

Workplace Violence - A Survey of Diagnostic Radiographers in Ismailia Governorate Hospitals, Egypt

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Abstract: Violence in hospitals is becoming more frequent and more aggressive worldwide. Radiographers, as members of the frontline hospital personnel are at increased risk of workplace violence. So, this study aimed to determine the magnitude and the nature of workplace violence towards radiographers in hospitals, to identify its risk factors, and to study its impact on victims. All diagnostic radiographers in Ismailia Governorate Hospitals (n=123), except those who were on extended leaves or who had less than one year clinical experience (n=22), were invited to complete a standardized questionnaire designed specifically to study workplace violence in the health sector. Out of 101 radiographers, 94 agreed to participate in this study (response rate = 93.1%). The majority of the participants (79.8%) had experienced workplace violence of any kind. Verbal abuse was the most common type. Patients' relatives were the main perpetrators. Most of violent incidents were not reported. Easy public access, crowding and noise, understaffing, and long waiting times, were the potential factors contributing to hospital violence. Many negative consequences on the victims' psychological status and work performance have been revealed. It could be concluded that workplace violence towards diagnostic radiographers is a significant problem in hospitals; thus, effective preventive strategies should be designed and implemented.

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1. Introduction:

Workplace violence has become an alarming phenomenon worldwide. It is a major contributor to death and injury in many parts of the world (Merecz *et al.*, 2006). In the United States, homicide is the third leading cause of death in the workplace. In the European Union, 2% of the labor force has been subjected to physical violence at work. However, recent surveys all over the world showed that current figures represent only the tip of the iceberg. So, many international organizations have made efforts to recognize workplace violence in various service sector industries and establish guidelines for its prevention (ILO, ICN, WHO & PSI, 2003 and Chappell & Di Martino, 2006).

Workplace violence affects many occupational groups, especially those in the health industry where violence is becoming a feature of everyday clinical practice (Warsaw & Messite, 1996; Jones & Lyneham, 2000; Lyneham, 2001 and ILO, 2003_a). Frontline hospital personnel such as nurses and radiographers are particularly at higher risk; where patients, patients' relatives, employers, supervisors, or coworkers are usually the possible sources of violence. Poorly designed working environment and long waiting times can trigger violence (Kwok *et al.*, 2006; Kris *et al.*, 2009 and MFL Occupational Health Centre, 2009).

Workplace violence at the health sector can be in the form of physical assault, homicide, verbal abuse, bullying/mobbing, sexual and racial harassment, and psychological stress. It can occur as one single incident or repeated small incidents which together create severe harm including immediate and long-term disruption to interpersonal relationships and to the whole working environment (ILO, ICN, WHO & PSI, 2003).

The global cost of workplace violence is enormous due to causes including; illness, disability and death, absenteeism and sick leaves, accidents, turnover of staff, and reduced work performance (Chappell & Di Martino, 2006).

Although interest in workplace violence in the health sector has grown considerably within the developed world, it still appears to be a "hidden and tertiary issue" in many developing countries (Kamchuchat *et al.*, 2008). Moreover, most hospital surveys have been conducted to determine the magnitude of the problem among nursing staff (Jones & Lyneham, 2000; Kwok *et al.*, 2006 and Abbas *et al.*, 2010). Unfortunately, workplace violence directed at radiographers and other frontline health sector personnel has rarely been researched in developing countries including Egypt, thus the real size of the problem in the health sector is largely unknown till now. So, this study was conducted to

determine the prevalence, nature, and sources of workplace violence among radiographers in Ismailia Governorate hospitals, to identify risk factors contributing to violent incidents, and to study their negative impact on victims in order to suggest appropriate preventive strategies.

2. Methods:

Study design and setting:

This cross-sectional study was conducted throughout the period from November 2010 to February 2011 in all Ismailia Governorate Hospitals (n=11) including; Ministry of Health (n=8), Health Insurance, Suez Canal University, and Suez Canal Authority Hospitals.

Study population:

The total number of diagnostic radiographers in Ismailia Governorate Hospitals at the time of the study was 123, out of them 18 were on extended leaves and 4 were excluded as they had less than one year clinical experience. Thus, 101 radiographers were invited personally to participate in this study.

