

## Knowledge and Attitude of Dental Patients towards Cross-Infection Control Measures

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### Abstract

**Aim:** The purpose of the study was to assess the knowledge and attitude of cross-infection control measures among the patients attending Sri Dharmasthala Manjunatheshwar (SDM) dental hospital, Dharwad, India. Secondly, to identify the factors influencing knowledge and attitude of dental patients towards cross infection control measures. **Study Subjects and method:** A cross-sectional survey was conducted among 250 individuals attending outpatient department in SDM dental hospital Dharwad, Karnataka, India. A close ended, structured, self-administered, questionnaire consisting queries related to the knowledge, attitude towards cross-infection control measures were assessed. Frequency distribution tables, analysis of variance and scheffe's multiple comparison tests were performed. **Results:** Less than 50% dental patients were aware of the spread of infection in dental clinics via saliva, blood and unsterilized/contaminated dental instruments. Over 90% said that dentist should wear gloves, and wear face mask. Seventy five percent study participants would like their dentist to change the gloves after every patient and 40.8% said that there is highly unlikely of contracting AIDS from dentist suffering with AIDS. A significant knowledge differences were observed among rural and urban study subjects with different occupational, educational and income groups. **Conclusion:** Dental patients considered in the present study showed poor knowledge towards spread of infection in dental hospital setting. However, adequate knowledge and positive attitudes were observed towards the use of barrier methods of infection control among dental patients. Demographic variables considered in the study showed inconsistency in knowledge of infection control.

**Keywords:** Knowledge; Attitude; Control measures; Cross-infection.

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### Introduction

Cross infection can be defined as the transmission of infectious agents between patients and staff within a clinical environment. Transmission may result from person to person contact or via contaminated objects. Transmission of infection from one person to another requires a source of infection. The infective agent is transmitted through blood, droplets of saliva and

instruments contaminated with blood, saliva and tissue debris. The route of transmission may be inhalation or inoculation.[1]

In dentistry, the source of infection may be the patients suffering from infectious diseases, those who are in the prodromal stage of certain infections and healthy carriers of pathogens. Carriers of pathogens who pose a threat of disease transmission may be categorized as either convalescent carriers or asymptomatic carriers. An asymptomatic carrier has no past history of infection, as he/she may have unknowingly had a subclinical infection, and thus such carriers cannot be easily identified. Nevertheless, this individual may carry infective microbes in saliva and blood. Hepatitis B is a classic example of a disease which may manifest with or without symptoms. A convalescent carrier can be identified from the past history of infection and can be easily diagnosed.[2]

Transmission of infection within a dental

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surgery may occur by direct contact of tissue with secretions or blood, from droplets containing infectious agent, or via contaminated sharps or instruments which have been improperly sterilized. The major route of cross infection in dental surgery is via infection through intact skin or mucosa due to accidents involving sharps or direct inoculation onto cuts and abrasions in the skin.[3]

The protection barrier works by protecting the dentist from the patient or the patient from the dentist, or both from the surrounding contaminated environment. These barriers include gloves, masks, eye protectors, tray covers, covers of the working surfaces and light handles.[4,5]

Practice of dentistry has remarkably changed since the discovery of the potential risks of spreading HIV/AIDS, Hepatitis-B and other viral diseases during dental treatment. This has lead heightened awareness of cross-infection risk among dental practitioners. It means the use of barrier procedures (gloves, masks, eye protection) and autoclaves are now indispensable features of the in dental practice. Momentum for such change has come mainly from within the profession. But, changing patient expectations and role of media coverage has also provided movement on the issue of infection control.

Several studies have been reported in the literature on knowledge of infection control measures targeted towards dental students, dental practioners and staff. However, lack of published reports on the perception of infection control measures among dental patients from Indian context has given an impetus to undertake this study with an objective to assess the knowledge and attitude of cross-infection and its control measures among the patients attending SDM dental hospital, Dharwad, India.

### **Subjects and Methods**

A cross-sectional survey of the dental patients was carried out by considering a

convenient sample of 250 individuals (159 males, 91 females) selected from the outpatient dental clinics of SDM dental hospital, Dharwad, India. Study was approved by the ethical review committee of SDM dental college and hospital, Dharwad. Informed consent to participate in the study was obtained from the dental patients. Age of the participants ranged from 15 years-76years.

