OPEN ACCESS

Saudi Journal of Oral and Dental Research

Abbreviated Key Title: Saudi J Oral Dent Res
ISSN 2518-1300 (Print) |ISSN 2518-1297 (Online)
Scholars Middle East Publishers, Dubai, United Arab Emirates
Journal homepage: https://saudijournals.com

Original Research Article **Family Medicine**

Compliance of Dental Health Care Providers on Infection Control Standard Precautions Guidelines in Primary Health Care Centers, Makkah, Saudi Arabia, 2018

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DOI: 10.36348/sjodr.2021.v06i12.007 | **Received:** 15.10.2021 | **Accepted:** 19.11.2021 | **Published:** 24.12.2021

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Abstract

Introduction: Infection Control measures are based on how an infectious agent is transmitted and include standard, contact, droplet and airborne precaution. Infection Control is an important part in the dentistry. Provision of dental care is a risk of transmitting infectious diseases. The main aim of this study is to assess the knowledge and compliance of Dental health Care Providers on infection control standard precautions guidelines in Primary Health Care Centers in Makkah, Saudi Arabia. The output of this study is helpful for higher authorities to develop appropriate and sound policies to increase knowledge and compliance on this issue. The main objective of the study is to determine the level of compliance of Dental Health Care Providers on infection control standard precautions guidelines in Primary Health Care Centers in Makkah, Saudi Arabia, 2018. ***Methods:*** A questionnaire based cross sectional survey was conducted in dental clinics of 42 Primary Health Care Centers in 4 major sectors, Makkah, Saudi Arabia. A total of 82 Dental Health Care Providers were assessed for Compliance on infection control standard guidelines and the factors that can relate to it. Descriptive analysis was performed to determine mean and standard deviation for continuous variables and proportion for categorical variables. Bivariate analysis was performed to explore the relationship between compliance of Dental Health Care Providers on infection control standard precautions guidelines and knowledge of DHCPs on infection control standard precaution guidelines, age, gender, history of chronic diseases, smoking status, marital status, type of job and CBAHI accredited PHCCs were assessed by chi square test at a 95% confidence level and P-value ≤0.05 was taken as significant. ***Results:*** Descriptive statistics showed that the mean age of the DHCPs was 34 ± 5.05 SD. Majority (74.4%) were female providers. About 43.9 % of the DHCPs were dentist and 56.1 were dental assistants. This study showed that 78 % DHCPs classified as adequate knowledge. Among all DHCPs, 93.9 % aware about infection control standard precautions guideline while 56.1 % of the DHCPs received basic infection control skill license. Bivariate analysis showed that, among all DHCPs, 19.5 % classified as adequate compliance. There was no statistically significant difference between compliance of Dental Health Care Providers on infection control standard precautions guidelines and knowledge of DHCPs on infection control standard precaution guidelines, age, gender, history of chronic diseases, smoking status, marital status, type of job and CBAHI accredited PHCCs. ***Conclusion:*** This study showed very low compliance of Dental Health Care Providers on infection control standard precautions guidelines.

Keywords: Infection Control, Standard Precautions Guidelines, Dental Health Care Providers, Knowledge, Attitude, Compliance.

INTRODUCTION

Infection control (IC) is defined as "Measures practiced by health care personnel to reduce the risks of transmission of infectious agents to patients and employees (e.g., proper hand hygiene, scrupulous work practices, use of personal protective equipment (PPE), such as masks or respirators, gloves, gowns and eye protection). IC measures are based on how an infectious

agent is transmitted and include standard, contact, droplet and airborne precaution [1].

In the United States of America, Occupational Safety and Health Administration (OSHA) estimates that about 5.6 million workers in the health care industry and related occupations annually are at risk of occupational exposure to blood borne pathogens, including human immunodeficiency virus (HIV), hepatitis B virus (HBV), hepatitis C virus (HCV), etc. [2]. According to Centers for Disease Control and Prevention (CDC), thousands of Americans are infected with HIV but are unaware of their sero-positive status [3]. In 2008, 4.7 million people in Asia were living with HIV, including 350,000 who became newly infected [4]. The number of people living with HIV has risen from around 8 million in 1990 to 33 million today, and is still growing. About 67% of people living with HIV are in sub-Saharan Africa [5].

Provision of dental care is not free from risk. Most infectious diseases that colonize the oral cavity and respiratory tract, such as HBV, HCV, HIV, herpes simplex virus type 1, influenza, rubella, and other viruses and bacteria, can be transmitted in dental clinics. The high percentages of affected people worldwide increase the chance of their attendance at dental clinics [6], and dental staff members, including dentists and dental students, are at high risk of exposure to and contraction of these diseases [7]. For example, professionals in dentistry and oral hygiene are three times more likely than the general population to contract HBV infection [8].

