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UNIVERSAL PRECAUTIONS: Knowledge, compliance and perceived barriers among dental practitioners of public and private dental institutes in Karachi

A.Younus[1], A.Aleem[2], T.Khan[3], M.Khalil[4]

[1,4] Jinnah Sindh Medical University

[2] Karachi Medical and Dental College

[3] Liaquat College of Medicine and Dentistry

Abstract

Objectives: To assess the knowledge and use of universal precautions for blood-borne pathogens and to assess the perceived barriers of adherence to universal precautions at workplace among dentists at public and private dental hospitals in Karachi. In addition, the frequency of exposure to blood-borne pathogens and needle stick injuries among dentists in the last six months.

Methodology: A cross-sectional analytical study was conducted in the dental institutes of Karachi. The study tool was a self-administered healthcare professional questionnaire inquiring about respondent characteristics, knowledge level, universal precautions practices, compliance with UP, and body fluid exposure. Of the 500, 370 questionnaires were completed and included in the study.

Results: Dentists at both public and private institutes showed the highest percentages (>90%) for statements about HIV/Hepatitis B and C and the route of transmission of these pathogens. Of the 12 up practices, dentists at both institutes showed higher compliance values (>80%) for 5 statements. Overall compliance (at least 60% responses were always in category) was 48% in public practitioners and 13.5% in private institutes. The perceived barriers in UP practices were identified as: unavailability of policies posted in department (pub: 30%, pvt: 82.3%), tough job duties (pub: 50%, pvt: 37.2). Altogether, 309 exposure incidents were reported by dentists in the public sector and 235 in the private sector for the last 6 months before the study.

Conclusion: It was concluded that dentists at both institutes have adequate knowledge of blood borne pathogens and adhere to most of universal precautions practices. In the public sector, dentists have a comparatively lower number of factors that interfere with universal precautions than private institutes. Dental institutes should be vigilant about UP adherence among dentists working in OPDs.

Key words: universal precautions, dental professionals, compliance, HBV, HIV, dental colleges.

Introduction:

Blood-borne infections like hepatitis B and C, HIV, and the human immunodeficiency virus placed all healthcare professionals, including dentists, at a high risk of contracting infections as a result of their work-related contact with patients' bodily fluids and blood. The world health organization estimates that occupational sharps injuries account for 40–65% of hepatitis B virus (HBV) and hepatitis C virus (HCV) infections among health care workers (HCW) in developing countries, compared to 8%–27% and less than 10% of HBV infections in developed countries (1). A lack of safety-engineered devices (such as auto-disable syringes, safer needle devices), a lack of personal protective equipment (such as gloves, goggles, masks, gowns), a lack of compliance with universal precautions (UP) (such as hand washing, not recapping needles, properly disposing of sharps in separate sharps containers, etc.), and inadequate health care regulations regarding workplace safety conditions all increase the risk of blood borne infection among healthcare workers (HCW) in developing countries, wearing protective gear (gloves, gowns, masks, and eye goggles), particularly in circumstances where exposure to blood or bodily fluids may occur (2, 3). Additional factors

Corresponding Author:

Name: Dr. Anjum Younus

Affiliation: Jinnah Sindh Medical University

Email: Anjum.younus@duhs.edu.pk

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that contribute to the high number of needle stick injuries include the culture (patient demand) of using injections rather than other methods, the large number of unlicensed, informal practitioners, the lack of HBV vaccination coverage (4), the unavailability of post-exposure prophylaxis, and the high prevalence of blood borne infections in the general population (2,5). Studies from many developing countries have reported that a lack of universal precautions (13,19-20), needle recapping (9-10,12), excessive handling of contaminated syringes/needles (3,10,12), unsafe disposal of sharps (3-4,12), and poor knowledge regarding universal precautions (13) among healthcare workers are the most prevalent factors that determine needle stick injuries. Despite the fact that guidelines for universal precautions have been in place since 1987, and advise that all patients, regardless of their status as blood-borne infection carriers, use blood and body fluid precautions (gloving, gowning, hand washing, and proper waste management) (21). Non-adherence to universal precautions has been extensively reported in different studies from the developing world (12, 19-20). Studies have reported a significant association between adherences to universal precautions and decreased subcutaneous exposure to blood (21). Between 1994 and 1995, there was an increase in dentists' reports of following recommended infection control procedures and taking universal precautions against hepatitis B and human immunodeficiency virus infection; however, the majority of dentists did not follow these recommendations (22). Lower infection rates are linked to infection control protocols, especially barrier protection (23). Recommended infection control practices are available in all dental treatment settings are available (24). Pakistani dental practices have been found to be a possible risk factor for the spread of infectious diseases, particularly hepatitis B and hepatitis C (18). It is evident that dental schools give infection control protocols much attention and offer training in this area. It has been observed that a very small percentage of dental professionals have followed these protocols in the clinics to prevent any type of injury or infection or to lower the chance of contracting occupational infections in the healthcare setting from both known and unknown sources. Healthcare workers, especially dental professionals, must be aware of and follow these recommendations to avoid occupational and nosocomial infections.

