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ORIGINAL ARTICLE

Sharps Injuries in the Operating Rooms of Qazvin Hospitals

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ABSTRACT

Surveying of sharps Injuries in the Operating Rooms of Qazvin Hospitals in 2013. This study was a descriptive cross - sectional study. Statistical population of this study was sustained physicians, technicians and nurses of operating rooms of Qazvin hospitals in various shifts. Fifty one persons were investigated. The main tool for data collection was standardized questionnaire. This questionnaire included information about demographic, environmental and social factors on the injury with sharp instruments according to standard working conditions were completed by a trained interviewer. The obtained data were analyzed using SPSS software.The effect of surgery instrument in surgery injury were needle 47.1%, scalpel 37.3%, suture needle injury 37.3% , acute surgical wounds tools 3.9% and the other tools 13.7%.Also effect of the anesthetic gas was 51% that halothane (56.9%) and isoflurane (7.8%) were the most effective in surgery injuries. Needle is the greatest factor in causing the injury during surgery that requires serious training and correcting the underlying cause.

Key words:*Sharps Injuries, Operating Rooms, Qazvin Hospitals.*

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INTRODUCTION

Operating rooms present special challenges in reducing the risk and number of sharps injuries and bloodborne pathogen exposures [1]. The degree of risk is directly related to a number of factors including the inherent nature of peri-operative work, routine and concentrated use of various types of sharp instruments and exposure to large amounts of blood, body fluids and tissue [2, 3, 4, 5, 6, 7]. Protective equipment, such as masks and face shields, required for the purpose of patient and provider protection, can add to exposure risk as it creates greater difficulties in communicating. Limited space and visibility within operative fields, under-staffing, emergent patient care situations, pace of work, distractions and ambient noise may increase the risk of sharps injuries and blood borne pathogen exposures [5, 6].

Several studies have examined the risk of blood borne pathogen exposure in operating rooms. A large seroprevalence study conducted in 1995 in a New York City teaching hospital found that 16.7% of major surgery patients aged 25 to 44 were infected with one or more of the three viruses Human Immunodeficiency Virus (HIV), Hepatitis B Virus (HBV) or Hepatitis C Virus (HCV) [8] . Observational studies have demonstrated that sharps injuries occur in 2-19% of all surgeries, depending on the type of surgery and other factors [3, 5, 7, 9, 10, 11].

A 15-month, six-hospital study of OR exposures conducted jointly by the International Health Care Worker Safety Center and the Association of peri Operative Registered Nurses revealed a number of patterns related to Sharps injuries. During the surveillance period, 386 percutaneous injuries were reported. The highest proportion of injuries (33%) occurred within the operative field; the surgical site ranked second with 25%. Three types of devices caused 75.9% of injuries: suture needles (51.0%), hollow-bore needles (13.2%), and scalpel blades (11.7%)5.

Several studies have demonstrated that there is significant underreporting of sharps injuries among healthcare workers. One study reported that as many as 70% of surgeons never or rarely report percutaneous exposures [12]. Factors contributing to low reporting rates include: healthcare workers' perception of risk, occupation13, length of service14, lack of time, and poor follow-up care [15].

In 2001, pursuant to the Massachusetts law, An Act Relative to Needle stick Injury Prevention (MGL Chapter 111 §53D), the Massachusetts Department of Public Health (MDPH) promulgated regulations requiring annual reporting of data on sharps injuries among healthcare workers by hospitals. Since that

time, MDPH has collected data for seven surveillance periods. The initial surveillance period occurred between October 1, 2001 and December 31, 2001. Subsequent surveillance periods follow the calendar year. For all periods, data were submitted by all MDPH licensed facilities.
As an ongoing effort to utilize these data to enhance statewide efforts by hospitals to reduce the number of sharps injuries among their workers, the MDPH Occupational Health Surveillance Program is issuing this special report. This report includes a description of the nature and circumstances of sharps injuries (SI) among healthcare workers in Massachusetts operating rooms based on 2004 data, and recommendations for reducing these injuries in the future. There are indications, based on the above-mentioned studies and 2004 Massachusetts data, that opportunities exist for reducing sharps injuries within operating rooms around the state. As sharps data are presented, it is always important to emphasize that underreporting remains a significant issue that varies according to occupation and hospital. It is reasonable to assume, therefore, that these data represent an underestimate of the problem.

