

# Occupational Hazards Awareness and Preventive Practices Among Dental Interns Versus Dental Postgraduate at Riyadh Elm University Hospital

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## Abstract

**Background:** Dental interns and postgraduates were predisposed to a number of occupational hazards, these includes exposure to infections, percutaneous exposure events, dental materials, radiation, and noise, musculoskeletal disorders, psychological problems and dermatitis, respiratory disorders, and eye problems. **Aim of work:** To assess the level of occupational hazards awareness and preventive practices among dental interns versus dental postgraduates in Riyadh Elm University. **Subject and methods:** 100 participants were subjected to a questionnaire that included demographic data, awareness of occupational hazards and safety measures practiced by the study participants. Assessment tools were conducted through calculation of the three rates (accident incidence rate, accident frequency rate and accident severity rate), in addition to, calculation of frequency of each question, scoring degree and grading from weak, moderate to excellent. Results: Out of the 100 participants, 85% were males and 15% were females; 87% of participants were excellent in applying the term preventive practices and the rest of participants were moderate but the difference between the two groups was statistically insignificant ( $P=0.103$ ) and nearly equal to each other. However, the majority of participants awareness about occupational hazards and preventive practices were weak and the difference between the two groups was statistically significant ( $P=0.000$ ). **Conclusion:** Dentists were exposed to many occupational risks hazarded during work and need more education programs to overcome these occupational hazards.

## Introduction

Occupational hazard refers to a risk or danger as a consequence of the nature or working conditions of a particular job (Chopra SS, 2017). It can also refer to a work, material, substance, process, or situation that predisposes, or itself causes accidents or disease, at a work place. The history of occupational hazard awareness can be traced back to the 18th century when Bernadino Ramazzini, who was referred to as the father of occupational medicine, recognized the role of occupation in the dynamics of health and diseases (Fasunloro A, 2014). Dental trainees and postgraduates were predisposed to a number of occupational hazards, these includes exposure to infections, percutaneous exposure events, dental materials, radiation, and noise, musculoskeletal disorders, psychological problems and dermatitis, respiratory disorders (Desai V, 2015). The role of occupational health is the promotion and maintenance of the highest degree of physical, mental, and social wellbeing of workers in all occupations; the prevention of deviation from health among workers caused by their working conditions; their protection from risks resulting from factors adverse to health. Healthy practitioners are particularly important

for a successful dental practice and well-being of the patient (Leggat PA, 2016). Dentists should be aware of individual protective measures and appropriate sterilization and other high-level disinfection utilities. Continuous education and appropriate intervention studies are needed to reduce the complications of these hazards. It is important for dentists to remain constantly up to date about measures on how to deal with newer strategies and dental materials, and implicates the need for special medical care (Ayatollahi J, 2012).

## Aim of Work

To assess the level of occupational hazards awareness and preventive practices among dental interns versus dental postgraduates at Riyadh Elm University Hospital.

## Subject and Methods

**Study setting:** Riyadh Elm University Hospital.

**Study design:** Cross sectional study.

**Sample size:** The final sample size was 100 participants including 85 dental interns and 15 dental postgraduates.

**Data collection:** The data were obtained by using a self-administrated validated questionnaire that included demographic data of participants, awareness of occupational hazards and safety measures practiced by the study participants.

**Assessment tools:** the evaluation was done by calculating the three rates (accident incidence rate, accident frequency rate and accident severity rate), calculation of frequency of each question and scoring degree of each question and grading students from weak or moderate to excellent.

**Ethical approval:** Informed consent was obtained from all participants. This research is registered in Riyadh Elm University Research Center with a registration number: FRP/2019/2 and IRB approval number: RC/IRB/2019/96. The study participants were asked to answer every questionnaire item as “yes” or “no” closed-ended questionnaire.

**Statistical Analysis:** By (SPSS), version 20 was used for statistical analysis. The data were presented as frequency tables and chi square test was used to assess the association between dental interns and postgraduate dentists attending the clinics of Riyadh Elm University Hospital.

**Results**

Table (1) shows that Out of the 100 participants, 85% were males and 15% were females. The mean age of the study participants was 23.24±1.688 years, dental interns were 85% versus 15% postgraduates.