Study objectives:

•To assess the knowledge of blood-borne pathogens and adherence to general blood-borne pathogen safety precautions among dentists at public and private dental hospitals in Karachi.

•To estimate the frequency of exposure to blood-borne pathogens and needle-stick injuries among dentists in the last six months in both public and private dental hospitals in Karachi.

Methodology:

Study setting & population:

This study was conducted in dental outpatient clinics in both private and public dental colleges (permission was obtained) in Karachi. The institutional review board of Dar-ul-sehat hospital granted ethical approval. The total number of respondents was 370, of which 190 were from public institutes and 180 were from private institutes. All were registered dental practitioners, including assistant professors, demonstrators, postgraduate trainees, and house officers working in both public and private dental colleges in Karachi. The departments involved in this study were oral & maxillofacial surgery, periodontics, operative dentistry, orthodontics, prosthetics, and oral diagnosis from each dental college. Study duration: the study was carried out from February 2024 to June 2024.

Eligibility criteria:

Inclusion criteria:

•All dental practitioners who are providing oral health care in outpatient departments of either public or private dental colleges located in Karachi.

•All dental colleges should affiliate with the Pakistan medical & dental council.

•Dental practitioners who provided informed consent for participation.

Exclusion criteria:

•Dentists consulted in executive clinics were excluded because these facilities differed in terms of patients and practice from the rest of the facilities.

•Undergraduate dental students and dental auxiliary staff, including dental hygienists, technologists, and assistants, were excluded from the study.

•Incomplete questionnaire.

Sampling design:

Dental colleges were selected based on their approval to conduct the survey. The sampling technique was stratified random sampling was used. Two strata were, i) private dental colleges, and ii) public dental colleges sample size calculation the sample size has been calculated by sample size was calculated by considering overall 23.7% compliance with universal precautions (25) assuming 5% bounds on error estimation and 95% confidence level, the required minimum sample size for this study was 278 dental professionals.

Methods of data collection: Data were collected using a validated questionnaire comprising of various parts. The knowledge part of the questionnaire was modified from an earlier investigation (12). With the author's permission. Questions on universal precautions, barriers to universal precautions, and blood and body fluid exposures have been adapted from a study conducted in us (25) and these questions were also validated and pre

tested (19). The questionnaire was prepared in English language at reading level of twelfth standard. Informed consent was obtained from the dentists at the selected dental colleges. The informed consent form describes the purpose of the study, its risks, and benefits. Signatures of the participants were obtained with informed consent.

Measurement of variables

Compliance with universal precautions: compliance was measured through 12 items indicating whether the dental practitioners engaged in these behaviors related to universal precautions. A 6-point Likert scale (never, rarely, sometimes, often, always, or not applicable) was used to rate the behavior. For the current study, "strict compliance" was defined as a "score" of ≥60% of responses giving "always" for all the applicable items (p-value <0.05)