Ethical issues:

Consent from the Ethical Committee of Scientific Researches in Zagazig Faculty of Medicine was obtained. Also, permissions were obtained from the managers of the hospitals before conducting the study. Moreover, informed consents were obtained from all the participants while interviewing them.

Tools of the study:

All participants were personally interviewed using a questionnaire based mainly on "workplace violence in the health sector - country case study – questionnaire" (ILO, ICN, WHO & PSI, 2003) and other relevant questionnaires (Anderson, 2002 and IAPA, 2007). The questionnaire was translated into Arabic after being modified according to the Egyptian culture, nature of work of diagnostic radiographers, and working conditions in the Egyptian health sector. This questionnaire composed of five main parts;

Part one: included demographic data of the participants such as; age, sex, marital status, current workplace, common work location, clinical experience years, work shift, and staff number present in the same work setting during most of work time.

Part two: included hospital violence description such as; types and common sources of violence as well as victims' responses to violent incidents.

For the purpose of this study, workplace violence was defined as any act in which a person is abused, threatened, intimidated or assaulted during

work, including commuting to and from work, involving an explicit or implicit challenge to safety, well-being or health. Moreover, four types of violence experienced within the health sector were categorized (ILO, ICN, WHO & PSI, 2003; Winstanley & Whittington, 2004; Caruana, 2005; Kris *et al.*, 2009 and MFL Occupational Health Centre, 2009);

- 1) Physical assault: the use of physical force against an individual involving physical contact, such as beating, kicking, slapping, stabbing, shooting, pushing, biting, pinching, and sexual assault, regardless of whether or not an injury was sustained.
- 2) Verbal abuse: the use of words which are personally insulting, such as generally abusive spoken obscenities and foul language, or indicating a lack of respect for the dignity and worth of an individual.
- 3) Threatening behavior: any action that involves signs of violence indicating intention to harm, such as the intention to throw a chair, cause a fight or to verbally threaten an individual.
- 4) Sexual harassment: any unwanted behavior of a sexual nature, including verbal or physical, which is offensive to an individual or for the perpetrator's own sexual gratification.

Part three: included data about participants' knowledge, opinion, and satisfaction regarding workplace violence prevention and reporting procedures.

Part four: included data about factors contributing to hospital violence such as; security measures defects (insufficient security guards and lack of panic alarms), hospital environment and workplace design defects (obstructed escape routes, easy public access, insufficient lightning, noise, and crowding), work organization and training defects (understaffing in work shifts, long waiting times, long working hours and work overload, poor communication, and insufficient training of staff regarding predicting and confronting workplace violence), and factors related to hospitals' location and patients' characteristics (prevalent violence and crimes in the region and alcohol drinking and addiction).

Part five: included data about the negative impact of violent incidents on victims including manifestations and consequences of post-traumatic stress disorder such as; repeated disturbing memories, sleeping difficulties, concentration difficulties, repeated headache, frustration/depression, aggression/anxiety, job dissatisfaction, lack of willingness to work, increased sick leaves, disturbed social relations, need for psychic counseling, alcohol

consumption/addiction, and suicide attempts (Bisson, 2007).

Data management:

Data were computerized and statistically analyzed using SPSS version 19 (IBM, 2010). Chi-squared and Fisher exact tests were used for categorical qualitative variables. Odds ratios (OR) with 95% confidence intervals (CI) were also estimated.

3. Results:

Prevalence and demographic risk factors of workplace violence

Ninety four out of 101 radiographers agreed to participate in this study with a response rate of 93.1%. They were distributed in Ismailia Governorate hospitals as follow; 60.6% in the ministry of health, 21.3% in the Suez Canal University, 12.8% in the Suez Canal Authority, and 5.3% in the Health Insurance. The common work location for all of them was the Radiology Department. The majority of the participants (79.8%) had experienced workplace violence of any kind. Moreover, the present study revealed that young age (< 45 years), male sex, low clinical experience (< 10 years), and rotating work shifts were not significantly associated with workplace violence. Alternatively, married radiographers and those who were working most of their times with staff number ≤ 5 were significantly at higher risk for workplace violence compared to single radiographers and those who were working with > 5 staff members [OR (95% CI) = 10.2 (2.35-45.83) and 6.34 (1.17-35.3), respectively] (Table 1).

Workplace violence description and victims' responses

Respondents who had experienced violence (n=75) were allowed to choose multiple types of workplace violence, verbal abuse was the most common type (98.7%), followed by threatening behavior (46.7%), and physical assault (38.7%); while, sexual harassment was rare (1.3%) (Figure 1).