**Table (1): shows the distribution of participants doctors according to demographic data**

Demographic data	variable	NO	%
<b>Gender</b>	Males	85	85
	Females	15	15
<b>Degree</b>	Dental Interns	85	85
	Postgraduates	15	15
<b>Age</b>	min	22years	
	max	28 years	
	mean ±SD	23.24±1.688	
<b>Dental Interns Age</b>	minimum	22 years	
	maximum	23 years	
	mean ±SD	22.58±0.497	
<b>Dental Postgraduates Age</b>	minimum	26 years	
	maximum	28 years	
	mean ±SD	27±0.926	
<b>Working hours</b>	mean ±SD	7.4±1.435	
<b>Dental interns Age</b>	mean ±SD	8±0.00	
<b>Dental Postgraduates Age</b>	mean ±SD	4±0.00	

Table (2) shows the participants gender, the males’ percentage were higher among the dental interns (89.4%) than dental postgraduates (60%). On the other hand, the females were higher among dental post graduates (40%) than dental interns (10.6%) and the difference was statistically significant (P=0.009). In relation to preventive practices for participants, the difference between the two groups was statistically significant in relation to wearing white coats, changing the gloves for each patient, wearing the mask, using disinfectants for hand washing, participants doing hepatitis B and C lab tests and using the eye shield. However, the difference between the two groups was statistically insignificant in relation to wearing the gloves, wearing medical shoes, washing hands before and after examining the patient, vaccination against hepatitis B, safely disposing hazardous waste for each patient and wearing the head cover.

**Table (2): shows the distribution of participants according to gender & preventive practices for dentists**

Gender & preventive practices for dentists		dental interns n=85		dental postgraduates n=15		Fisher's Exact Test p value
		NO	%	NO	%	
Gender	male	76	89.4	9	60	0.009*
	female	9	10.6	6	40	
Are the participants wearing white coats	yes	84	98.8	11	73.3	0.002*
	no	1	1.2	4	26.7	
Are the participants wearing the gloves	yes	84	98.8	13	86.7	0.058
	no	1	1.2	3	13.3	
Are the participants changing the gloves for each patient	yes	82	96.5	11	73.3	0.009*
	no	3	3.5	4	26.7	
Are the participants wearing the face mask	yes	82	96.5	8	53.3	0.000*
	no	3	3.5	7	46.7	
Are the participants wearing medical shoes	yes	70	82.4	13	86.7	1
	no	15	17.6	2	13.3	
Are the participants washing their hands before and after detection	yes	73	85.9	11	73.3	0.253
	no	12	14.1	4	26.7	
Are the participants using disinfectants for hand washing	yes	70	82.4	8	53.3	0.020*
	no	15	17.6	7	46.7	
Did the participants do hepatitis B and C lab tests	yes	83	97.6	10	66.7	0.001*
	no	2	2.4	5	33.3	
Have the participants received hepatitis B vaccination	yes	84	98.8	14	93.3	0.279
	no	1	1.2	1	6.7	
Are the participants using the eye shield	yes	76	89.4	10	66.7	0.034*
	no	9	10.6	5	33.3	
Are the participants using sterile tools for each patient	yes	85	100	15	100	NV
	no	0	0	0	0	
Are the participants safely disposing the hazardous waste for each patient	yes	79	92.9	14	93.3	0.718
	no	6	7.1	1	6.7	
Are the participants wearing the head cover	yes	74	87.1	13	86.7	0.619
	no	11	12.9	2	13.3	

NV: not valid to calculate significant p value

**Table (3): shows the distribution of participants doctors according to preventive practices**

preventive practices for participants doctors							Fisher's Exact Test p value
total score category	Dental interns n=85		Dental Postgraduates n=15		Total N= 100		
	NO	%	NO	%	No	%	
Excellent	76	89.4	11	73.3	87	87	0.103
Moderate	9	10.6	4	26.7	13	13	

Tables (3) shows that 87% of participants were excellent applied to the term of preventive practices and the rest of participants were moderate but the difference between two groups was statistically insignificant (P= 0.103) and nearly equal to each other.

