instruments to prevent cross-infection in their dental clinics. A study by Laheij et al concluded that transmission and infection with hepatitis B virus poses the greatest risk for both the dental team and the patients.<sup>3</sup> Therefore, it is equally important for the patients to understand what cross-infection is and why dentists use protective barriers like gloves and masks. This will make them more comfortable when dentists use such protective barriers. Further more, amid the COVID-19 pandemic, public awareness of cross-infection and its prevention is crucial as such awareness can help curb the transmission and spread of COVID-19 to some extent.

Although infectious disease transmission can occur in any health-care setting, many dental clinics, particularly in underdeveloped and developing countries, do not follow recommended infection control standards.<sup>5</sup> In a systematic review, Oosthuysen et al found that in developing countries, compliance with infection-control guidelines in oral health care facilities was low and concerning.<sup>6</sup> According to a survey, conducted by Pradhan, only 34% of dental clinics in Kathmandu were using autoclave to sterilize instruments while the majority of them were using boiling water.<sup>7</sup> Awareness of cross-infection, protective barriers, and proper sterilization method can help people avoid getting treatment in dental clinics with low standards of infection control.

Several surveys have been done in many countries about public awareness of cross-infection and its control measures.<sup>2,8,9</sup> However, no data regarding awareness of cross-infection and infection control in dental clinics is available from any part of Nepal in the literature. Therefore, the main aim of the study was to assess awareness of cross-infection and its control measures among patients attending the College of Dental Surgery, B.P. Koirala Institute of Health Sciences, a tertiary dental hospital.

## METHODOLOGY

This cross-sectional study was carried out in three months (November 2019 – January 2020) among 362 patients who attended the College of Dental Surgery, BPKIHS. Ethical clearance was obtained from the Institutional Review Committee, B.P. Koirala Institute of Health Sciences

(Reference number: DRU/42/020). Participants were selected by convenience sampling method. The sample size was calculated by considering a proportion of 62% participants who were aware that transmission of infection can occur from dentist to patient in the study done by Ratnayake et al.<sup>2</sup> Level of confidence (z) was set at 95%, and permissible error (d) was set at 5%. Patients aged 18 years and above were included. Written consent was taken from all the participants. The questionnaire was asked to the patients in the waiting room of the department of oral medicine and radiology.

A questionnaire used in a previous study was used as the data collecting tool with permission from the main author.<sup>2</sup> The original English questionnaire was translated and validated in Nepali by forward-backward method. Two independent individuals translated the English questionnaire in Nepali and the discrepancies in these two sets of translated questionnaires were resolved by the two translators. Then the back translation of the Nepali version to English was done by two different individuals. Lastly, the translated English questionnaire was compared with the original English questionnaire in which the translated version exhibited acceptable validity. This translated questionnaire was used to collect the responses of the participants.

The questionnaire consisted of 4 questions intended to obtain sociodemographic information (age, gender, education level, number of past dental visits) and 10 questions designed to assess awareness of cross-infection and its control measures in a dental clinic. The latter 10 questions consisted of three close-ended responses: "Agree", "Disagree", and "Do not know". The questionnaire was administered by an investigator as not all the participants involved in the study were literate. Participants who had difficulty understanding any question were given clarification in simple words. The responses were coded and entered and analyzed using Statistical Package for the Social Sciences® (SPSS) software version 23 for Windows®. Chi-Square tests were done to check the association of awareness with the education level of the participants. Level of significance was set at  $p < 0.05$ .

## RESULTS

The study sample consisted of 362 participants out of which 186 were males and 176 were females. The age of the participants ranged from 18 to 68 years with a mean age of  $36 \pm 13.1$  years. Regarding education level, 51.5% participants had completed higher secondary level education or above degree whereas the remaining 48.5% participants had education up to or lower than secondary level. More than half of the participants (55.5%) had visited a dental clinic in past for treatment.

