

# Analysis of Information, Impact and Control of HIV amongst Dental Professionals of Central India

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## ABSTRACT

**Background:** Dental health care providers may be exposed to a variety of microorganisms via blood, oral or respiratory secretions. Though the risk of transmission of Human Immunodeficiency Virus (HIV) in dental settings is low, the consequences of being infected are life threatening. Therefore, high standards in infection control and waste management are required in controlling occupational contagion and cross infection.

**Aim:** To obtain comprehensive information about the HIV related information, its impact on the health care provider's attitude towards treating patients living with HIV/AIDS (PLWHA), infection control & waste disposal practices among dental professionals of Malwa region of Madhya Pradesh; situated in Central India.

**Materials and Methods:** A cross-sectional survey was conducted among 320 private dental practitioners. Data

was collected using a pretested, self administered 40 item questionnaire and statistically analysed.

**Results:** The response rate was 81.25%. Over all 50.76% dentists were graded as having good knowledge of HIV. Unfortunately, their willingness to treat these patients remained low. In all 39.23% dentist were willing to render care to PLWHA. Junior dentists expressed less hesitation with regard to acceptance of risk patients than other dentists. Over 65% of the respondents reported adherence to universal precautions. The most alarming observation was that dentists were not following safe waste management practices.

**Conclusion:** Dental professionals continue to indicate a reluctance to treat patients with HIV/AIDS or those in high- risk groups. The results suggest need to have a comprehensive motivational program and implementing ways to ensure access and availability of safe dental care for PLWHA. The desire to get training on how to handle PLWHA illustrates that receptiveness to change exists.

**Keywords:** Biomedical waste management, Infection control, PLWHA, Universal precautions

## INTRODUCTION

Ever since it has been recognized in the United States in 1981, AIDS has kept the medical world on its toes. According to WHO, 35.3 million people worldwide are living with HIV/AIDS, with an adult prevalence of 0.27 % in 2011. National AIDS control (NACO) surveillance recorded prevalence of more than 5% in Madhya Pradesh state located in Central India [1]. These figures only emphasise the enormity of the problem for the affected communities and the importance of adequate preparedness of the health care professionals who serve these communities.

Infections may be transmitted in the dental operator through several routes, including direct contact with blood, or oral fluids, indirect contact with contaminated instruments, equipment, or environmental surfaces; or contact with airborne contaminants present in either droplet splatter or aerosols of oral and respiratory fluids [2]. The average risk of HIV transmission among health care professionals has been reported to be 0.3% [3] on percutaneous injury and 0.1% [4] on mucosal exposure. Although the risk of HIV transmission in dental office is low, the consequences of being infected are life threatening. Risk assessment is not always feasible, adherence to universal precautions and appropriate waste disposal are critical to prevent occupational exposure. Inaccurate information regarding disease transmission and misperceptions of personal risks lead to reluctance of health professionals in treating PLWHA [5]. The oral health professionals must ensure that PLWHA receive competent dental treatment without any prejudice and discrimination [6,7].

Developments in technology, awareness regarding infection control requirements as well as the rise in litigation have all created new challenges for the private practitioner. Previous studies have shown significant differences between institutional faculty and private practitioners with respect to infection control and waste disposal

practices [8]. Surveys have also indicated that private dental practitioners are concerned regarding the financial strain caused by adherence to the infection control guidelines [9].

To create awareness amongst oral health care workers; various training programs are conducted by Government bodies as well as the Dental Council of India. Data regarding the baseline knowledge of HIV/AIDS amongst dental professionals of Central India and impact of the same on the goal of providing optimal dental care to persons living with HIV/AIDS is required to modify training programmes further.

Keeping these objectives in mind, a cross-sectional survey was conducted to assess HIV- related information, its impact on attitude towards PLWHA and occupational risk perception among private dental professionals of Malwa region of Madhya Pradesh. Additionally, an attempt was made to assess the infection control and waste management practices.