Violence victims were allowed to choose multiple workplace violence sources, patients' relatives were the main source (100%), followed by patients themselves (50.7%); while, minority of victimized respondents had suffered violence from managers/supervisors/heads of departments as well as from their colleagues (8% and 2.7%, respectively) (Figure 2).

Victimized respondents were allowed to indicate multiple responses on this issue; where it

was revealed that the majority of them reported the incidents to senior staff/head of department/manager, called security/police, or tried to warn the attacker (85.3%, 77.3%, and 58.7%, respectively); while, minority of them tried to defend themselves verbally or physically, completed an incident form, or asked help from colleagues (14.7%, 5.3%, 2.7%, and 1.3%, respectively). On the other hand, none of them ignored the incident, pursued prosecution, or completed a compensation claim (Table 2).

Participants' knowledge, opinion, and satisfaction

The majority of respondents (97.9%) considered most of violent incidents are preventable. Moreover, 93.6% of them knew about the existence of hospital violence reporting procedures. However, 60% of respondents with occupational violence experience were not satisfied about the existing reporting and investigation procedures (Table 3).

Factors contributing to workplace violence

Respondents were allowed to choose multiple risk factors of hospital violence, the majority of them (92.6%, 81.9%, 72.3%, 71.3%, and 67%, respectively) considered easy public access, crowding and noise, understaffing, insufficient security staff, and long waiting times as major risk factors. However, lower proportions (47.9%, 44.7%, and 37.2%, respectively) considered that prevalent violence and crimes in the region, insufficient staff training, alcohol drinking and addiction, and long working hours/work overload as important risk factors. Other factors such as, insufficient lightning, lack of/obstructed escape routes, poor communication, and lack of panic alarm/cell phones were not considered to be major contributing factors for hospital violence (Table 4).

Impact of workplace violence on victims

Violence victims (n=75) were allowed to choose multiple manifestations and consequences of post-traumatic stress disorder; where the majority of them complained of lack of willing to work, repeated headache, job dissatisfaction, and concentration difficulties (78.7%, 73.3%, 66.7%, and 50.7%, respectively); while, lower proportions reported aggression/anxiety, frustration/depression, increased sick leaves, repeated disturbing memories, disturbed social relations, and sleeping difficulties (49.3%, 32%, 24%, 21.3%, 16%, and 12%, respectively). While, none of them reported psychic counseling need, alcohol consumption/addiction, or suicide attempts (Table 5).

Table (1): Prevalence and demographic risk factors of workplace violence towards the studied diagnostic radiographers.

<i>Variables</i>	<i>Total participants (n = 94)</i>	<i>Experienced violence (n = 75)</i>	<i>OR (95% CI)</i>
Age (years)			
< 45	72 (76.6%)	59 (81.9%)	1.7
≥ 45	22 (23.4%)	16 (72.7%)	(0.45 – 5.76)
Sex			
Male	73 (77.7%)	60 (82.2%)	1.85
Female	21 (22.3%)	15 (71.4%)	(0.49 – 6.31)
Marital status			
Married	81 (86.2%)	70 (86.4%)	10.2
Single	13 (13.8%)	5 (38.5%)	(2.35 – 45.83)*
Experience years			
< 10	44 (46.8%)	36 (81.8%)	1.27
≥ 10	50 (53.2%)	39 (78%)	(0.41 – 3.95)
Work shift			
Rotating	59 (62.8%)	49 (83.1%)	1.7
Morning	35 (37.2%)	26 (74.3%)	(0.55 – 5.26)
Staff number			
≤ 5	85 (90.4%)	71 (83.5%)	6.34
> 5	9 (9.6%)	4 (44.4%)	(1.17 – 35.3)*

NB. * Statistically significant result.