In this study, 82% of the participants were aware that there was a chance that an infection could be transmitted from a dentist to a patient while 80.4% were aware that infection could be transmitted from a patient to a dentist in a dental clinic. Similarly, around 70% of the participants knew that



infection could be transmitted between patients attending the same dental clinic. Most of the participants considered wearing gloves (94%) and facemask (86%) by the dentist to be important (Table 1).

Further, more than half of the participants (56%) considered boiling dental instruments in water to be the best way of sterilization. A considerable number of participants (59.7%) were unaware about the proper method of sterilization i.e., autoclave.

**Table 1: Awareness regarding cross-infection and its control measures of the participants (n=362)**

Questions	n (%)
Q1. There is a possibility that a dentist who has got an infectious disease might transmit that infection to a patient that he/she treats.	
Agree	297 (82%)
Disagree	39 (10.9%)
Do not know	26 (7.1%)
Q2. There is a chance that a dentist might acquire an infection from a patient who has got an infectious disease.	
Agree	291 (80.4%)
Disagree	56 (15.5%)
Do not know	15 (4.1%)
Q3. There is a chance of transmission of an infection from a patient to another receiving treatment in the same dental clinic.	
Agree	255 (70.4%)
Disagree	71 (19.6%)
Do not know	36 (10%)
Q4. Equipment and instruments used in a dental clinic could be a source of infection.	
Agree	294 (81.2%)
Disagree	53 (14.6%)
Do not know	15 (4.2%)
Q5. It is not important whether the dentist wears gloves or not as long as his/her hands are clean.	
Agree	13 (3.6%)
Disagree	342 (94.4%)
Do not know	7 (2%)
Q6. Wearing gloves by dentists in dental clinic protect only them from infectious diseases.	
Agree	48 (13.2%)
Disagree	294 (81.2%)
Do not know	20 (5.6%)
Q7. It is not important whether the dentist wears a face mask or not.	
Agree	33 (9%)
Disagree	311 (85.9%)
Do not know	18 (5.1%)
Q8. Wearing face masks by dentists in dental clinic protect only them from infectious diseases.	
Agree	60 (16.5%)
Disagree	286 (79%)
Do not know	16 (4.5%)
Q9. Boiling dental instruments in water for 15-20 minutes is the best way of making them germ-free.	
Agree	203 (56%)
Disagree	111 (30.7%)
Do not know	48 (13.3%)
Q10. There are other better ways of sterilizing instruments other than boiling in water.	
Agree	146 (40.3%)
Disagree	99 (27.3%)

To check the association of awareness with the education level of the participants, the responses "Disagree" and "Do not know" were summed for questions 1-4 and 9-10 (Table 1) and the responses "Agree" and "Do not know" were summed for questions 5-8 (Table 1) as these options implied unawareness for the respective questions. Awareness of the participants showed significant association with their education level ( $p < 0.05$ ) (Table 2).

**Table 2: Awareness according to the education level of the participants (n=362).**

Questions	E0		E1		p-value
	Agree	Disagree	Agree	Disagree	
Q1	137 (37.8%)	38 (10.5%)	160 (44.2%)	27 (4.5%)	0.07
Q2	128 (35.4%)	41 (11.3%)	163 (45%)	30 (8.3%)	0.03*
Q3	119 (32.8%)	67 (18.5%)	136 (37.5%)	40 (11%)	0.004*
Q4	133 (36.7%)	37 (11.7%)	161 (44.5%)	31 (7.1%)	0.17
Q5	14 (3.8%)	164 (45.3%)	6 (1.7%)	178 (49.2%)	0.05
Q6	43 (11.8%)	133 (36.7%)	25 (7%)	161 (44.5%)	0.007*
Q7	33 (9%)	141 (39%)	18 (5%)	170 (47%)	0.010*
Q8	48 (13.3%)	126 (34.8%)	28 (7.7%)	160 (44.2%)	0.010*
Q9	110 (30.4%)	65 (18%)	93 (25.6%)	94 (26%)	0.011*
Q10	56 (15.5%)	118 (32.6%)	90 (24.9%)	98 (27%)	0.002*

\* $p < 0.05$ , significant. E0 = Education level up to or below secondary level, E1 = Education level higher than secondary level. Q1-Q10 = Questions corresponding to table 1.