In the clinical context, diseases can be transmitted through direct contact with blood, oral fluids, or other secretions, indirect contact with contaminated instruments, surgical equipment, or environmental surfaces, or contact with aerosols of oral and respiratory fluids of infected patients [9].

A study done in Riyadh, Kingdom of Saudi Arabia (KSA), showed that 3.2% of female patients attended the dental clinics of King Saud University had seropositive HBV and HCV. Meanwhile, they didn't know about their infection and had no clinical manifestations. The study concluded that taking medical history without screening for HBV and HCV might lead to treating infected patients as non-infected and this can increase the risk of cross infection unless strict adherence to standard precautions is applied [10]. Another study conducted by reviewing literature done on occupational risks of viral infections in the operating room over the last 5 decades. Results revealed that the risks of viral infections remained the same as a decade ago [11]. Furthermore, a house-hold survey done in Damietta, Egypt, 2014, found that 1.1% of the participants were infected with HBV, 9.3% with HCV, and both infections co-existed in 0.4%. One of the main risk factors for both infections was exposure to dental procedures [12]. In addition, the continuous increase in the number of patients seeking dental clinics should give alarming signs to dentists and Dental Health Care Programs (DHCPs) for better awareness of extra-precautions required while treating the dental patients. These measures are needed for protecting both patients and staff members [13].

Such infections can be avoided by safe work practices and following IC guidelines in dental settings. Comprehensive IC guidelines were published by the United States CDC in 2003 as a guidance document for Dental Health Care Providers (DHCPs) in performing clinical procedures, and were updated later for compliance with IC guidelines, safety precautions, vaccination against most common pathogens and proper post-exposure management [8].

Studies on compliance with Standard Precaution Guidelines (SPGs) among dentists has been previously carried out in other Asian countries such as Pakistan and Jordan, indicating that gaps in some dentists' knowledge might be present [14, 15]. These studies also showed that dentists working in hospitals and dental schools had more adherences to these recommendations than those in the private sector. Similarly, SPGs compliance was found only 8.4% among dental practitioners in private dental sector in Riyadh [16]. Similarly, a study found inadequacy of compliance in private Lebanese dental clinics necessitating improved educational training and sustained monitoring by regulatory bodies [17].

After reviewing the previous research, researcher found that there is no published data about SPGs knowledge and practices in the dental clinics under government sector. This survey was undertaken to fill the gap and assess compliance regarding standard precaution guidelines in DHCPs in dental clinics under the supervision of Ministry of Health (MOH). By implementing IC guidelines in addition to vaccinations and proper post-exposure management, exposure to infections in dental settings can be prevented. All dental settings, regardless of the level of care provided, must make infection prevention a priority and should be equipped to observe SPGs and other infection prevention recommendations contained in CDC's Guidelines for IC in Dental Health Care Settings and national guidelines [8]. **Aim of the study:** The main aim of this study is to increase the knowledge and compliance of DHCPs on IC SPGs in PHCCs in Makkah City, Saudi Arabia.

MATERIALS & METHODS

Setting: Makkah City divided into 7 Sectors (Al Adl, Al Kaakeya, Al Sharae, Al Zahir, Al Kamel, Al Jumoum and Al Khulais) having 87 PHCCs. Study was carried out in 42 PHCCs in 4 major sectors (Al Adl, Al Kaakeya, Al Sharae and Al Zahir) inside the Makkah City.

Duration: Six month after the approval of synopsis from Research Evaluation Unit (REU) in 2018.

Sample Size: The total number of dentists and dental assistants working in 42 PHCCs in 4 major sectors were 113 in which 56 were dentists and 57 were dental assistants. We selected all dentists and dental assistants from the above mention area. Response rate was 72%. So out of 113, we have selected 82 in which 36 were dentists and 46 were dental assistants.

Sampling Technique: Convenient sampling technique.

Study Design: Cross sectional.

Sample Selection:

Inclusion Criteria

1. Dentists registered by Saudi Commission of Health Specialty in 42 PHCCs in 4 major Sectors of Makkah City were included.
2. Dental Assistants registered by Saudi Commission of Health Specialty in 42 PHCCs in 4 major Sectors of Makkah City were included.
3. All male and female dentists and dental assistants were included regardless of their nationalities.