## MATERIALS AND METHODS

A randomized cross-sectional survey was carried out among 320 dental professionals belonging to 3 cities Indore, Ujjain and Dewas, of the Malwa region of Madhya Pradesh, India. Data was collected using a pretested, self-administered questionnaire covering key aspects regarding-Information (12 questions), Attitude (8 questions), Infection control practices (10 questions) and Waste disposal practices (10 questions). A trained faculty hand delivered the questionnaire and helped the dentists in developing a clear understanding of the questions. Participation was voluntary; participants were educated on the aim of the survey. Strict confidentiality was observed and informed consent obtained. Completed questionnaires were collected on the same day and prospectively analysed. Percentages were calculated for all variables.

In the Information section having 12 questions, the correct response was scored as 1 and incorrect or no response as zero. The score obtained was graded as; 12=excellent, 10-11= Good 8-9=Fair and below 8 =Poor. Analysis of variance was used to compare means of knowledge scores. A p-value of < 0.05 was considered significant. Statistical analysis was done using the statistical package Epi INFO 7.

## RESULTS

The present study was conducted among 320 dental professionals of Malwa region of M.P. The response rate was 81.25%. The demographic distribution of participants is presented in [Table/Fig-1]. The observations revealed that the dental professionals had good information regarding HIV/AIDS. Years of work experience was found to affect the level of information related with HIV/AIDS. In group III, 14.28% of dentists were rated as having excellent information score. No significant gender difference was noted [Table/Fig-2,3].

Attitudes concerning HIV positive patients, major concerns relating to refusal of treatment and willingness towards HIV antibody testing are given in [Table/Fig-4]. Reasonable numbers of dentists 60.77% were unwilling to render care to HIV positive patients. The senior dentist with more than 10 years experience, scored highest on information scale (9.70±1.55) out of maximum score of 12. Unfortunately increased knowledge has not reduced fear associated with treating infectious patients and virtually, their willingness to treat these patients remained low. The most common concern reported was fear of occupational contagion 60.76% and transmission to supporting staff and family members 26.54%.

Higher percentage of young dentists showed a sense of ethical responsibility to care for PLWHA. Meanwhile, a higher number of dentists 56.12% responded that they desired comprehensive training for handling HIV infected patients. Others 37.69 % felt that known HIV infected should be isolated to prevent transmission of infection to non infected patients and health care givers.

The infection control practice measures being implemented are depicted in [Table/Fig-5]. In our study population 63% of the respondents always took the medical history of the new patients

GROUPS	NO. OF RESPONDENTS	MEAN AGE (Y) ±SD	WORK EXPERIENCE (Y) ±SD
I Age: 25-30 Exp: 0-5 y	Total (n=67) Male(36) Female(31)	27.24±1.70 27.25±1.72 27.23±1.65	3.5±0.98 3.52±0.99 3.48±0.97
II Age 30-35 y Exp: 5-10 y	Total (n=95) Male(49) Female(46)	32.56±1.76 32.47±1.83 32.65±1.72	7.65±1.52 7.46±1.53 7.85±1.51
III Age >35 y Exp: >10 y	Total (n=98) Male(60) Female(38)	37.45±1.60 37.27±1.67 37.68±1.44	13.28±1.39 13.33±1.42 13.21±1.34

[Table/Fig-1]: Demographic characteristics of respondents

GRADES	I(n=67)	II(n=95)	III(n=98)	TOTAL(n=260)
EXCELLENT	10.44	12.63	14.28	12.69
GOOD	38.80	53.68	56.12	50.76
FAIR	46.26	28.42	26.53	32.3
POOR	4.47	5.26	3.06	4.47

[Table/Fig-2]: Level of HIV related information: Percentage of respondents

Excellent: 12 correct answers  
Good: 10-11 correct answers out of 12  
Fair: 8-9 correct answers out of 12  
Poor: <8 correct answers out of 12

GROUPS →	I(n=67)	II(n=95)	III(n=98)	'f'	p-value
Mean score	8.89±1.60	9.37±1.70	9.70±1.55	4.98	<0.001
Median score	9	10	10		

[Table/Fig-3]: Analysis of Dental professional's information score: result of One-Way Anova