METHODS

This study was a descriptive cross - sectional study. Statistical population of this study wassustained physicians, technicians and nurses of operating rooms of Qazvin hospitals in various shifts. Fifty one persons were investigated. The main tool for data collection was standardized questionnaire. This questionnaireincluded information about demographic, environmental and social factors on the injury with sharp instruments according to standard working conditions were completed by a trained interviewer. The obtained data were analyzed using SPSS software.
A number of data limitations need to be taken into account when interpreting the sharps injuries presented here. Optimally, sharps injury rates would be calculated using information on the total number of hours worked, sharps devices purchased or used, or procedures performed as the rate denominator. However, such information is not available, thus preventing the calculation of rate data. Given what is known about underreporting of sharps injuries, the number of sharps injuries in the operating room presented in this report is likely to be an underestimate of the true number of injuries. And finally, the presence of small cell sizes in certain cross tabulations of data highlighted in this report can make results less stable and make interpretation somewhat problematic.

RESULTS

In this study, 51 cases from fourQazvin Hospital (Rajai, Qods, BuAliand Kausar) were evaluated. 88.2% were female and 11.8% were male. Average of age was31 years old, height 165 cm and work experience 10 years. In the study of environmental factors on affecting injury,influence of duration surgery was 66.7%. Influence of surgery type, brightness and color of operating room in injury of surgery were 78.6%, 67%, and 31.4%, respectively.
Desired colors of persons wereblue 54.9%, green 17.6% and other colors 27.5%. In this study, most participants in the realm of individual factors weresmoking and anesthesia gas that effect of smoking was 45.1%. Also effect of the anesthetic gas was 51% that halothane (56.9%) and isoflurane (7.8%) were the most effective in surgery injuries.
The effect of number of surgery, shift and door in surgery injuries were 92.9%, 90.2% and 31.4%, respectively.The effect of surgery instrument in surgery injury were needle 47.1%, scalpel 37.3%, suture needle injury 37.3% , acute surgical wounds tools 3.9% and the other tools 13.7%.
The effect of the side issues of life, behavior and responsibility of the surgeon in surgical injury were 68.6%, 92.1% and 55.7%, respectively. The overall impact of individual factors, environmental and social factors in injury of surgical operation were, 54.27%, 81.8% and 76.9% respectively.

- Physicians sustained the greatest number of injuries (50%), followed by technicians (25%), including surgical technicians, and nurses (19%).
- Further breakdown of physician categories reveals attending physicians and surgeons accounted for 20% of all injuries, whereas surgical interns and residents, fellows, and anesthesiologists accounted for 20%, 2.3%, and 0.7% respectively. Medical and other students accounted for 6% of the injuries.
- Occupational groups with the greatest number of suture needlerelated injuries in the operating room were attending physicians (58%), RNs and LPNs (17%) and technicians (22%).
- For 74% (384) of suture injuries, no information was provided regarding specific type of suture needle (curved vs. straight).
- Combined, suture needles and scalpels accounted for approximately 62% of the devices involved in sharps injuries to OR hospital workers. A significant proportion of suture needle (53%) and scalpel injuries (67%) in the OR were accounted for by nonphysician personnel including: nurses, physician assistants, medical students, and nurses' aides.

•Hollow-bore needles including hypodermic needles (excluding spinal/epidural needles and pre-filled syringes) accounted for 20% of OR injuries.
• Suturing, cutting, and administration of injections together accounted for 75% of the procedures during which sharps injuries occurred.
• Eighty-five percent of injuries with devices used for cutting procedures involved scalpels. The remaining injuries involved bovies, scissors, trocars and other sharp devices.
• The top two categories of injury based on how the injury occurred include suturing (25%) and collision with a sharp or coworker (25%).
• Injuries occurring after use and before disposal were almost evenly distributed among hypodermic needles (24%), suture needles (20%) and scalpel blades (23%).
• "After use, before disposal" injuries accounted for 26% of OR injuries. Nurses and technicians sustained 70% of these injuries.
• Injuries occurring during or after disposal accounted for 9% of injuries. Nurses and technicians sustained 61% of the injuries in this category.