Exclusion criteria:

1. All male and female internship undergraduate and post graduate medical students were excluded.
2. Dentist and dental assistants who were on annual vacations were excluded.
3. Dentists and dental assistants who did not agree to participate in this research were excluded.

Data Collection procedure: After ethical review committee approval from joint program of family medicine Makkah, principal investigator was explained the nature and purpose of the study to all selected DHCPs. Written informed consent was obtained. Data was collected from selected from DHCPs by conducting interviews until the required sample was achieved.

Data Collection Tool: A structured questionnaire was filled by principal investigator. The questionnaire comprises of four major parts. Part one is designed to measure socio-demographic data for example gender, age, history of chronic disease, smoking status, marital status, type of job, working experience and CBAHI accredited PHCCs. Part two is design to measure the knowledge of DHCPs on IC SPGs. Knowledge was assessed by 4 items questionnaire. A scoring system was assigned for the 4 included items: 1, correct response and 0, incorrect response. To confirm whether the DHCPs had good knowledge, a correct response percentage of 75% or more was “adequate”. To confirm whether the DHCPs had bad knowledge, a correct response percentage of less than 75% was “inadequate”. Part three is design to assess the attitude of DHCPs on IC SPGs. Attitude was assessed by 17 items questionnaire. Part four is design to measure compliance of DHCPs on IC SPGs. Respondents were asked to evaluate on three-point rating scales ranging from Never (0) to always (2) [18]. To confirm whether the DHCPs had good compliance, a correct response percentage of 75% or more was “adequate”. To confirm whether the DHCPs had bad compliance, a correct response percentage of less than 75% was “inadequate”.

Study Variables: Independent: Age, Gender, History of chronic disease, Smoking status, Marital status, Type of job, Working experience, CBAHI accredited PHCCs, Attitude of DHCPs on IC SPGs, and Knowledge of DHCPs on IC SPGs.

Dependent: Compliance of DHCPs on IC SPGs.

Data Analysis Procedure: Data was analyzed using software of Statistical package of Social Sciences (SPSS version 23).

RESULTS

Table 1: Socio demographic characteristics of DHCPs (n=82)

S. No.	Characteristics	Frequency (n)	Percentage (%)
1	**Age (years)**		
	Mean(SD)34(±5.05)		
	≤34	54	65.9
	>34	28	34.1
2	**Gender**		
	Male	21	25.6
	Female	61	74.4
3	**Smoking Status**		
	Smokers	9	11
	Ex-smokers	7	8.5
	Non-smokers	66	80.5
4	**Marital Status**		
	Single	6	7.3
	Married	76	92.7
5	**Nature of Job**		
	Dentist	36	43.9

S. No.	Characteristics	Frequency (n)	Percentage (%)
	Dental Assistant	46	56.1
6	**last qualification**		
	bachelor	49	59.8
	Diploma	30	36.6
	Master	3	3.7
7	**Working experienced (years)**		
	Mean(SD)9(±4.66)		
	≤10	60	73.2
	>10	22	26.8
8	**Working in CBAHI and JICA accredited PHCCs**		
	Yes	26	31.7
	No	56	68.3

SD: Standard Deviation, CBAHI: The Saudi Central Board for Accreditation of Healthcare Institutes, JICA: Japan International Cooperation Agency, PHCCs: Primary Health Care Centers, and DHCPs: Dental Health Care Providers

Table 1 shows socio-demographic characteristics of DHCPs working in dental setting of PHCCs of Makkah, Saudi Arabia. The mean age of the DHCPs was 34 ± 5.05 SD. About 65.9% of the DHCPs belong to age less than or equal to 34 years. Out of total DHCPs, 25.6% were male and 74.4% were female. There were 11% DHCPs having a smoking history. About 43.9% of the DHCPs were dentist and 56.1 were dental assistants, among them 92% were married and 59.8 % taken bachelor degree. The mean working experienced was 9 ± 4.66 SD. About 73.2% of DHCPs had experienced equal or less than 10 years. Out of total DHCPs, 31.7 % were working in CBAHI and JICA accredited PHCCs.