Parameter	Percentage of responses to each parameter			
	GROUP I	GROUP II	GROUP III	TOTAL
<b>MAIN CONCERNS:</b>	55.22	36.89	30.61	39.23
1. Willingness to care				
2. Occupational contagion with HIV	44.78	63.16	69.39	60.76
3. Fear of transmitting HIV to family/auxiliary staff	20.89	34.73	22.44	26.54
4. Fear of loss of other patients	32.83	27.63	16.32	23.22
5. Financial burden increased Infection control need	25.37	21.05	18.36	21.15
<b>ATTITUDE TOWARDS HIV TESTING</b>				
6. Perceived need for additional training to handle HIV patients	14.92	18.94	56.12	31.92
7(a) HIV testing mandatory for patients	40.29	27.36	14.28	26.54
7(b) Respondents' willingness for HIV testing	40.29	37.89	45.91	41.54
8. HIV patient should be quarantined	43.89	26.94	28.57	31.92

[Table/Fig-4]: Respondents' answers to questions about their attitudes towards patients with HIV/AIDS (PLWHA): percentage of responses to each parameter

Parameter	Percentage of responses to each parameter			
	GROUP I	GROUP II	GROUP III	TOTAL
1 History of patient				
a). Medical & dental both	58.20	62.10	67.34	63.07
b) Dental history only.	41.80	37.90	32.66	36.93
c). Inquire HIV status.	10.44	9.47	10.20	10.00
2. Adherence to sterilization				
a) self responsibility	26.86	40	64.28	45.77
b) supporting staff responsibility	44.77	38.94	17.34	32.31
c) combined responsibility	28.35	21.05	18.36	21.92
3. Preferred method of sterilization				
a) autoclave	74.62	68.42	50	63.07
b) boiling	25.38	20	23.46	22.69
c) chemical	NIL	11.57	26.53	14.23
4. Disposal of small endodontic instruments				
a) after single use	27.36	24.21	19.38	26.54
b) sterilized & reused	61.19	74.73	80.61	73.46
5. Disinfection of dental impressions				
a) required	40.29	48.42	45.91	45.38
b) not required	59.71	51.58	54.09	54.62
6. Disinfection includes				
a) dental chair only	16.42	17.9	13.27	15.77
b) dental chair + entire clinic	83.58	82.10	86.13	84.73
7. Universal precautions Adopted-				
a) Hand wash before & after dental procedure	61.19	61.05	71.42	65.00
b) wear facemask & gloves routinely	86.56	90.52	81.63	86.15
c) mouth rinse before oral examination	61.19	62.10	76.53	67.31
8. Extra precautions when treating high risk patients:				
a) double gloving & mask	10.00	9.5	10.20	10.20
b) Protective eye wear	10.44	3.15	Nil	3.84
c) Impervious gown	65.67	65.26	73.46	68.46
9. All patients are potentially infectious				
a) Yes	83.00	71.42	84.23	79.55
b) No	17.00	28.58	15.77	20.45
10. Procedures after exposure incident				
a) Immediate report of exposure	89.55	88.42	89.79	89.23
a) Confidential medical examination	86.56	89.47	86.73	87.67
b) Acceptance for PEP	83.58	76.84	76.53	78.46

[Table/Fig-5]: Respondents' attitudes, and practice regarding infection control measures; percentage of responses to each parameter

Parameter	Percentage of responses to each parameter			
	GROUP I	GROUP II	GROUP III	TOTAL
1.Trained in Biomedical waste management				
a)Yes	13.43	4.21	28.57	15.77
b)No	86.56	95.78	71.42	84.23
2.Bio-hazardous soft saturated waste collection				
a)biohazard labelled bags	43.28	62.10	44.89	50.77
b)dustbin	56.71	37.89	55.10	49.23
3.Disposal of soft waste				
a)incineration	26.86	21.05	28.57	25.38
b)corporation bin	73.13	76.53	75.51	76.15
4.Collection of sharps				
a)separate metal box	65.67	65.26	73.46	68.46
b)closed plastic bottles	24.21	33.68	26.53	31.15
5.Disposal of sharps				
a)through professional agency	7.46	20	35.71	22.69
b)garbage bin	92.53	80	64.28	77.30
6. Availability of equipment for segregation of chemicals eg. Ag,Hg				
a) Available	16.41	23.15	23.46	21.54
b)not available	83.58	76.84	76.53	78.46
7. Disposal of liquid waste				
a) directly in sewer	77.61	82.10	80.61	80.38
b) collection and disposal	22.38	17.89	19.38	19.16
8.waste disposal frequency				
a)Daily	86.56	90.52	78.57	85
b) Periodic	13.43	9.47	21.42	15
9.Responsibility of segregation and disposal of waste				
a) auxiliary staff	54.54	63.63	69.56	64.28
b) dentist	45.46	36.31	30.43	35.71
10. Difficulty in waste management				
a) extra burden	37.31	35.78	29.59	33.84
b)non-availability of professional services	62.68	64.21	70.40	66.15