**Tables (4): shows the distribution of participants according to occupational risk factors**

Occupational risk factors		Dental Interns n=85		Dental Postgraduates n=15		Fisher's Exact Test p value
		NO	%	NO	%	
Are the participants using sharp instruments	yes	82	96.5	15	100	0.611
	no	3	3.5	0	0	
Are the participants using mercury while doing amalgam	yes	0	0	0	0	NV
	no	85	100	15	100	
Are the participants using a lamp with a suitable power to operate	yes	83	97.6	14	93.3	0.389
	no	2	2.4	1	6.7	
Are the participants using the appropriate shoe for work	yes	70	82.4	13	86.7	1
	no	15	17.6	2	13.3	
Are the participants using a suitable height detection chair	yes	81	95.3	13	86.7	0.22
	no	4	4.7	2	13.3	
Are the participants working more than one shift	yes	0	0	0	0	NV
	no	85	100	15	100	
Are the participants changing the work period (morning or evening)	yes	83	97.6	13	86.7	0.161
	no	2	2.4	2	13.3	
Are the participants working on a suitable ground	yes	73	85.9	11	73.3	0.253
	no	12	14.1	4	26.7	
Are the participants working with a trained technical assistant	yes	83	97.6	11	73.3	0.004*
	no	2	2.4	4	26.7	

NV: not valid to calculated significant p value.

About 97% study participants use sharp instrument and none had regular exposure to dental amalgam. There was no significant difference between the two groups participants for the rest of all occupational risk factors. On other hand, with regard to participants working with a trained technical assistant the differences between two groups was statistically significant (P= 0.004)

**Table (5): shows the distribution of participants according to Awareness of occupational hazards and preventive practices**

Awareness of occupational hazards and preventive practices		Dental interns n=85		Dental Postgraduates n=15		Fisher's Exact Test p value
		No	%	No	%	
Did the participants receive any workshops about occupational hazards education		No		No		0.001*
	Yes	18	21.2	10	66.7	
	No	67	78.8	5	33.3	
Did the participants receive any workshops about awareness of preventive practices	Yes	17	20	11	73.3	0.000*
	Bo	68	80	4	26.7	

Table (5): shows that only 28% of the participants received a workshop on occupational hazards education but dental postgraduates were higher and statistically significant (P= 0.001) and also the same issue with regard to receiving a workshop on awareness of preventive practices.

**Table (6): shows the distribution of participants who received a workshop on occupational hazards education**

Within doctor received a workshop on occupational hazards education		Dental Interns n=18		Dental Postgraduates n=10		Monte Carlo Test p value
		NO	%	NO	%	
Did the participants receive the workshop	outside the hospital	16	88,8	5	50	0.000*
	inside the hospital	2	11.2	5	50	
The instructor of the workshop was from	outside the hospital	16	88,8	5	50	0.000*
	inside the hospital	2	11.2	5	50	
The duration of the workshop appropriate	yes	1	0.6	4	40	0.000*
	no	17	94.4	6	60	
The workshop sufficient information	yes	4	22.2	3	30	0.002*
	no	14	77.8	7	70	
Information about the workshop was obtained as a print	yes	3	16.6	3	30	0.000*
	no	15	83.4	7	70	

Table (6): shows that the difference between the two groups was statistically significant with regard to all parameters related to the workshop quality but the majority of participants were not satisfied about the duration, location and sufficient information.

**Table (7): displays the distribution of participants who received a workshop on awareness of preventive practices**

Within participants who received a workshop on awareness of preventive practices		Dental interns n=17		Dental Postgraduates n=11		Monte Carlo Test p value
		NO	%	NO	%	
Did the participants receive a workshop	outside the hospital	11	64.7	10	90.9	0.000*
	inside the hospital	6	35.3	1	9.1	
The instructor of the workshop was from	outside the hospital	11	64.7	10	90.9	0.000*
	inside the hospital	6	35.3	1	9.1	
The duration of the workshop appropriate	yes	0	0	3	27.2	0.000*
	no	17	100	8	72.8	
The workshop sufficient information	yes	0	0	6	54.5	0.000*
	no	17	100	5	45.5	
Information about the workshop was obtained as a print	yes	6	35.2	1	9.1	0.000*
	no	11	64.8	10	90.9	

Table (7) displays that the difference between the two groups was statistically significant with regard to all parameters related to the workshop quality but the majority of participants were not satisfied with the duration, sufficient information, the layout of information and the workshop location outside the hospital where the participants work.