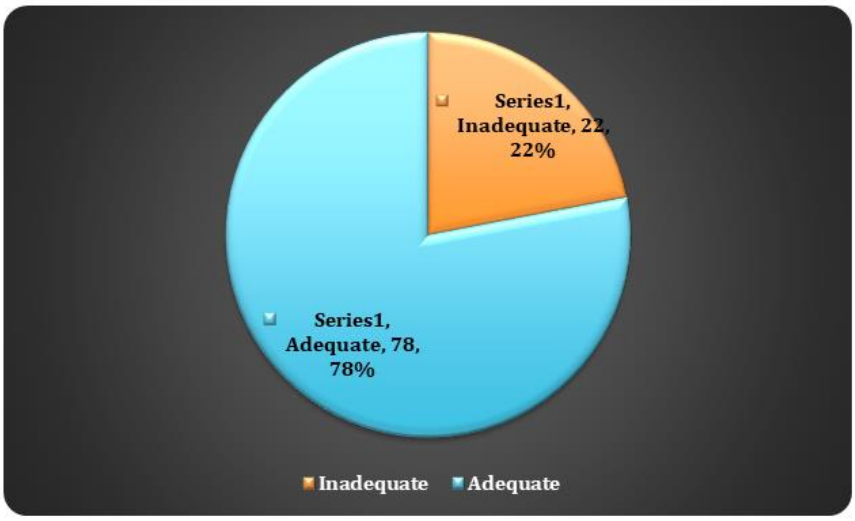

Figure 1: Knowledge Scores of DHCPs on infection control standard precautions guideline, Frequency (n) and percentage (%) n=82

Figure 1 the classification of knowledge of DHCPs on IC SPGs is summarized in figure 1. The score of less than 75% classified as inadequate knowledge, among all DHCPs they were 22% and those who have score greater or equal to 75% classified as adequate knowledge were 78%.

Table 2: Attitude of DHCPs on infection control standard precautions guideline (n=82)

S. No	Characteristics	Frequency (n)	Percentage (%)
1	**Level of knowledge of standard precautions guideline**		
	Average	35	42.7
	Excellent	46	56.1
	Uncertain	1	1.2
2	**Aware about infection control standard precautions guideline**		
	Yes	77	93.9
	No	5	6.1
3	**Have you ever taken hepatitis B vaccines**		
	Yes	73	89

S. No	Characteristics	Frequency (n)	Percentage (%)
	No	9	11
4	**How many doses of hepatitis B vaccines received before**		
	3 doses	70	95.8
	<3doses	3	4.2
5	**Were you tested for post HBV serology**		
	Yes	45	54.9
	No	37	45.1
6	**Do you have infection control guideline**		
	Yes	82	100
	No	0	0
7	**Have you received guideline from infection control department**		
	Yes	74	90.2
	No	8	9.8
8	**Have you received guideline in case of needle stick injury**		
	Yes	75	91.5
	No	7	8.5
9	**Appropriate protocol for needle stick injury case in PHCC**		
	Yes	66	80.5
	No	16	19.5
10	**Have you received infection control training**		
	Yes	79	96.3
	No	3	3.7
11	**Types of infection control training**		
	Basic infection control skill license	43	54.4
	Basic infection control course	20	25.3
	Infection control in dental clinics and CSSD	8	10.1
	All previous courses	8	10.1
12	**How adequate infection control training you have received**		
	Inadequate	14	17.1
	Adequate	62	75.6
	Uncertain	6	7.3
13	**Are you updating your infromation regarding infection control**		
	Yes	63	76.8
	No	19	23.2
14	**Is it suitable for you to treat patients who have infectious diseases**		
	Yes	68	82.9
	No	14	17.1
15	**Have you ever treated patients of infectious diseases**		
	Yes	70	85.4
	No	12	14.6
16	**Do you believe your comitment are well against infectious diseases**		
	Yes	67	81.7
	No	15	18.3
17	**Can you rate your institutional comitment with infection control guideline**		
	Poor	6	7.3
	Average	57	69.5
	Excellent	19	23.2

HBV: hepatitis B virus, PHCC: Primary Health Care Center, and CSSD: central sterile services department

Table 2 shows distribution of response of attitude DHCPs on IC SPGs. Attitude was assessed by 17 items questionnaire. Questions regarding Attitude were, Level of knowledge of SPGs? Over all 56% of the DHCPs responded 'excellent', Aware about IC SPGs? 93.9% responded 'yes'. Among all DHCPs, 89% responded 'yes' to have you ever taken hepatitis vaccines? In which 85.4% received 3 doses and 54.9% tested for serology after immunization. Over all 100% of DHCPs responded 'yes' to do you have IC SPGs while 90.2% responded 'yes' to have you received instruction from infection control department? Among all DHCPs, 91.5%, 80.5%, and 96.3% responded 'yes' to have you received instruction in case of NSI? Is

there appropriate protocol for needle stick injury cases in your PHCC? Have you received IC training? respectively. Over all 56.1% of the DHCPs received basic infection control skill license. Among all DHCPs, 75.6% thought their training was 'adequate'. Over all 82.9%, 85.4% and 81.7% responded 'yes' to is it suitable for you to treat patient having infection diseases? Have you ever treated patients having infectious diseases? Do you believe your commitment were well with IC guideline? respectively. Among all DHCPs, 69.5% responded 'average' to can you describe your institutional commitment with IC requirements?