**[Table/Fig-6]:** Respondents' attitudes, and practice biomedical waste disposal; percentage of responses to each parameter

while 36.93% took dental history only. Along with the medical history of debilitating diseases, 10% dentists inquired about HIV status of the patients. Most, 63.07% dentists made use of autoclave for sterilizing instruments and 47.77% respondents were not totally dependent on clinic assistants for sterilization of instruments. Majority of dentists 86.15% routinely used disposable gloves & facemask. Impervious gowns were used by 68.46% of the respondents. Only 10.20% of respondents used double gloving for high risk patients.

The awareness and adherence to safe waste management practices is reported in [Table/Fig-6]. Unfortunately, only 16% dentists had received any formal training of biomedical waste management. Utilization of biohazard labelled bag was reported by 51% of the practitioners. Liquid waste disposal directly in sewer was reported by 80% of the respondents. Sharp collection in metal box was adopted by 68.46% of the dental practitioners.

Whenever practised, segregation and waste disposal was being done mostly by auxiliary staff. In Group I, 45 % of the dentists took the responsibility for segregating the biomedical waste which was the highest amongst the study population.

## DISCUSSION

There exists significant disparity between the prevalence of dental disease and access to dental care among the Indian population [10]. The scenario is further complicated by the spread of HIV infection, which has achieved epidemic proportions [11]. According to UNAIDS report 2009 [12], it was estimated that 2.4 million people were living with HIV in India, which represents the third greatest number of people living with HIV in the world [13]. Oral health care workers continue to exhibit reluctance to treat patients with HIV or

those in high risk group [14]. The NACO report has classified Madhya Pradesh as highly vulnerable state based on HIV prevalence rates in adult population [1]. Oral manifestations are common in PLWHA. Potentially infectious patients unaware of their own serological status are seeking dental care in increasing numbers [15,16]. So, the threat of accidental transmission of HIV to dental care providers always exists [17]. Thus, analysis of the HIV related information and its impact on the attitude of dental care providers is of vital importance.

In our study, we focused on critical information regarding transmission, diagnosis and availability of drugs and vaccines. It is encouraging to note that most of the dental professionals had satisfactory information regarding HIV/AIDS. These results are similar to those found in an earlier survey conducted in north India where in the total mean knowledge score was 78.8% (excellent) with no statistically significant difference between the knowledge and attitude scores of males and females [11].

In India, significant laws and human rights provisions exist preventing discrimination against patients based on their HIV/AIDS status [18]. There remains a serious disconnect between these provisions and actual enforcement. Amongst our group of respondents only 39.23% expressed willingness to treat HIV positive patients or those in high risk group.

Bodhade et al., in their survey conducted in Maharashtra state also reported that higher number of dental practitioners were reluctant to treat HIV patients in their private clinical setups as compared to dentists practicing in institutions [19]. Factors associated with refusal to treat patients with HIV/ AIDS include, primarily, fears related to occupational contagion and cross-infection, loss of other patients if dental care is provided to patients with HIV infection. This is well corroborated by previous research studies [20-22].

Although contrary to our findings there is evidence that dentists' willingness to treat patients with AIDS has improved in recent years [23]. A previous study reported a positive mean attitude score of 77.7% towards treating HIV positive patients [17]. This difference could be due to the fact that these studies were conducted amongst dental students. In our study, also the 55.2% young dentists showed a higher willingness to care for patients with HIV/AIDS.