Frequency of needle stick injuries and type of exposure to blood borne pathogens: participants from public and private dental colleges were asked about 4 types of exposure incidents, including needle stick injuries, splashes to eyes or mouth, contacts with open wounds, and cuts with sharps objects during the last six months. This variable was assessed using 7 items. The first four items used the number of cases reported as response. The remaining three items assessed the screening and vaccination status of dentists using three responses (yes, no, or do not know). Knowledge about the transmission of hepatitis b and c and transmission of human immunodeficiency virus/acquired immunodeficiency syndrome was measured through 12 questions with scales from 1 to 5 (definitely true =1, probably true =2, probably false = 3, definitely false = 4, do not know =5). Barriers to universal precautions were measured using 11 items component of the questionnaire. E ach item had responses on the Likert scale ranging from 1 to 4 (strongly disagree= 4, disagree= 3, agree= 2, strongly agree= 1). Perceived susceptibility to infection during the workplace was assessed through a single item on a scale from 1 to 5 (none to very high). One with higher scores showing more perception regarding susceptibility to infection in workplace and vice versa. Perceived severity of disease threat was assessed through single item "what would happen if a healthcare worker unintentionally sustained a needle stick injury?" With responses of nothing and acquisition of blood-borne pathogens.

Demographics details were gathered using ten questions that inquired about employees' age, sex, occupation, level of education, work schedule, and supervisory status. Data management and quality control data were collected by a trained dentist (the principal investigator). During the data collection, the investigator ensured that the responses were completed and logically consistent.

Data analysis:

The data were inputted, processed, and evaluated using SPSS version 24 (IBM). **Descriptive statistics:** the mean, range, and frequency were calculated for the participants' demographic and work characteristics. The percentages of responses related to knowledge of blood-borne pathogens, self-reported compliance, and perceived barriers to up were calculated for each stratum.

Table 1: Demographic characteristics of the sample (n=370)

	Features	Public institutes N = 190	Private institutes N =180
1	**Age in years**		
	mean ± sd	26.1±3.2	25±3.6
2	**Gender**		
	Female	154 (81.1 %)	121 (32.8 %)
	Male	36 (18.9 %)	59 (67.2%)
3	**Education**		
	Graduate	116	148
	Postgraduate	74	31
4	**Job category**		
	Administrative	10	17
	Practicing dentistry	91	73
	Clinical (patient contact)	89	90
5	**Profession**		
	Dental house officer	92	125
	Demonstrator	9	27
	Assistant professor	4	24
	Post graduate trainee	85	3
6	**Tenure in health field (years)**		
	Mean	4.66± 3.8	2.68± 2.4
7	**Average patient/week**		
	Range	4-700	1-300
8	**Average HIV/HBV/week**		
	Range	0-200	0-50

Inferential statistics: The two groups of dentists were compared for compliance with universal precautions using the Chi-square test. The significance threshold was set less than 0.05. To determine the 95% confidence interval (CI) for the relationship between socio-demographic characteristics and up compliance, a logistic

regression model was utilized. In the univariate analysis, variables with a p-value of 0.05 were added to the multivariate model.

Results

Respondents' characteristics

Overall, 500 dental surgeons were approached in 4 dental colleges and among them 78 dentists refused to participate in survey and 52 returned incomplete questionnaires or lost it. Completed questionnaires were obtained from 370 dental professionals, among them 190 (51%) respondents were from public institutes and 180 (49%) from private dental colleges. Response rate was 74%. Majority of respondents were dental house officers (58.6%), followed by post graduate trainees (23.7%). The respondents were predominately Females (74.8%) in both types of institutes. The mean age of respondents was 26 years in public and 25years in private institutes. The respondents had tenure in the field of dentistry with the mean of 4.6 years and 2.6 years in public and private institutes, respectively. The complete socio-demographic profile of dental professionals is presented in table 1

Knowledge of blood borne pathogens: It is noteworthy that dentists at both public and private institutes secured the highest scores (> 90% correct) for the dimensions measuring information about HIV/hepatitis B & C and the route of transmission of these pathogens. Public dental professionals have better knowledge about alternate modes of HIV transmission (>70 % correct) than HBV / HCV transmission modes. Private dentists provide mostly incorrect scores for alternate modes of both bloods borne pathogens.