#### *Questionnaire Design*

A structured, close-ended, self-administered questionnaire was designed and pretested in a local language of Kannada for reliability and validity. A pilot study undertaken among the dental patients showed a split half reliability of 0.85 and validity 92%.

Questionnaire consisted of three parts, first part included socio demographic data such as age, gender, education, income, occupation, residence and visit to the dental hospital. Second part included fifteen questions to assess the knowledge on infection, spread of infection in dental hospital, use of barrier methods to control spread of infection and HIV and HBV infections and use of autoclave in controlling infection. Third part had five questions to assess the perceived attitude of patients towards cross infection control measures. A total 250 questionnaires were distributed among the dental patients and all the questionnaires were filled and returned back. A response rate of 100% was obtained. It took 3-5 minutes for each patient to complete the questionnaire.

#### *Statistical Analysis*

Every correct answer was scored 1 and incorrect answer was scored zero. Thus, a maximum knowledge score of 15 will be obtained by adding all the correct responses of fifteen questions. Similarly, a maximum attitude score of 5 will be observed by adding all the correct responses in the attitude section.

Frequency distribution table was generated for demographic data. Student t test, analysis of variance (Anova) and scheffe's multiple comparison tests were performed to compare

mean knowledge and attitude scores of the patients. Level of significance was set at  $\leq 0.05$ . All the data was analyzed by using IBM-SPSS software version 19.

In the present study there were 250 questionnaires distributed and hundred percent responses were obtained. Majority of the respondents were Male (63.6%). Most of the study subjects were in the age range of 15 - 24 years, residing in the urban area (62%) and were employed (27.6%). Many of study subjects had their educational level till the 8th - 10th standard (31.6%) with no income group constituting (42.4%) (Table 1).

Almost 55% of the study subjects knew the meaning of infection and 24% were aware of spread of infection in dental hospital environment. However, 38.4%, 46.4% and 39.6% of the study subjects said that the saliva, blood and contaminated or unsterilized instruments can spread infection during dental treatment respectively. Only 15.2% said that they can acquire infection from dentist and 26.8% said that dentist can acquire infection from patients during dental treatment. Ninety four percentages of study subjects knew that dentist should wear gloves, 86.8% said that wearing gloves by dentist gives

**Table 1: Demographic Characteristics of the Study Participants**

		N	Percentage (%)
Age (in years)	15-24	72	28.8
	25-34	68	27.2
	35-44	44	17.6
	45-54	36	14.4
	55-64	20	8.0
	Above 65	10	4.0
	Total	250	100.0
Gender	Male	159	63.6
	Female	91	36.4
	Total	250	100.0
Residence	Rural	95	38.0
	Urban	155	62.0
	Total	250	100.0
Occupation	Student	46	18.4
	House wife	49	19.6
	Business	56	22.4
	Employed	69	27.6
	Agriculture	30	12.0
	Total	250	100.0
Education (Class)	1-7	23	9.2
	8-10	79	31.6
	11-12	38	15.2
	Graduate	63	25.2
	Other degree	47	18.8
	Total	250	100.0
Income (Indian Rupees= INR)	No income	106	42.4
	500-2500	72	28.8
	2501-4500	32	12.8
	4501-6500	17	6.8
	above 6501	23	9.2
	Total	250	100.0
Patient visits	First time visited	48	19.2
	Visited	202	80.8
	Total	250	100.0

**Table 2: Respondents Knowledge towards Cross-Infection and its Control Measures**

Knowledge Related Questions	Yes (%)	No (%)	Don't know (%)
Meaning of infection	54.4	26.8	18.8
Awareness of spread of infection in dental hospital	24	44	32
Infection spread from saliva (spit) during dental treatment	38.4	29.2	32.4
Infection spread from blood during dental treatment	46.4	26.4	27.2
Infection spread from contaminated/ unsterilized dental instruments	39.6	38.8	21.6
Acquiring infection from dentist during the dental treatment?	15.2	67.2	17.6
Dentist acquiring infection from patient during the dental treatment	26.8	51.2	22
Dentist should wear gloves	93.6	2.8	3.6
Wearing of the gloves by dentist gives protection to both dentist and patients from cross infection	86.8	6.4	6.8
Dentist should wear face mask	92.8	2	5.2
Dentist should wear spectacles, gowns, coats	84.4	5.6	10
Dentist should use new gloves for each patients	80.8	8.8	10.4
AIDS infection can spread during dental treatment	34.8	38	27.2
HBV infection can spread during dental treatment	19.2	30	50.8
Autoclave is the Best method of sterilizing (germ free) Dental instrument.	29.2	21.6	49.2