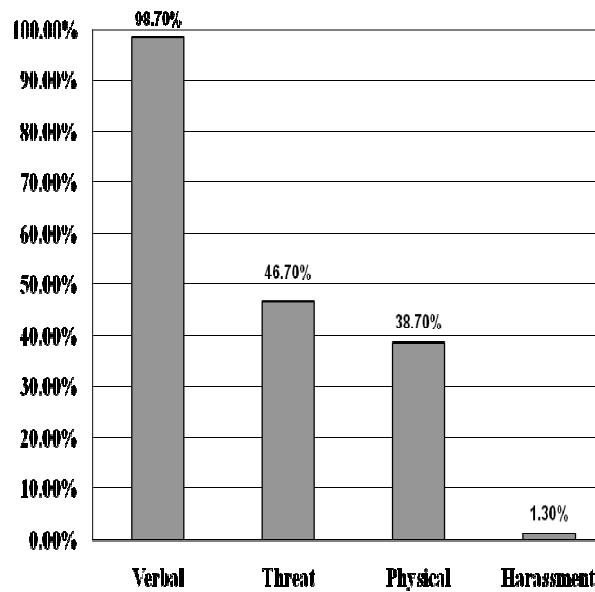


Figure (1): Frequency distribution of victims according to the reported types of workplace violence.

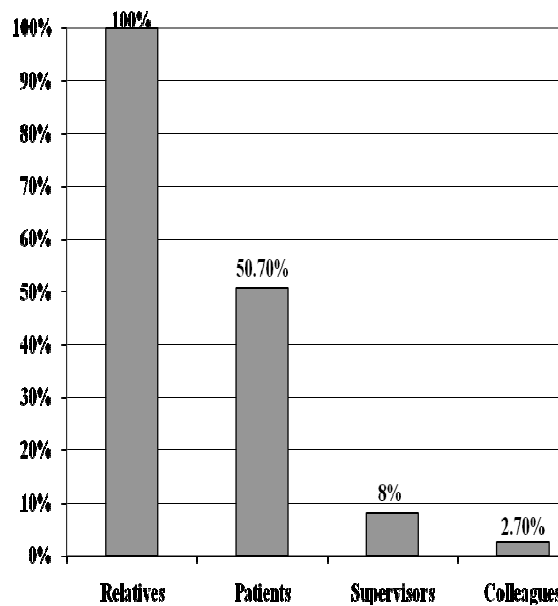


Figure (2): Frequency distribution of victims according to the reported sources of workplace violence.

Table (2): Victims' responses to workplace violence

<i>Responses</i>	<i>Violence victims (n =75)</i>
Reported to senior staff/head of department/manger	64 (85.3%)
Called security/police	58 (77.3%)
Tried to warn the attacker	44 (58.7%)
Tried to defend verbally	11 (14.7%)
Tried to defend physically	4 (5.3%)
Completed an incident form	2 (2.7%)
Asked help from colleagues	1 (1.3%)

Table (3): Participants' knowledge, opinion, and satisfaction regarding workplace violence prevention and reporting procedures.

<i>Knowledge and opinion</i>	<i>Total participants (n = 94)</i>
Considering violent incidents are preventable	92 (97.9%)
Knowing of existing workplace violence reporting procedures	88 (93.6%)
<i>Satisfaction level</i>	<i>Violence victims (n = 75)</i>
Not satisfied	45 (60%)
Satisfied to some extent	29 (38.7%)
Very satisfied	1 (1.3%)

Table (4): Factors contributing to workplace violence.

<i>Contributing factors</i>	<i>Total participants (n = 94)</i>
Easy public access	87 (92.6%)
Crowding and noise	77 (81.9%)
Understaffing	68 (72.3%)
Insufficient security staff number	67 (71.3%)
Long waiting times	63 (67%)
Prevalent violence and crimes in the region	45 (47.9%)
Insufficient staff training	42 (44.7%)
Alcohol drinking and addiction	35 (37.2%)
Long working hours/work overload	35 (37.2%)
Insufficient light (inside/outside)	25 (26.6%)
Lack of/obstructed escape routes	18 (19.1%)
Poor communication	16 (17%)
Lack of panic alarm/cell phone	10 (10.6%)

Table (5): Impact of workplace violence on victims.