Table2: Assessment of Knowledge about blood borne pathogens among dentists at both institutes

I	STATEMENTS (Basic information about HIV & HBV/HCV)	Percentage of responses showing "Definitely true & true"				Percentage of responses showing "Definitely false & false"			
		HIV		HBV / HCV		HIV		HBV / HCV	
		Public	Private	Public	Private	Public	Private	Public	Private
1.	This is a disease caused by a virus.	99.48	99.4	99.9	98.3	-	-	-	0.6
2.	Any person infected with the virus can pass it on to someone else through intercourse.	99.8	99	90.6	95.5	-	1.1	9.4	4.5
3.	A pregnant woman who is infected with Virus can transmit it to her unborn baby.	98	93.4	95.3	96.7	2.1	3.9	10.6	3.4
4.	People infected with the virus, even if they do not have any symptoms, can spread the disease to others.	26	90.5	92.1	91.6	4.2	8.9	7.9	0.6
5.	All the following provinces have high rates of infection: NWFP, Baluchistan, Sindh and Punjab.	71.5	25	65.8	52.5	9.5	37.4	11.5	23.4
II	**STATEMENTS (About modes of transmission)**								
1.	A person can be infected with virus by Eating food that was prepared by someone infected with virus.	16.4	6.0	50.5	48	87.2	17.8	59.5	51.4
2.	Touching the skin of someone infected with virus.	3.7	11.8	16.4	41.9	96.3	88.3	83.6	58.1
3.	Being bitten by mosquitoes.	16.3	10.0	21	27.4	89.3	27.5	72.7	72.1
4.	Using public toilets.	26.3	40.8	33.7	38	70.5	54.7	56.8	57
5.	Using public drinking fountains.	21.6	19.0	33.7	24.8	73.1	79.9	60.5	48.6
6.	Being sneezed or coughed on by someone infected with Virus.	31.5	20.2	45.8	62.6	68.4	79.3	54.2	37.4
7.	Working near someone infected with virus.	10.9	26.3	34.3	48.6	81	72.6	65.7	50.8

HBV / HCV = Hepatitis B / Hepatitis C virus
HIV = Human immunodeficiency virus

Compliance with Universal Precautions: Respondents in both public and private institutions demonstrated a high degree of compliance with safety protocols. Overall compliance (at least 60% responses were in always

category) was 48% in public institutes practitioners and 13.5% in private institutes.
In both institutes, higher scores showing compliance with washing hands after removal of disposable gloves (public 74.7%, private 78.3%), Wear disposable gloves whenever indicated (public 84.2%, private 86.1%), and wear a disposable face mask whenever indicated (public 86.8%, private 81.7%).

The records showing the lowest compliance rates were for wearing a disposable outer garment (public 32.1%, private 21.2%), wearing protective eye shields (public 47.4, private 21.7%), and wiping up all potentially contaminated spills with the disinfectant (public 56.3%, private 37.2%).

Compliance rates and level of significance among dentists at both institutes for each item are shown in Table 3.

Table 3: Assessment of Compliance with Universal Precautions (UP) among dentists at both institutes

ITEMS		Percentage responding "always" (strict compliance)		
		Public (n=190)	Private (n=180)	P-value
1	Dispose of sharp objects into a sharp's container.	73.2	30.6	<0.001
2	Treat all patients if they are infected with HIV/HBV/HCV	64.2	23.3	<0.001
3	Follow all universal precautions with all patients regardless of their diagnosis	55.8	46.1	.039
4	Wash my hands after removal of my disposable gloves	74.7	78.3	.244
5	Wear a disposable outer garment that is resistant to blood and body fluids.	32.1	21.2	.011
6	Wear disposable gloves whenever there is a possibility. of exposure to blood and body fluids	84.2	86.1	.357
7	Wear protective eye shields whenever there is a possibility of splashing or splatter to my eyes	47.4	21.7	<.001
8	Wear a disposable face mask whenever there is a possibility of splashing or splatter on my mouth	86.8	81.7	0.110
9	Promptly wipe up all potentially contaminated spills with the disinfectant	56.3	37.2	<0.001
10	Take special caution when using scalpels or other sharp objects	84.2	83.3	<0.001
11	Recap needles that have been contaminated with blood	81.1	44.4	<0.001
12	Unscrewed needles from plunger after procedure	84.7	40	<0.001

*p-value is calculated using chi-square and value of <0.005 is considered as of significance