**Table (8): shows the distribution of participants according to Awareness of occupational hazards and preventive practices**

Awareness of occupational hazards and preventive practices							Monte Carlo Test p value
total score category	dental trainee doctors n=85		dental post graduated doctors n=15		Total N= 100		
	NO	%	NO	%	No	%	0.000*
Excellent	2	2.4	10	66.6	12	12	
Moderate	31	36.5	1	6.8	32	32	
Weak	52	61.1	4	26.6	56	56	

Table (8) shows that the majority of participants' awareness of occupational hazards and preventive practices were weak and the difference between the two groups was statistically significant (P=0.000)

**Table (9): displays the distribution of participants doctors according to the type of occupational risks were exposed to**

The type of occupational risks that the participants were exposed to		Dental interns n=85		Dental Postgraduates n=15		Monte Carlo Test p value
		NO	%	NO	%	
Were the participants exposed to occupational hazards	yes	69	81.2	11	73.3	0.493
	no	16	18.8	4	26.7	
Were the participants exposed to chemical hazards	yes	67	78.8	4	26.7	0.000*
	no	16	18.8	4	26.7	
	Not known	2	2.4	7	46.6	
Were the participants exposed to biological hazards	yes	64	75.3	0	0	0.000*
	no	16	18.8	4	26.7	
	Not known	5	5.9	11	73.3	
Were the participants exposed to physical hazards	yes	44	51.8	0	0	0.000*
	no	16	18.8	4	26.7	
	Not known	25	29.4	11	73.3	
Were the participants exposed to mechanical hazards	yes	47	55.3	11	73.3	0.055
	no	16	18.8	4	26.7	
	Not known	22	25.9	0	0	
Were the participants exposed to psychosocial hazards	yes	46	54.1	0	0	0.000*
	no	16	18.8	4	26.7	
	Not known	23	27.1	11	73.3	
Were the participants exposed to ergonomic hazards	yes	30	35.3	0	0	0.009*
	no	16	18.8	4	26.7	
	Not known	39	45.9	11	73.3	

Table (9): displays that only 20 participants were not exposed to occupational risks and the difference between the two groups was statistically insignificant (P=0.493). On the other hand, the difference types of occupational hazards of both groups were statistically significant. The highest occupational hazards among dental interns were chemical hazards versus among dental postgraduates were the highest occupational hazards were mechanical hazards.

**Table (10) shows the difference rates used to assess the occupational risks in work place among participants**

Number of participants	Number of exposed doctors	Number of work hours	Number of occupational accidents	Number of work hours lost	Accident incidence rate	Accident frequency rate	Accident severity rate
100	80	740	347	132	433.75accident per 100 employees	468.91 accident per 1000 hours	22.29days lost per 1000 hours

Day work means 8 hours work

Table (10) shows that 80 of the participants working at Riyadh Elm University were exposed to occupational accidents and 22.29 days were lost per 1000 hours which indicated high risk

## Discussion

The present study reported that the majority of participants were applying the preventive practices by excellent way to protect themselves from exposure to occupational risk. However, the majority of participants didn't receive preventive occupational risk workshops or lectures which lead to 80 participants exposure to occupational risk. Another study reported that most prevalent preventive measure reported by the participants was the use of facemask (99.4%), wearing gloves on a routine basis (98.1%), and changing gloves between patients (96.2%). Majority (84.4%) of the study participants were vaccinated against hepatitis B. Only 57.5% of study participants had regular exposure to dental amalgam, and 43.8% feel stress while working in clinic or laboratory. Overall, internship students score better regarding their awareness and preventive practices; this was found to be statistically significant. Clinical practices were better among the internship group of participants as compared to second-year BDS students (Singh et al 2016). In agreement to the present study, another study done by (Reddy V et al 2015), stated that 92.4% (n=61) of dentists faced physical hazards, 13.6% (n=9) chemical hazards, 63.6% (n=42) biological hazards and 78.7% (n=52) psychological hazards. Dentists with clinical experience less than 5 years had greater prevalence of physical hazard (93.3%, n=14/15) which justified the results due to many potential toxic materials that were used in dentistry that poses health hazard if appropriate precautions are not used. In the current study, we found that 97% of participants were using sharp instrument which lead to 58% of dentists to face mechanical hazards and 64% were exposed to biological hazards. Many other studies suggest that half of the dentists faced mechanical hazards due to needle stick injuries or due to drilling instruments, needle stick injuries (Ramos-Gomez F, 1997)

## Conclusion

Dentists were exposed to many occupational risks hazards due to overload, working procedures or using dangerous instruments and chemicals.

## Recommendation

Continuing education programs is recommended to overcome these occupational hazards.

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