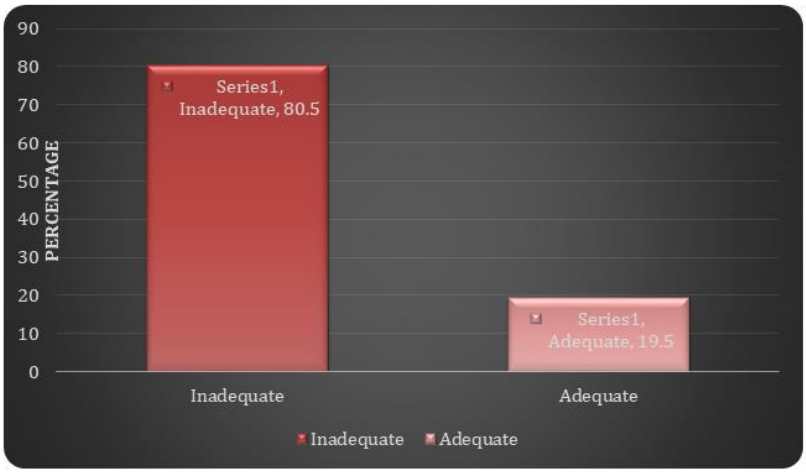

Figure 2: Compliance scores of DHCP on infection control standard precautions guideline Frequency (n) and percentage (%) (n=82)

Figure 2 the classification of compliance among DHCPs is summarized in figure 2. The score of less than 75% classified as inadequate compliance, among all DHCPs they were 80.5% and those who have score greater or equal to 75% classified as adequate compliance were 19.5%.

Table 3: Relationship of Compliance score of DHCP on infection control standard precautions guidelines with Socio demographic characteristics (n=82)

S. No	Characteristics	Inadequate n(%)	Adequate n(%)	Chi Square X^2	P-Value*
1	**Age (years)**			2.22	0.136
	≤34	46(85.2)	8(14.8)		
	>34	20(71.4)	8(28.6)		
2	**Gender**			1.793	0.181
	Male	19(90.5)	2(9.5)		
	Female	47(77.0)	14(23.0)		
3	**Smoking Status**			0.648	0.723
	Smokers	8(88.9)	1(11.1)		
	Ex-smokers	6(85.7)	1(14.3)		
	Non-smokers	52(78.8)	14(21.2)		
4	**Marital Status**			0.033	0.855
	Single	5(83.3)	1(16.7)		
	Married	61(80.3)	15(19.7)		
5	**Nature of Job**			1.292	0.256
	Dentist	31(86.1)	5(13.9)		
	Dental Assistant	35(76.1)	11(23.9)		
6	**last qualification**			0.41	0.815
	Bachelor	40(81.6)	9(18.4)		
	Diploma	24(80.0)	6(20.0)		
	Master	2(66.7)	1(33.3)		
7	**Working experienced (years)**			1.153	0.283
	≤10	50(83.3)	10(16.7)		
	>10	16(72.7)	6(27.3)		
8	**Working in CBAHI and JICA accredited PHCCs**			0.108	0.743
	Yes	14(77.8)	4(22.2)		
	No	52(81.3)	12(18.8)		

CBAHI: The Saudi Central Board for Accreditation of Healthcare Institutes, JICA: The Saudi Central Board for Accreditation of Healthcare Institutes, and PHCCs: Primary Health Care Centers

Table 3 describes application of chi square test between compliance score on IC SPGs and Socio demographic characteristics of DHCPs. There was no statistically significant difference between age and compliance score, X^2 (1, N= 82) = 2.222, p value = 0.13. Similarly, there was no significant relationship between gender and compliance score, X^2 (1, N=82) = 1.793, p value = 0.18. There was no statistically significant difference between smoking status and compliance score, X^2 (2, N= 82) = 0.648, p value = 0.72. Similarly, there was no significant relationship between marital status and compliance score, X^2 (1, N=82) = 0.033, p value = 0.85. There was no statistically significant difference between nature of job and compliance score, X^2 (1, N= 82) = 1.292, p value = 0.25. Similarly, there was no significant relationship between last qualification and compliance score, X^2 (2, N=82) = 0.410, p value = 0.81. There was no statistically significant difference between working experienced and compliance score, X^2 (1, N= 82) = 1.153, p value = 0.28. Similarly, there was no significant relationship between work in CBAHI or JICA accredited PHCCs and compliance score, X^2 (1, N=82) = 0.413, p value = 0.74.