<i>Negative impact</i>	<i>Violence victims (n =75)</i>
Lack of willing to work	59 (78.7%)
Repeated headache	55 (73.3%)
Job dissatisfaction	50 (66.7%)
Concentration difficulties	38 (50.7%)
Aggression/anxiety	37 (49.3%)
Frustration/depression	24 (32%)
Increased sick leaves	18 (24%)
Repeated disturbing memories	16 (21.3%)
Disturbed social relations	12 (16%)
Sleeping difficulties	9 (12%)

4. Discussion:

The present study showed that the majority of the studied radiographers (79.8%) had experienced workplace violence of any kind. Closely similar results were revealed by many international studies, where more than 50% and even up to 100% of health care providers in hospitals experienced violent incidents (Lyneham, 2001; May & Grubbs, 2002; Wells & Bowers, 2002; Hegney *et al.*, 2003; Uzun, 2003; Mayhew & Chappell, 2005; Kwok *et al.*, 2006 and Ryan & Maguire, 2006). Moreover, the result of the present study confirms those of previous similar studies conducted on radiographers in Ireland (Healy *et al.*, 2002) and Hong Kong (Kris *et al.*, 2009), however in those studies slightly lower proportions of the respondents reported experience of workplace violence (63% and 61%, respectively). On the contrary to our results, much lower prevalence of workplace violence (27.7%) was reported by two Arabian studies conducted on nurses in Ismailia Governorate hospitals and primary health care centers, Egypt (Abbas *et al.*, 2010) and on primary health care workers in Al-Hassa, Saudi Arabia (El-Gilany *et al.*, 2010). These discrepancies in the results could be attributed to the differences between countries, health service level, health care professions, and patients' characteristics. Moreover, hospitals' characteristics including their geographical distribution, size, and the number of population being served have a major role in determining the magnitude of workplace violence; where the lower the education level and socioeconomic status of the population as well as the larger the hospital and the greater the number of patients being served with very high levels in services such as Accident and Emergency and Psychiatry the higher the incidence of workplace violence (Hesketh *et al.*, 2003; Ryan & Maguire, 2006; Gascón *et al.*, 2009 and Kris *et al.*, 2009). Furthermore, most of these studies varied in their definition of workplace violence and the recall period (Kwok *et al.*, 2006).

The present study revealed that young age (< 45 years), male sex, low clinical experience (< 10 years), and rotating work shifts were not significantly associated with workplace violence. Alternatively, married radiographers and those who were working most of their times with staff number ≤ 5 were significantly at higher risk for workplace violence compared to single radiographers and those who were working with > 5 staff members [OR (95% CI) = 10.2 (2.35-45.83) and 6.34 (1.17-35.3), respectively]. The result of the present study agrees with those of other studies, where it was suggested that the role relationship with patients, not the gender was the predictor of violence (Binder & McNeil, 1994; Healy *et al.*, 2002 and Kris *et al.*, 2009). Moreover, our

result confirms that of another study conducted on radiographers in Hong Kong where low experience didn't increase the risk of workplace violence (Kris *et al.*, 2009). On the contrary to our results, young age and shorter duration of employment were revealed to be the determinants of violence towards radiographers (Healy *et al.*, 2002) and nurses (Chou *et al.*, 2002 and Chen *et al.*, 2009). Regarding shift work, the finding of the current study is consistent with that of a previous similar one, which revealed that violent incidents may occur at any time thus hospitals should allocate at least one experienced radiographer in each shift (Kris *et al.*, 2009). Alternatively, other studies found that night shifts pose more risks than other time periods and have recommended that more experienced staff should work during these periods (Ayranci, 2005 and Caruana, 2005). Moreover, the results of the present study disagree with those of an Egyptian study conducted on nursing staff, where males, those who were commonly working in night shifts, and those in a place crowded with colleagues were significantly more exposed to violence. Moreover, being single posed no higher risk of exposure to violence than being married (Abbas *et al.*, 2010). These discrepancies may be due to the variations between those studies and the present one regarding the cut off point of the experience years and the age of the participants as well as the differences between nurses and radiographers regarding educational and training years and job tasks. Furthermore, marriage can lead to increased risk of violence, where it has been suggested that accumulation of stress and tension from familial and societal problems in demanding health occupations can contribute to emerging violence (ILO, 2003_b).