In dental practice high standards of infection control and safety must be developed to improve patient safety and reduce occupational exposure. Considering the safety of health care workers from blood-borne pathogens, the Centre for Disease Control (CDC) and Prevention developed universal precautions (1879) [24]. The fundamental principle behind this concept is that clinicians cannot rely definitively on the medical history and examination of a patient to determine the absence or presence of infectious diseases. Therefore, the same infection control procedures should be adapted for all patients. In 1996, Hospital Infection Control Practices Advisory Committee (HICPAC) released the standard precautions for infectious patient care [25]. In 2003, the CDC of the United States of America updated their guidelines for infection control in dental clinics [26]. In our study population, majority of dentists routinely use disposable gloves & facemask 86.15% .Very few dentists 3.84% were using protective eye wears, in contrast to research conducted in Nigeria, Caribbean and Kenya [27-30]. The dental practitioner should not rely on a single precautionary strategy. Protective eye wear forms the first line of defense in reduction of infectious materials such as aerosols. The second line of defense is the use of pre-procedural mouth rinse such as chlorhexidine. In our study, 67.31% of the dentists preferred an oral mouth rinse before commencement of any treatment procedure.

Extra precautions such as double gloving while treating HIV positive patients are probably discriminatory. Only 10.20% used double gloving for high risk patients. This is in contrast to the findings of a study conducted in South India which reported use of double

gloving by 78% dentists [31]. Also, it is important to note that 20.45% of the participants in our study did not consider all patients to be potentially infectious. This lack of knowledge regarding infectious diseases and their transmission in the dental settings can act as a significant barrier in fighting the HIV/AIDS epidemic.

Post exposure prophylaxis (PEP) for HIV if indicated should start within the next hour after the exposure [32]. Most of the dentists in our study were ready to report any occupational exposure and showed willingness to accept PEP. However, the attitude towards undergoing HIV testing was negative with only 41.54% respondents willing for the same.

The term biomedical waste has been defined as any waste that is generated during the diagnosis, treatment, or immunization of human beings or animals, or in the research activities pertaining to or in the production or testing of biological and includes categories mentioned in schedule I of the Biomedical Waste (Management and Handling) rules 1998 [33,34]. Dental waste forms a significant subset of biomedical (BM) waste. Dental practices generate large amounts of cotton, latex, soft tissue, extracted teeth, sharps and clinical glass capable of causing punctures or cuts. Safe management of dental care waste is critical to prevent occupational exposure [34,35].

The most alarming observation in our study was that majority of the dentists were not following safe waste management practices. Lack of any formal training concerning biomedical waste management seems to be the prominent cause for the same. The potentially hazardous soft saturated waste was disposed directly in to corporation bins and sewer by majority; which is detrimental to the environment [36]. Incineration with the help of a professional agency was reported by only 25.38% of the respondents.

An important prerequisite to successful waste management program is separation of different types of waste as per treatment and disposal option, which is termed as segregation [37]. Our findings indicated that whenever practised, segregation was being done mostly by auxiliary staff which could lead to compromised standard of care in absence of trained personnel. Substantial number of dentists reported lack of facilities for segregation of mercury/amalgam and silver recovery. These results are in accordance with other studies which also reported the unsafe disposal of waste by private dental practitioners [35,38-40]. Sudhakar et al., in a study conducted in Bangalore city observed that 64.3% of private dental practitioners did not segregate waste before disposal and 47.6% hand over health care waste to street garbage collectors. Lack of waste management agency services and lack of knowledge regarding proper waste management were reported as the main hurdle [35].

This shows that existence of legislation governing dental healthcare waste disposal alone is not sufficient and there is need for education of dental practitioners regarding the hazards associated with improper waste management.

## LIMITATIONS

The respondents' actual practices could not be supervised and, therefore, the results given are based on their subjective self-assessment.

## CONCLUSION

Data from the study demonstrated that there is a substantial opportunity to improve the dental professional's attitude towards people living with HIV. The low willingness to treat should be the source of concern. Access to dental care is important to HIV-positive persons because, oral manifestations of HIV/AIDS have been identified as a significant health issue and they serve as clinical markers of underlying HIV infection. Poor oral health can be a contributing factor in development of opportunistic infections in persons living with HIV/AIDS. Hence, there is a need to address, the dental practitioners' misconceptions and attitudes towards the disease.

Furthermore, training in infection control and strict adherence to proper waste management protocols must be made mandatory for all dental practitioners.

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