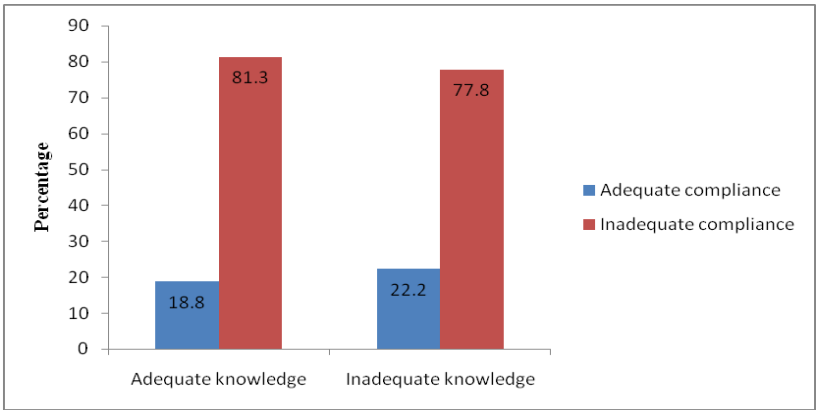

Figure 3: Compliance scores of DHCP on infection control standard precautions guideline by knowledge (n=82)

Figure 3 shows the compliance of DHCPs on IC SPGs by their knowledge on IC SPGs. Among DHCPs who have adequate knowledge, 18.8% have adequate compliance. Among DHCPs who have inadequate knowledge, 22.2% have adequate compliance. There was no statistically significant difference between knowledge of DHCPs on IC SPGs and compliance of DHCPs on IC SPGs, X^2 (1, N= 82) = 0.108, p value = 0.74.

DISCUSSION

This study was carried out to determine the compliance of DHCPs on IC SPGs and their associated factors in dental clinics of PHCCs in Makkah, Saudi Arabia. This study also explored the difference between compliance of DHCPs on IC SPGs and age, gender, smoking status, marital status, nature of job, last qualification, working experienced, working in CBAHI or JICA accredited PHCCs and knowledge of DHCPs on IC SPGs.

The result of this study showed that among all DHCPs, 78% have adequate knowledge on IC SPGs. These findings were consistent with the finding of previous researches conducted in Uganda [19], USA [20], India [21] and Saudi Arabia [18]. This finding was not in line with a study conducted in Valcea, Romania where only (29.2%) had adequate knowledge [22]. In contrast, these findings were not inline in the previous researches conducted in UK [23], Taiwan [24] and USA, were found inadequate knowledge among DHCPs.

Most of the DHCPs in the current study showed (93.9%) were aware about IC SPGs while (100%) had IC guidelines in their PHCCs. These finding were aligned in a study conducted in Hail region, Saudi Arabia [18], were found (86%) aware about IC SPGs while (82.6%) had IC guidelines in their PHCCs [18]. In the present study, a large percentage of (89%) of DHCPs received hepatitis B vaccination and tested (54.9%) hepatitis B antibodies following immunization. These percentages are closely similar (88.9%) and (67.5%) to that reported by Hassan Kasim Haridi [18].

However, all recorded percentages in Saudi Arabia were much higher than that recorded among dental practitioners of the private sector through the same decade in North Jordan (36%) [15]. The prevalence of hepatitis B antigen carriers in Saudi Arabia is estimated to be 8.3% for the entire population [25]. This means that dentists and their assistants in Saudi Arabia are at a high risk of exposure to hepatitis B antigen. Therefore, there should be 100% hepatitis B vaccination coverage of all dentists and dental workers, rather than the 89 % found in this study. Post-vaccination testing for antibody to hepatitis B surface antigen (anti-HBs) response is indicated for DHCPs who have blood or patient contact and are at ongoing risk for injuries with sharp instruments or

needle sticks. Knowledge of antibody response should guide appropriate post-exposure prophylaxis [8].