**Table 3: Respondents Attitude towards Cross-Infection**

Attitude related questions		
Would you like your dentist routinely wear gloves, face mask, while treatment?	Agree (%)	89.2
	Disagree (%)	5.2
	Don't know	5.6
	Total	100
Would you like to undergo dental treatment if dentist does not wear gloves, mouth mask, and spectacles?	Agree (%)	12.8
	Disagree (%)	73.2
	Don't know	14
	Total	100
How often would you like, your dentist to change the gloves?	After every patient	75.2
	Dentist feels necessary	9.2
	When contaminated	15.6
	Total	100
How likely is it to contract AIDS from a dentist with AIDS during dental treatment.	Highly unlikely	40.8
	Unlikely	37.2
	Likely	22
	Total	100
Would you like to attend dental hospital if you come to know that AIDS and HBV patients get treated here?	Agree (%)	50
	Disagree (%)	33.6
	Don't know	16.4
	Total	100

protection to both dentist and patients from cross infection. Almost 80.8% subjects agreed that dentist should use new gloves for every patient. When enquired about wearing of face mask and spectacles/gowns by dentist during

treatment 92.8%, 84.4% subjects answered correctly. Only 34.8% knew that AIDS can spread during dental treatment and 19.2% know that Hepatitis B viral infection can spread during dental treatment. When asked

**Table 4: Comparison of Mean Knowledge and Attitude Scores among Study Participants by Using ANOVA Test**

		Test for Knowledge			Test for Attitude		
		F value	P value	Sig.	F value	P value	Sig.
Gender	Male	0.888 <sup>b</sup>	0.347	NS	0.353 <sup>b</sup>	0.553	NS
	Female						
Residence	Rural	8.615 <sup>b</sup>	0.004	S	0.805	0.371	NS
	Urban						
Age (In years)	15 - 24	2.173 <sup>b</sup>	0.058	NS	1.037 <sup>b</sup>	0.396	NS
	25 - 34						
	35 - 44						
	45 - 54						
	55 - 64						
	≥65						
Occupation	Student	4.586 <sup>b</sup>	0.001	S	0.264 <sup>b</sup>	0.901	NS
	Housewife						
	Business						
	Employed						
Education (Class)	1 - 7 <sup>th</sup>	6.871 <sup>b</sup>	0.000	S	2.774 <sup>b</sup>	0.028	S
	8 - 10 <sup>th</sup>						
	11-12 <sup>th</sup>						
	Graduates						
	Other degree						
Income (INR)	No income	4.388 <sup>b</sup>	0.002	S	1.018 <sup>b</sup>	0.399	NS
	500 -2500						
	2501- 4500						
	4501- 6500						
	Above6501						
Visit	First	7.404 <sup>b</sup>	0.007	S	3.715 <sup>b</sup>	0.055	NS
	Previous						
"b" analysis of variance, S=significance, NS=Non -significant, INR=Indian rupees							

**Table 5: Scheffe’s Multiple Comparison Tests for Knowledge and Attitude in Different Education Groups**

Education	Knowledge					Attitude					
	1 - 7 <sup>th</sup>	8 - 10 <sup>th</sup>	11- 12 <sup>th</sup>	Graduates	Other degree	Education	1 - 7 <sup>th</sup>	8 - 10 <sup>th</sup>	11- 12 <sup>th</sup>	Graduates	Other degree
Mean	18.12	18.65	20.52	21.82	21.54	Mean	6.93	7.15	7.71	7.92	8.08
1 - 7 <sup>th</sup>	1.00	0.63	0.04	0.00	0.00	1 - 7 <sup>th</sup>	1.00	0.98	0.47	0.05	0.04
8 - 10 <sup>th</sup>	0.63	1.00	0.09	0.00	0.01	8 - 10 <sup>th</sup>	0.98	1.00	0.59	0.21	0.04
11- 12 <sup>th</sup>	0.04	0.09	1.00	0.27	0.36	11- 12 <sup>th</sup>	0.47	0.59	1.00	0.98	0.91
Graduates	0.00	0.00	0.27	1.00	0.80	Graduates	0.05	0.21	0.98	1.00	0.99
Other degree	0.00	0.01	0.36	0.80	1.00	Other degree	0.04	0.04	0.91	0.99	1.00

about the best method of sterilizing dental instruments, 29.2% said autoclave (Table 2).