Perceived Barriers of Universal Precautions at workplace

Participants were inquired about their adherence with universal precautions and their perceived barriers for universal precautions (UP) practice through 11 statements. Responses were categorized under two: 1. Agree and 2. Disagree.
In the public sector, dentists indicate comparatively a smaller number of factors that interfere with Universal precautions practice than private institutes. Private institute dentists reported barriers for taking universal precautions as: unavailability of policies posted in department (82.3%), tough job duties (37.2%), compliance with UP procedures and practices are not part of their written evaluations (46.1%) and they were not told when they do not follow UP (43.9%). Public professionals do not comply with UP due to their tough job duties (50%) and, unavailability of policies (30.5%) posted in their department.
In table.4, statements measuring perceived workplace barriers for adherence with UP and responses (agreement & disagreement) of dentists is reported.

Table.4 Perceived barriers in Practicing UP at workplace in both institutes					
	STATEMENTS	**Percentage of responses "Strongly Agree & Agree"**		**Percentage of responses "Strongly Disagree& Disagree"**	
		Public N=190	**Private N=180**	**Public N=190**	**Private N=180**
1.	UP keep me for doing my job to the best of my abilities.	**82.1**	**84.4**	17.8	15.5
2.	I do not have enough information to correctly Comply with UP in my work.	22.6	39	77.3	61.6
3.	I am knowledgeable in the use of UP	**98**	**93.3**	2.1	6.7
4.	Policies on UP are posted in my work area.	**69.5**	17.8	30.5	**82.3**
5.	New employees quickly learn that they are expected to follow UP	62.1	73.3	37.9	26.7
6.	My job duties often interfere with my being able to comply with UP	50	37.2	50	**62.8**
7.	I can't always follow UP because "patient's need comes first"	43.2	48.9	56.8	51.1
8.	I can reduce my risk of occupational HIV/HBV/HCV infection by complying with UP	**92.6**	**87.8**	7.4	12.3
9.	My Immediate supervisor is supportive of my practicing UP.	90	82.2	10	17.8
10.	In my facility employees' compliance with UP procedures and practices are part of their written evaluations	**73.7**	**53.9**	26.4	46.1
11.	Employees are told when they do not follow UP	**67.9**	56.2	12.1	43.9

UP = Universal Precautions

*p-value is calculated using chi-square and value of <0.05 is considered as of significance

Blood and body fluid Exposures:

Public sector dentists experienced 66 needle stick injuries, with 56% reported. In the private sector, there were 31 needle stick injuries, with a 77.6% reporting rate. Splash exposure was reported by 60% of public practitioners, compared to private. Public institutions had 190 incidents of cuts with sharp objects, with a 98% reporting rate. For the six months prior to the questionnaire, 235 respondents from the commercial sector and 309 respondents from the public sector reported exposure occurrences involving blood and other bodily fluids. These results are shown in Table 5.

Table 5: Distribution of Blood and Body fluid exposures in the last 6 months of study

In Public Institutes

	Exposure Type	Total Exposures	No. of Exposures Reported	Percentage of Reported exposures
1	Needle sticks	66	36	54.5%
2	Splashes	192	115	60%
3	Direct Contacts	0	0	0
4	Cuts	160	158	98.7%

In Private Institutes

	Exposure Type	Total Exposures	No. of Exposure Reported	Percentage of Reported exposures
1	Needle sticks	31	24	77%
2	Splashes	545	180	33%
3	Direct Contacts	36	7	19.4%
4	Cuts	90	24	26.6%

Compliance with UP and Respondents' characteristics

In table 6, regression model results of demographic and work characteristics of dental professionals with Compliance as outcome are listed.

Compliance was most significantly associated with type of Dental institutes (OR= 6.024, 95% CI, 3.597-10.089), gender (OR = 1.70, 95% CI, .997- 2.929) and designation (OR = 5.674, 95% CI, 1.115-28.871).

In other words, dental professionals of Private Colleges were more than 6 times more likely to report non-adherence to Universal precautions and male practitioners were 1.7 times more likely to be non-compliant with Universal precautions than female dentists and demonstrators were 5.6 times more non-compliant than assistant professors.