Needle Stick Injury (NSI) was reported by almost 60 percent of the dentists in the past one year, but there was no information regarding post exposure prophylaxis. This was less than that reported in the Romanian study [26] but more than that reported in Nigeria [27] and South Africa [28]. DHCPs are susceptible to injuries inflicted by contaminated needles and sharp objects. Serious blood borne pathogens, such as HIV, HBV, HCV, and Treponema pallidum, can be transmitted from these injuries [29]. The reported risks of contracting infections after sustaining pathogen positive NSI were 0.3% for HIV [30], 6.0%-30.0% for HBV [31], and 0%-10.0% for HCV [29]. The precise risks of NSI in dental healthcare environment were investigated less frequently [32]. The routine uses of sharp instruments in dental treatment, the presence of blood and saliva, and the diverse bacterial flora in the oral cavity all contribute to the hazardous nature of the dental workplace for blood-borne infections. The result of this study showed that 90.2% of DHCPs instructed to follow IC SPGs in the PHCCs whereas 91.5 % received instruction what to do in case of NSI and 80.5% had appropriate protocol for NSI. Similar finding was reported in a study conducted in Hail region, Saudi Arabia [18]. In contrast, lower percentage 67.3% were reported not too aware about the correct management of NSI in a study conducted in a study Makkah, Saudi Arabia [33].

The result of this study showed that 96.3% of the DHCPs received IC training and their adequacy was 76.8%. These finding were consistent in a study conducted in Hail region, Saudi Arabia, were found 84.4% received infection control training while their adequacy was lower in percentage (47.9%) [18].

The current study revealed that among all DHCPs, overall, only 19.5 % had adequate compliance on IC SPGs. This finding was in line in a study conducted in Riyadh [16], Saudi Arabia and Jordan [15], were found 8.4% and 14% respectively among all DHCPs. This study also reported that among DHCPs who have adequate knowledge, only 18.8% have adequate compliance. This was not in line in the study conducted in Saudi Arabia [16, 34] and South India [35]. The discrepancy between reported knowledge and compliance identified by this study as indicated by a better knowledge score (78%) than the compliance score (19.5%) may reflect the propensity of people to inflate their knowledge to the compulsory rules of the institutions to received IC training but not reflected in their behavior.

The result of the study showed that there were no significant association found between socio-demographic factors and compliance on infection control standard precaution guideline. This finding might be due to small number of DHCPs included in this study.

STRENGTHS AND LIMITATIONS

This is an important study with the objective to examine the compliance of DHCPs on IC SPGs and their associated factors in dental clinics of PHCCs in Makkah, Saudi Arabia, 2018. The findings of this study highlight the need for strict adherence to IC protocol in dentists. Evidence has suggested that IC procedures can reduce the risk of disease transmission by compliance to standard IC protocol. The strength of this study was only one researcher was involved in data collection process. The result of this study may be subject to the limitations common to survey. There was 72.5% response rate which may led to non-response bias. In addition, recall bias may have occurred because DHCPs surveyed retrospectively. The limitations of this study could be the nature of study design which is cross-sectional; thus, the cause-and-effect relationship could not be established. The target group of this study was DHCPs who were working in MOH; hence generalization of the findings could be limited to only the DHCPs. All the data in the study were self-reported, and it is pertinent to be cautious in interpreting and generalizing the findings, but this needs to be verified by a further direct observation study. We enrolled participants through non-probability sampling, so that the finding of this study could not be generalized to all DHCPs. Finally, A smaller sample will give a result which may not be sufficiently powered to detect a difference between the groups and the study may turn out to be falsely negative leading to a type II error. However, appropriate sample size calculations before the conduct of the study have eliminated some of the effects caused by chance.

CONCLUSION

We conclude that, most of the DHCPs had ‘inadequate compliance’. However, there was no significant difference between socio-demographic factors and compliance on IC SPGs. A lack of compliance towards infection control was a general feature of the findings of this research. It highlighted the need of IC education that starts at dental training colleges and is followed through after graduation with continuing Professional Development. It is recommended that the MOH undertake periodic surveys to ensure that the knowledge and skills of DHCPS are maintained and to identify any weaknesses and modify the training accordingly. This may also go a long way to raise the awareness of the importance of infection control among DHCPs. It is recommended that the MOH establish an IC Committee that will be responsible for planning, monitoring and control, and evaluation of IC in all clinics. This proposed committee will also be responsible for developing and updating infection control polices and guidelines, identifying training needs, and designing and approval of training

modules. Further surveys need to be conducted that will correlate socio demographic factors and knowledge with the development of the compliance which in other studies have been reported to be highly associated with compliance.

Additional Information:

Funding statement: no funding was needed/received.

Availability of data and materials: the first author has the research data.

Declaration of interest statement: the authors declare no financial support given or having a relationship with any organization may benefit from this article and no conflict of interest.

Authors' contributions: study conception: BB; Manuscript writing: BB, and AA Review and editing: BB, and MK; Data collection: TA, AL, GA, and MA; Data entry: SA, AB, and MA; supervision, MK and AA.