When asked about their attitude towards use of barrier methods, 89.2% subjects would like their dentist to wear gloves, face mask routinely while providing dental treatment. Only 12.8% of like to undergo dental treatment if dentist does not wear gloves, mouth mask and spectacles. Seventy five percentages of the study subject like their dentist to change the gloves after every patient and 40.8% of study subjects said that there is highly unlikely of contracting AIDS from dentist suffering with AIDS. Nearly half of the study subjects showed positive attitude to undergo dental treatment even though AIDS and hepatitis B patients receive dental care in the hospital (Table 3).

Statistically significant difference was observed in knowledge among rural and urban study subjects, with different occupational, educational and income groups. No such difference was found between male and females and in different age groups (Table 4).

Education of study subjects showed statistically significant difference in attitude towards cross infection control measures such difference is not seen other groups. Further analysis by using scheffe's multiple comparison tests for knowledge showed that house wives and employed personnel were more knowledgeable than business personnel and the difference was statistically significant (Table 4). Knowledge of study subjects increasing from no income group to the different higher income groups. The Study subjects with income 2501- 4500inr, 4501- 6500inr and above 6500inr has more knowledge of cross infection control measures as compared to no income and 500-2500inr groups, and the difference was statistically significant (Table 4). As the educational level of the study subjects increasing the knowledge towards cross infection control measures also increased and the difference was significant between 1-7th standard, 11-12th standard and graduates (Table-5). Scheffe's multiple comparison tests showed the statistically

significant difference between 1-7th standard and 8-10th standard educated subjects and subjects with other degree certificates towards cross-infection control attitude (Table 5).

## Discussion

Prevention of cross-infection forms an essential aspect of dental practice and remains one of the most cost beneficial medical interventions available. Dentist must adopt standard precautions, which consider all blood and blood-contaminated fluids as potentially infectious in their practice. [6] The wearing of gloves by dentists undertaking clinical procedures has been recommended as an essential element of dental surgery cross-infection control.[7]

In the present study, 93.6% of respondents knew that the dentists should wear protective gloves. This highly positive result is in agreement with previously reported studies of United States of America and United Kingdom.[8-11] Several recent studies conducted among African patients have also shown similar results.[1,12-15] Nearly 80.8% respondents expected dentist to wear new gloves while treating every new patient. This result is higher than 79% [16], 60% [1] and 43% [12] and lower than 86% [10] and 95% [17] reported by different studies.

The Dental Health and Science Committee of the British Dental Association recommended that gloves be changed if a puncture is suspected and if there is blood contamination. The only safe approach is to assume that every patient is a carrier of a blood-borne disease.[18] It is noteworthy that the American Dental Association has not approved the reuse of gloves in clinical practice.[11]

In the present study 86.8% study subjects said that wearing gloves will provide protection to both dentist and patients from cross infection. This response was 94.3% [13], more than 63% [14], 49% [1], 94% [19] and 91% [17] have been reported by different

studies. Large majority of patients in the Glasgow region thought that the gloves were for the dentists' own protection.[12]

Dental health care professionals are at a risk of infections caused by various micro-organisms including *M. tuberculosis*, hepatitis B, hepatitis C viruses, streptococci, staphylococci, herpes simplex virus type 1, HIV, mumps, influenza and rubella.[20] These organisms can be transferred from any of the routes from blood, saliva or contaminated/unsterilized instruments. Hence, these three routes of infection transmission in the dental practice are important. About 38.4%, 46.4% and 39.6% of the patients were aware of spread of infection from blood, saliva and unsterilized instruments in the present study. However, 50%-80% dental patients from Saudi Arabia reported spread of infection via saliva and blood.[17] This suggests lower level of awareness of spread of infection among Indian dental patients.