Table 6: Univariate Logistic regression of Demographic and Work-related characteristics with strict compliance with UP as an outcome

Variables	B	Sig.	Crude OR	95% C.I. for OR	
				Lower	Upper
Dental College (Public)					
Private	1.796	<.001*	6.024	3.597	10.089
Gender (Female)					
Male	.536	.051	1.709	.997	2.929
Age (> 25 Years)					
< 25 years	.255	.282	1.290	.811	2.051
Service years (> 5 years)					
< 1 year	.573	.106	1.773	.885	3.550
1 -5 years	.374	.199	1.453	.821	2.571
Education (Postgraduate)					
Graduate	.055	.823	1.057	.651	1.717
Profession (Assistant Professor)					
Dental house officer	-.279	.504	.756	.333	1.717
postgraduate trainee	-.329	.467	.719	.297	1.745
Demonstrator	1.736	.037*	5.674	1.115	28.871
Job Category (Administrative)					
practicing dentistry	.362	.412	1.436	.605	3.411
Clinical (patient contact)	.434	.324	1.543	.652	3.652

Reference category mentioned in ()

*P-value is significant and less than 0.05

Multivariate logistic regression model equation:

We have employed logistic regression models here, to predict non-compliance among dental practitioners at both institutes. In table.7, multivariate analysis of logistic regression model results was presented with demographic and work characteristics of dental professionals and Compliance as outcome.

Compliance was most strongly significantly associated with type of Dental institutes (odds ratio [OR] = 6.542, 95% CI, 3.597-11.486).

In other words, dental professionals of Public Colleges were more than 6.54 times more likely to report adherence to Universal precautions adjusted with age, sex, and years of service/experience.

Table 7: Multivariate Logistic Regression Model of Demographic and Work-related characteristics with strict compliance with UP as an outcome

Items	B	Sig.	Adjusted OR	95% C.I. for OR	
				Lower	Upper
Dental College (Public)					
Private	1.878	<.001*	6.542	3.726	11.486
Gender (Female)					
Male	.153	.639	1.165	.615	2.207
Age (> 25 Years)					
< 25 years	.509	.207	1.664	.754	3.668
Service years (> 5 years)					
< 1 year	.367	.492	1.443	.506	4.115
1 -5 years	.221	.605	1.248	.539	2.886

Reference category mentioned in ()
*P-value is significant and less than 0.05

Discussion

This study shows that knowledge and compliance towards universal precautions among dentists working at dental OPDS of public and private dental colleges are optimal and in comparison, public sector dentists show better results.

Our study participants have comparable demographic characteristics such as mean age, gender distribution, more house officers and interns, and tenure in clinical field with another similar study conducted at a tertiary care hospital in Karachi (26).

All dentists from both institutes had elevated levels of knowledge regarding blood borne pathogens and up practices. More than 90% of dentists have adequate information about hepatitis B & C and HIV. Our results regarding knowledge and awareness of up are similar with another study conducted among dental practitioners at Lahore which found that majority of the dentists were well aware of universal precautions (masks, gloves), however the practices of using sterile coverings and disinfecting surfaces prior to treatment were found to be low among dentists (27).

Kermode et al. Observed that knowledge of universal precautions was correct among only 56% of respondents (19).

But it was observed that at both institutes, dentists reported less knowledge regarding alternate modes of transmission of blood borne pathogens. Among dentists at private institutes, 62.2% reported that hepatitis B & C could be spread through sneezing, 48.3% said it could be acquired by working nearby of patient and 47.8% believed it could be spread by eating food prepared by infected people. Similar results were reported about knowledge of alternate modes of HIV transmission among HCWS in rural India where a substantial proportion believed that HIV could be transmitted by contact with saliva, urine and faeces, mosquitoes, coughing and sneezing, and sharing plates, cups and spoons indicated that knowledge about HIV transmission was incomplete (19).

In our study, overall compliance rate with universal precautions was more significant among public dental professionals as compared to private institutes. Out of 12 items, dentists at both institutes follow 8 to 9 universal precautions practices. Similarly, in 1991 the American dental association reported high figures in all the following infection control practices compared with their 1986 findings, rises on glove use (90%), the use of masks (60%), and the use of protective clothing (64%) (29). A study from Lahore on the use of infection control measures reported use of gloves by 94% and use of face-

masks by 97% of qualified dentists (30). The findings of our study also show an improvement in adoption of infection control measures by the qualified dentists at dental institutes.