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Study Questionnaire

Personal data:

Please provide the following information about yourself:

Name (optional): ……..……

Age: ……

Gender: Male Female

Do you have any chronic disease?

DM HTN IHD Dyslipidemia Asthma COPD

Other (specify): ……

Smoking status: smoker Non-smoker ex-smoker

Marital Status: Single Married Divorced Widowed

Type of job: Dentist Dental assistance

Last degree received: …….

Number of working years: …….

Do you work in CBAHI or JCI accredited PHC: Yes No

Knowledge, Attitude and associated factors:

1- Infection control standard precaution may include: (choose the correct answer)

- ❖ Use a yellow plastic bag for sharp objects.
- ❖ Re-capping needle by using both hand without gloves.
- ❖ Hand hygiene and use of mask, gloves, goggles, face shield, gowns or aprons.
- ❖ Use a dental equipment and instrument for every patient without disinfection.

2- What are the routine recommended vaccine for health care provider including dental healthcare providers in health facility? (choose the correct answer)

- ❖ Hepatitis A vaccine, MMR and varicella zoster.
- ❖ Hepatitis B recombinant vaccine, Influenza vaccine, Meningococcal vaccine.
- ❖ Pneumococcal vaccine, Hepatitis B vaccine and Hepatitis C vaccine.
- ❖ Rota virus vaccine and Hepatitis B vaccine.

3- In case of needle stick or sharp objects injury the instructions should be followed are? (choose the correct answer)

- ❖ Use of alcohol and water then continue your work after wearing gloves.
- ❖ Clean the site of injury with water and report the injury.
- ❖ Immediately receive Hepatitis B vaccine and immunoglobulin.
- ❖ Wash needle sticks and cuts with soap and water, apply isopropyl alcohol 70% and Bandage appropriately then Reporting the Injury.

4- If a Hepatitis B infected patient came to you for dental problem what will be your decision for management of this patient?

- ❖ Apply infection control standard precautions and treat the patient.
- ❖ Apply infection control standard precautions and treat the patient without surgical intervention.
- ❖ Refer the patient to Hospital for management of hepatitis B.
- ❖ Refuse to treat the patient.

5- Can you determine your level of knowledge of standard precautions guidelines?

Poor Average Excellent Uncertain

6- Are you aware with infection control standard precautions guideline?

Yes No

7- Have you ever taken a vaccination for hepatitis B?

Yes No

8- If your answer is YES, how many doses have you taken?

3 doses of hepatitis B immunization

Less than 3 doses of hepatitis B immunization

More than 3 doses of hepatitis B immunization

Don't remember the number of hepatitis B immunization doses

9- Were you tested for the post HBV immunization serology?

Yes No

10- Do you have a written Infection Control guideline in your department?

Yes No

11- Have you received instructions with Infection control guideline from Infection control department?

Yes No

12- Have you received instructions about what to do in case of needle stick injury?

Yes No

13- Is there an appropriate protocol for emergency treatment of needle stick or sharp accidents available in your clinic?

Yes No

14- Have you received an infection control training? (If you answer the question with No ignore Question Number 14 and 15).

Yes No

15- Can you mention the type of infection control training you have received? (you can choose more than one)

- ☐ Basic Infection control skill license.
- ☐ Basic Infection control course.
- ☐ Infection control in dental clinic and central sterile service department
- ☐ Other (specify): ……

16- How adequate the infection control training you have received?

Adequate Inadequate Uncertain

17- Are you updating your information regarding infection control guideline?

Yes No

18- Is it suitable for you to treat patients who have infectious disease (like HIV, Hepatitis B, Hepatitis C, Tuberculosis)?

Yes No

19- Have you ever treated patients with infectious diseases?

Yes No

20- Do you believe your commitment with Infection control measures well protect you from infectious diseases?

Yes No

21- Can you describe your institutional commitment with infection control requirements?

Poor Average Excellent Uncertain

Practice:

Table 4: Questions about Practice of Protective barriers

Protective barrier	Always	Sometimes	Never
How often do you wash hands before and after patients treatments?			
How often do you wear gloves while performing dental procedures?			
How often do you change gloves between patients?			
How often do you use sterile surgical gloves for surgery?			
How often do you wear Masks?			
How often do you change mask between patients?			
How often do you wear protective eyewear?			
How often do you use Caps or hair cover?			
How often do you wear disposable Gowns /scrubs for surgery?			
Do you use puncture resistant container for sharp instrument?			
How often do you use surface barriers for dental unit surface?			
How often do you use surface disinfectants for routine wiping?			