In the present study, verbal abuse was the most common type of violence (98.7%), followed by threatening behavior (46.7%), and physical assault (38.7%); while, sexual harassment was rare (1.3%). These findings are closely similar to those of the Hong Kong study, where verbal abuse was the most common type of violence (96.7%), followed by threatening behavior (34.1%) and physical assault (20.9%); while sexual harassment was also rare (3.2%) (Kris *et al.*, 2009). Similarly, an Australian survey involving radiographers revealed that the most frequent violence categories were verbal abuse, followed by threats of physical violence [Caruana, 2005]. Moreover, different research studies conducted in Israel, Hong Kong, Turkey, England, Spain, and Egypt found that verbal abuse ranged from 43% to 91% ; while physical violence ranged from 5.3% to 33% (Carmi-Iluz *et al.*, 2005; Kwok *et al.*, 2006; Celil *et al.*, 2007; Whittington & Shuttleworth, 2008; Gascón *et al.*, 2009 and Abbas *et al.*

al., 2010). Thus, it was suggested that despite the variable range of the reported workplace violence there is a consensus that the most commonly encountered type is verbal abuse (Atawneh *et al.*, 2003; Uzun, 2003 and Mayhew & Chappell, 2005).

The present study revealed that in all violent incidents patients' relatives were the main perpetrators. Moreover, a significant portion of violence and abuse was committed by patients (50.7%); while, managers/heads of departments/supervisors as well as colleagues represented minor sources for workplace violence (8% and 2.7%, respectively). The findings of the present study partially agree with those of other studies, where patients followed by their relatives were the major sources of workplace violence towards nurses and radiographers. Moreover, colleagues, seniors, managers, and doctors were not the sole perpetrators of workplace violence (Hesketh *et al.*, 2003; Kwok *et al.*, 2006; Kris *et al.*, 2009 and Abbas *et al.*, 2010). Our findings could be attributed to the easy hospital access of patients' relatives as well as to the job tasks of diagnostic radiographers in most hospitals that requires not only close contact with patients, as in positioning, but also dealing with their upset and worried relatives as described by another similar study (Kris *et al.*, 2009). Moreover, it was reported that patients may be a source of violence due to an emotive state such as anxiety, frustration, and anger due to restriction from usual activity, unrealistic expectation of the service, or being in pain (Caruana, 2005). Also, our results agree with those of another study, where it was suggested that internal violence shouldn't be overlooked as it may contribute to some incidents (Lee, 2006).

Regarding victims' responses towards workplace violence, the majority of them reported the incidents to senior staff/head of department/manager, called security/police, or tried to warn the attacker (85.3%, 77.3%, and 58.7%, respectively); while, minority of them tried to defend themselves verbally or physically, completed an incident form, or asked help from colleagues (14.7%, 5.3%, 2.7%, and 1.3%, respectively). On the other hand, none of them ignored the incident, pursued prosecution, or completed a compensation claim. Health care providers' responses towards violence partially differed in other studies, where the most common response was taking no action; the next common response was either to get help from co-workers/security or trying to defend themselves verbally; then warning the attacker; followed by reporting to senior staff. While, in those studies and ours, only a minority of the victims completed an incident form. The researchers of those studies suggested some factors that may contribute to such

response including; being afraid of what others would think of them, perceiving violence as part of their jobs, believing that reporting is not helpful, or insufficient training not only in recognizing signs of violence, but also in managing violent situations (Hesketh *et al.*, 2003; Ayranci, 2005; Caruana, 2005 and Kris *et al.*, 2009). The current study revealed a surprising result regarding this issue, where the majority of violence victims responded in a more correct way and a minority of them had self-defeating attitudes compared to those in the previously mentioned international studies. Our finding could be attributed to the higher prevalence of workplace violence towards the studied group that helps them in gaining better experience in predicting and confronting violent incidents.

In this study, the majority of respondents (97.9%) considered most of violent incidents are preventable. Moreover, 93.6% of respondents knew about the existence of hospital violence reporting procedures. However, 60% of violence victims were not satisfied about the existing reporting and investigation procedures. These findings partially agree with those of another study, where over half the respondents (56%) considered violence to be preventable; while, only 40% of them knew of existing guidelines on violence in their own hospitals and a minority (23.3%) found the support from their department was adequate (Kris *et al.*, 2009). Moreover, in an Egyptian study, over half the exposed nurses (55.8%) thought that violence events were preventable (Abbas *et al.*, 2010). The findings of the present study were also supported by those of a previous survey study, where most radiographers were not satisfied with the management procedures as they felt that the management impress that the patients have rights, but this does not extend to the staff (Caruana, 2005).