DISCUSSION

Sharps injuries are common, preventable hazards faced by medical personnel in the operating room. The potential consequence of such injuries includes transmission of bloodborne pathogens and detrimental effects on personal and professional lives.
The proportion of injuries occurring in the operating room is similar to that contained in a 2003 Exposure Prevention Information Network (EPINet) report released by the International Healthcare Worker Safety Center, in which operating rooms accounted for a significant percentage of injuries (29%), ranking second only to patient rooms (32%)[17].
Massachusetts OR data indicate that of 1,038 reported injuries in 2004, 519 (50%) were caused by suture needles, 13% by hypodermic needles and 12% by scalpel blades. A nonsafety device was involved in 85% of the suture needle-related injuries. Only 22% reports of injuries caused by a hypodermic or other hollow-bore needle indicated that the needle involved was a safety device. Sixteen percent of the injury reports contained no information to indicate whether the sharps device involved was a safety device.
A number of studies indicate the potential to reduce the number of injuries in ORs, based on introduction of changes within the work environment and substitution of safety devices for redefined surgical procedures. Use of blunt suture needles in fascia and muscle closure [5, 9, 11, 18, 19] and designated neutral zones [1, 6, 20] are two strategies that have demonstrated their effectiveness in randomized clinical trials. Researchers who conducted a multi-center surveillance study of occupational exposures and percutaneous injuries reported that 59% of suture needle injuries were caused by needles used to suture fascia or muscle, and estimated that use of blunt suture needles alone could have reduced suture needle injuries by as much as 30%5. Review of thesestudies and the Massachusetts data presented here have resulted in the following recommendations to prevent sharps injuries in Massachusetts' operating rooms.

Recommendations to Prevent Sharps Injuries in Massachusetts Operating Rooms:

Convene a multi-disciplinary team to identify and facilitate needed change. Change takes time and successful change requires cooperation and commitment from every member of the team. Quality improvement efforts should promote buy-in and active participation of all members of the team including senior leadership, nursing staff, surgeons, anesthesiologists,physician assistants, technicians, students and housekeeping. An inclusive, systematic approach is integral to the processes of device selection and evaluation and initiation of work practicecontrols [21, 22, 23, 24].
Modify work practices that create avoidable injury hazards. *Reinforce policies on disposal and recapping of sharps.* This category of injury represents an important focus for primary prevention activities. Modifying work practices can eliminate injuries due to improper disposal or handling of sharps and recapping. Seven percent of sharps injuries in Massachusetts operating rooms in 2004 resulted from improper handling or disposal of sharps16. The Occupational Safety and Health Administration prohibits recapping as a general practice. If absolutely necessary due to intermittent medication dosing, only a single-handed technique should be used when recapping a needle [23, 25].
Avoid hand-to-hand passing of sharps equipment as often as possible
A significant proportion of suture needle (53%) and scalpel injuries (67%) in the OR were reported by non-physician personnel. Use of a neutral or safety zone, whereby a designated area, device or field is used to place sharps for transfer, to eliminate simultaneous handling of sharps by two people, has demonstrated its value in preventing injuries and should be considered as one approach to reducing injuries for all OR personnel [1, 5, 6, 26]. The purpose of a neutral or safety zone is to reduce the hand-to-hand transfer of sharps that account for a significant percentage of injuries within ORs. Exceptions to use

of neutral or safety zones involve surgeons' discretion for situations when he or she cannot avert eyes from the surgical field or when positioning precludes the ability to reach the designated area1.

Examine non-safety device inventories and substitute devices with sharps injury prevention features where clinically appropriate.

NIOSH 23 and OSHA25 have identified engineering and work practice controls as the primary means by which sharps injuries should be reduced. Eliminate unnecessary sharps where possible. Some OR items including scalpels, surgical scissors, pick-ups and towel clips don't always need sharp points to effectively serve their purpose [5, 27]. For other categories of conventional sharps, including phlebotomy and hypodermic needles, there are a wide variety of safety devices available. More than 70% of sharps injuries in Massachusetts hospital operating rooms in 2004 caused by hollow-bore needles involved non-safety devices16. It is reasonable at this point in time to expect that, with the exception of pediatric or neonatal devices, a majority of hollow-bore needles are available with engineered sharps injury prevention features. Certain devices, such as those used in pediatrics and neonatology, have yet to be developed with integral safety features.

Use blunt suture needles where clinically feasible and appropriate.

Based on limited procedural data, the extent to which the potential exists for preventing sharps injuries through the use of blunt suture needles is unclear. There is evidence based on randomized clinical trials, however, to support use of these needles under particular circumstances such as in the closure of muscle and fascia [9, 11, 18, 19, 27]. In 2007, OSHA and NIOSH issued a joint safety and health information bulletin on the use of blunt suture needles as a means to reduce sharps injuries among healthcare workers28. The bulletin reinforces the OSHA requirements for the use of engineering controls and identifies blunt suture needles as one type of engineering control in the prevention of sharps injuries.

The Massachusetts Sharps Injury Surveillance System is a collaborative effort between the MDPH, hospitals, professional associations and community advocates. The success of the program in collecting data is a direct result of this collaboration. MDPH will continue to work with these groups to conduct surveillance, review exposure control activities in hospitals, and facilitate the exchange and dissemination of information among hospitals about successful prevention strategies.

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