It is believed that the face masks should be changed between patients, contrary to current professional opinion which advises face masks to be regularly changed particularly to minimize airborne transmission of infection such as tuberculosis and to minimize the inhalation of air constantly polluted with mercury and aerosols. In the present study 92.4% of the respondents expected dentists to wear face masks routinely. This response was 73% [16], 56% [10] and 93.7% [17] from studies carried out in different parts of the world. However, only 12% agreed to undergo dental treatment if dentist does not wear face mask and 84.4% of all respondents expected the dentist to wear protective spectacles and gowns routinely. This result is higher to that reported by 37% for Hong Kong patients [16] 44% for British patients [12] and 73.9% among Jordanian patients. [21] This response may reflect patients' knowledge about the risk of infection transmission from dentist to patient via lachrymal secretions and awareness of the potential spread of infection via debris from the patient's mouth to the eyes of dental staff and vice versa.

In the present study 34.8% of respondent

knew that HIV/AIDS infection can spread during dental treatment and 22% of respondents said that they were likely to contract AIDS from dentist affected with AIDS during dental treatment. This response was lower compared to African studies [1,14] and Jordanian study. [21] Only 19.2% respondents knew about the spread of hepatitis B infection in dental clinics. This finding was well below than reported among Jordanian patients. [21]

Sterilization and disinfection of instrument is of utmost significance in dental offices as it assists in preventing the transmission of infection from patient to patient and from instrument to patient. One third of the total populations were ignorant about sterilization methods used in dentistry. [12] This result is in accordance with the present study in which only 29.3% of respondent knew that autoclave is the best method of sterilizing dental instruments as compared to 43.7% reported by Nigerian patients. [13]

Proper infection control practices were known to improve dental patient's satisfaction. [22] Perceived cross-infection risk will lead to the avoidance or delaying of dental visits. This was evident when only 12.8% of the respondents in this study would agree to receive treatment if dentist is not wearing gloves, mouth mask and spectacles. Studies have reported that 79.5% respondents would be reluctant to take dental treatment [13] and more than half would not attend a dentist who did not wear gloves. [8] One-third of patients would avoid treatment when gloves were not worn. [14] Only 15% of patients would attend an orthodontist who did not wear gloves [19]. On contrary, study also reported that no patient had avoided or delayed a visit to the dentist because of concerns over risks of cross infection due to the blood borne viral diseases such as Creutzfeldt-Jacob Disease. [23]

Significant differences were observed in the knowledge of cross-infection control measures in different groups of residents, occupational categories and education and income levels of study participants considered in the present study. However, only age and educational

attainment were correlated with perceived knowledge of infectious diseases in a previous study.[24]

Present study showed age, gender, residence; education, occupation and income were the factors that could affect the attitude and perception of dental patients towards cross infection control measures. Similar findings have been reported from various studies. Language and dental visiting patterns[25] were the additional factors associated perceived attitude of dental patients towards infection control measures.

Urban subjects have more knowledge of cross infection control as compared to rural study subjects. The possible explanation could be more number of dental clinics, frequent visits by urban subjects to such clinics. Employed subjects have more knowledge of cross infection control as compared to house wives, business personnel and students. This could be due to the fact that employed study subjects were exposed to their office environment in which information related to cross-infection from colleagues, news papers may spread leading to increased knowledge.

As the educational level was increased the knowledge of cross-infection control measures was also increased. This could be due to easy understanding of concept of infection control among graduates and other higher qualified subjects. This finding might reflect concerns of health and safety among graduates/higher qualified as compared to below 10th standard educated subjects.

The income of study subjects also played a role in knowledge of cross infection control measures. As the income of the study groups increased from 500 INR and above, the knowledge of cross-infection also increased. The reason for this may be that higher income study subjects were either highly educated or employed.

The results presented indicate the opinions of Indian dental patients in one area. Whether such opinions would be widely held on a nationwide basis remains to be determined by conducting similar surveys in other dental schools in different parts of India. Moreover,

convenience sampling methodology and self-reported nature of the questionnaire itself could be the limitation of the study.

## Conclusions

Dental patients considered in the present study showed poor knowledge towards spread of infection via saliva, blood and contaminated/unsterilized instruments used in dental hospital setting. However, adequate knowledge and positive attitudes were observed towards the use of barrier methods of infection control such as use of gloves, face mask, spectacle and gowns/coats. Demographic variables considered in the study showed inconsistency in knowledge of infection and its control measures. It is the ethical responsibility of dental schools and private Practitioners to follow the cross-infection control protocol strictly. Dental professionals should take proactive approach in the education of patients towards cross-infection control practices.

## Acknowledgement

I would like to thank K.V.V Prasad, Professor and Head of the department of Community Dentistry for helping and guiding me to carry out this research work.

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