## DISCUSSION

This survey evaluated the awareness of cross-infection and its control measures among patients visiting College of Dental Surgery, BPKIHS, which is a tertiary dental hospital. In this study, 82% of the participants were aware that an infection could be transmitted from dentist to patient while 80.4% agreed that transmission could occur from patient to dentist. Similarly, about 70% of the participants believed that an infection could be transmitted between patients receiving treatment in the same dental clinic. These findings were higher than the findings by Ratnayake et al.<sup>2</sup> Though adequate, awareness regarding transmission between patients was comparatively low in the study population. This study was conducted at the start of the COVID-19 pandemic breakout. During that time extensive public awareness campaigns were being conducted about the importance of masks and hand hygiene. These campaigns may have raised participants' understanding of cross-infection and its control measures.

The majority of participants (94.4%) agreed that dentists must wear gloves while treating a patient, even if their hands were clean. This finding was similar to the reports of Deograde et al and Sofola et al.<sup>8,9</sup> Similarly, about 86% of respondents agreed that it was important for the dentist to



wear a facemask while treating a patient. Patients seem to endorse the use of gloves more enthusiastically than the use of facemasks possibly because they perceived gloves as primarily for their benefit and mask for the dentist's benefit.<sup>1</sup> Moreover, patients tend to think that facemask is used to prevent inhalation of bad breath from the patient.<sup>9</sup>

About 82% of the participants believed that gloves protect both dentist and patient. This finding was lower than the findings by Baseer et al and Ibrahim et al.<sup>4,10</sup> Further, nearly 79% of participants agreed that facemask protected both dentist and patient. Higher awareness in India and Nigeria had been attributed to the effectiveness of health-promoting programs launched by various formal and informal sectors including the mass media.<sup>8,9</sup>

Knowledge about the proper method of sterilization was low in the participants. Only 40.3% of participants were aware of better methods of sterilization other than boiling in water. Knowledge of autoclave has been reported to be low in studies from developing countries such as Sri Lanka, India, Nigeria, but higher in studies from developed countries such as England.<sup>2,8,9,11</sup> Samaranayake et al, in their study, attributed higher knowledge of autoclaves in England to mass media programs that discussed the limitations of boiling water sterilization when compared to other sterilization methods.<sup>11</sup>

Awareness of cross-infection was significantly associated with the education level of the participants ( $p < 0.05$ ) (Table 2). Similar findings have been reported by other studies.<sup>2,9</sup> However, this association was insignificant for the question inquiring about possibility of transmission of infection from dentist to patient (Q1, Table 2). The association was also insignificant for questions inquiring about contaminated dental instruments as a source of infection (Q4, Table 2) and the question inquiring about the importance of gloves used by dentists (Q5, Table 2). This could be because the answers to these questions are common knowledge and do not necessitate any formal education.

Many countries, including Sri Lanka, India, Nigeria, and England, have successfully used modern mass media to raise

public awareness of cross-infection.<sup>2,8,9,11</sup> Social media is a powerful tool and can be used to spread awareness about different issues.<sup>12</sup> Healthcare professionals and educators are using social media to disseminate health information and are spreading awareness about various health-related issues.<sup>12,13</sup> These platforms can similarly be used in Nepal to educate the general public about the risks of cross-infection.

## CONCLUSIONS

The majority of the participants were aware that there was a chance for an infection to be transmitted from a dentist to a patient. However, the dental healthcare professionals should educate people about the risks of cross-infection and infection-control practices required for a safe dental practice. They should also encourage the patients to be alert and question the cross-infection control measures practiced in the dental clinic. Awareness programs are helpful to clear up misconceptions and increase public awareness. Modern mass media and social media can be used to spread awareness about various health-related issues.

## LIMITATIONS OF THE STUDY

This study has been done at a single center and cannot be generalized to all dental patients of the country.

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## CONFLICT OF INTEREST

None

## FINANCIAL DISCLOSURE

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