Many environmental and patients-related risk factors of workplace violence were largely explored in many studies (Chen *et al.*, 2009). Moreover, the results of several studies revealed that violence in the health sector is influenced by underlying structural and situational risk factors (Viitasara & Menckel, 2002). Regarding this issue, the results of the current study revealed that the majority of the respondents (92.6%, 81.9%, 72.3%, 71.3%, and 67%, respectively) considered easy public access, crowding and noise, understaffing, insufficient security staff, and long waiting times as major risk factors. However, lower proportions (47.9%, 44.7%, and 37.2%, respectively) considered that prevalent violence and crimes in the region, insufficient staff training, alcohol drinking and addiction, and long working hours/work overload as important risk factors. Other factors such as, insufficient lightning,

lack of/obstructed escape routes, poor communication, and lack of panic alarm/cell phones were not considered to be major contributing factors for hospital violence. These findings partially agree with those of other studies, where long waiting hours, crowding, poor security, poor communication, understaffing, alcohol and other substance abuse (Tiihonen *et al.*, 1997 and Wallace *et al.*, 1998), patients with psychological problems (Nijman *et al.*, 2002), and work overload and long working hours were considered as potential provoking factors for violent events (Healy *et al.*, 2002; Di Martino, 2003; Ayranci, 2005; Caruana, 2005 and Kris *et al.*, 2009). So, the findings of the current study highlighted some important defects in hospitals' environment and work design, work organization, and security measures as potential factors contributing to workplace violence.

Although, recognizing the severity of workplace violence problem is essential, further investigation of the impact of such violence can benefit the whole profession (Kwok *et al.*, 2006). Thus, the present study investigated this issue and revealed that considerable proportions of violence victims had reported one or more of post-traumatic stress manifestations and consequences such as; lack of willing to work, repeated headache, job dissatisfaction, concentration difficulties, aggression/anxiety, frustration/depression, increased sick leaves, repeated disturbing memories, disturbed social relations, and sleeping difficulties. While, none of them reported psychic counseling need, alcohol consumption/addiction, or suicide attempts. These findings support those of other studies, where it was revealed that violence at work can trigger a range of psychological and emotional outcomes in victims such as anxiety, anger, fear, depression, increased stress, and sleep disturbances (Di Martino, 2003; ILO, 2003; Winstanley & Whittington, 2004 and Kris *et al.*, 2009). Moreover, many studies reported the negative impact of workplace violence on job satisfaction, willingness to work, eagerness in the profession, and work performance which in turn directly had negative impact on patient care and consequently the effectiveness of the health care system (Arnetz & Arnetz, 2001; Hesketh *et al.*, 2003 and Kris *et al.*, 2009).

5. Limitations of the study:

The present study is a cross-sectional one that aimed to obtain a generalized overview about workplace violence towards diagnostic radiographers in hospitals throughout the whole years of their clinical profession, thus it would have been subjected to recall bias. Moreover, despite of using standardized and clear definitions for different types

of workplace violence, the feeling of being abused is very subjective.

6. Conclusions and recommendations:

Findings of this study revealed that diagnostic radiographers in hospitals are at high risk of workplace violence. The most common type of violence was verbal abuse. However, threatening behavior and physical assault were not uncommon. Patients' relatives were the main perpetrators in all violent incidents. Although, the majority of respondents knew about the existence of hospital violence reporting procedures, most of violent incidents were not reported as most of victims were not satisfied about the existing reporting and investigation procedures. Hospital environment and work design defects, poor work organization, and insufficient security measures were the potential factors contributing to workplace violence. Many negative consequences of workplace violence on the victims' psychological status and work performance have been revealed.

So, there is an urgent need to control workplace violence in hospitals, which requires active collaboration between managers and health care providers in identifying and assessing the risk for violence and developing a workplace violence prevention policy and program in consultation with the hospital health and safety committee. The policy should outline reporting and incident investigation as well as ways for eliminating or mitigating the risk of violence including; improving working environment, workplace design, work organization, and styles of management; providing greater opportunities for training of radiographers to address workplace violence; and providing victims with counseling and employees assistance programs. Moreover, continuous research efforts must be supported to improve the safety of health personnel worldwide.

Competing interests:

The authors declare that there are no competing interests. Moreover, this research paper was financed by the authors of the study.

Authors' contributions:

Reem A Abbas; designed the study, modified the questionnaire, analyzed the data statistically, and wrote and revised the manuscript. Selim F Selim; interviewed the participants, collected the data, and revised the manuscript.

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5/6/2011