In our study, wearing protective outer garment, protective eye shields and removal of contaminated spills with disinfectant are major practices which are less frequent among dentists. Similarly, a study on dentists of Lahore reported that protective eye shield wearing at the time of surgery often neglected by majority of practitioners i.e. 65%(27).it is important to increase their use as majority of dental procedures like scaling and root canal treatment expose the dentist to a high number of microorganisms. Nonetheless, research conducted in developed nations such as Canada (33) indicated a growing inclination towards the use of personal protective equipment. Less resources and an increased patient burden could be the causes of this outcome.

Allocated by government to public hospitals. Another study in Lahore showed contrasting figures that maximum compliance was observed with use of aprons (58.3%) and lowest compliance with mask (2.5%) and goggles (0%) (26).

Due to the nature of some injections (such as anesthetics), which are frequently administered several times during a dental procedure, recapping has historically been a problem for dentists. We also found that needle unscrewing and recapping were less common (by 40%) among practitioners at private institutes than among those in public institutions. This is similar to another study of tertiary care hospitals in Karachi where 49.7% recapped and threw the needle, 41.3% bended and threw and only 9% used needles cutters (34).

In this study, dentists report few yet essential elements from management side which pose hindrance in compliance with universal precautions. One-third of public professionals do not comply with up due to their tough job duties and, unavailability of policies posted in their department. A study reported that one of the factors of non-compliance by employees was their long working hours that make them tired 25. Similar with our results, Fergusan kj, et al, reported more reasons for not using standard precautions in different community hospitals (20). contrary to our findings, the non-availability of relevant modalities remained the most crucial factor for non-compliance in a study at civil hospital, Karachi (34). According to a survey conducted at Khyber Pakhtunkhwa (KPK) public dentistry institutes, a lack of resources was cited by the majority of dentists as the main reason. There isn't much research on the topic to compare, but the outcome makes sense given that Pakistan is a developing nation and that many of its regions struggle with both a shortage of medical professionals and inefficient resource use (27).

Our study data show that many factors have placed dental professionals at greater than average risk of blood born pathogen exposure, such as their ways of providing treatment, number of patients with blood borne infections visiting dental OPDS, handling of sharp and contaminated objects etc.

We noted in our study that the number of incidents particularly needle stick (NSI) and cuts with sharps that are reported to concern hospital/institute within past six months was higher in public institutes as compared to private. This could be due to the reason that majority of dentists at private institutes were from high-social class and could better afford treatment outside the facilities provided within their dental institutes. Similarly, high frequency of needle stick injuries (67%) was reported among doctors in previous study (34). However, this is comparable to the wide range of frequencies of NSI from various countries worldwide. Clement et al reported a high rate of NSI (88.4%) among surgical residents of nigeria35. Mubashir et al reported that 66% of health care workers suffered NSI, mostly from contaminated needle (36). A recent survey from India reported that practices related to needle stick injury and its prevention seem to be good except when related to recapping and waiting to dispose of until the completion of the session (37).

The study's limitations include potential overestimation of socially desirable responses due to self-reported data, possible underreporting of sharps injuries in the last six months among Karachi's dental practitioners due to recall bias, and limited generalizability of the results to other dental institutes. Additionally, the cross-sectional nature of the data precludes the establishment of causality.

Conclusion

Our study revealed that dental professionals at Karachi dental colleges exhibited the highest compliance with universal precautions and adhered to most safe work practices across both types of institutes. Compliance with up was significantly associated with more than five years of service, female dentists, house officers, and postgraduate trainees. All respondents had good knowledge about the transmission of HIV and hepatitis B & C. In public sector institutes, dentists reported fewer factors interfering with universal precautions practice compared to private institutes. Public institutes reported a higher number of incidents, particularly needle sticks and cuts with sharps, within the past six months compared to private ones. Educational programs and training should be developed for dentists in OPDS of dental institutes, including information on blood-borne pathogen transmission and non-transmission routes of HIV. Senior management must ensure that necessary personal protective equipment is readily accessible, comfortable, and does not interfere with oral care provision.

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