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**Title: A Report On Nurses' Response to Occupational Injuries and
Exposures To Hazards In A Californian Community Hospital**

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Date of Submission: 30th March 2001

ACKNOWLEDGMENTS

Deepest gratitude to Dr Janis Mussett and Dr Margie Kolbe-Mims for their patience, good judgment and support throughout this endeavor, my wonderful husband David whose love and dedication inspired me to continue my studies and achieve my goals, and to my friends, Bill Mannion, Daniel Markowitz and Jill Cordova who patiently read my work and offered enthusiastic support throughout. Many thanks to the Medical Center who allowed me to distribute my questionnaires and to those who participated in this study and provided their valuable time to complete the surveys and to Gail Daly who helped with data collection and provided needed support at a difficult time.

ABSTRACT

This study set out to determine the reasons for underreporting of occupational injuries and exposures in the American health care environment. A cross sectional survey was used to report the responses and opinions of nurses who failed to report all occupational injuries and exposures, and the type of injuries that are least likely to be reported. The participants were a random sample of Registered Nurses employed in a California Health Care Center, who responded to a simple self-reporting questionnaire. The study revealed that the majority of occupational injuries, accidents and exposures by this group in the previous twelve month period had gone unreported. Ineffective education, unfamiliarity with methods of reporting and poor staffing ratios were factors that led to poor compliance of reporting. Other factors such as length of service and experience did not influence reporting habits. The originality of this research was that the questionnaire looked at the compliance of health and safe practices with consideration of the personal beliefs and attitudes that nurses hold in the workplace. Its significance is that it identified and documented appropriate strategies for employers to use to rectify the problem of reporting occupational injuries and accidents as well as described and analyzed the current systems in place.

DECLARATION

I certify that this thesis does not, to the best of my knowledge and belief:

(i) incorporate without acknowledgment any material previously submitted for a degree or diploma in any institution of higher education;

(ii) contain any material previously published or written by another person except where due reference is made in the text; or

(iii) contain any defamatory material.

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1.0 INTRODUCTION

The objective of this study was to determine the factors that influenced nurses to report occupational injuries, accidents and exposures. Based on the results of the study, suggestions for employers were provided and changes to their current practices and policies were recommended. These suggestions aimed to not only ensure the accurate collection of health and safety information at the facility, but the overall health and safety of it's nurses.

The Occupational Safety and Health Administration (OSHA) (1998), states that it has been well recognized that there are numerous health and safety issues associated with health care facilities including bloodborne pathogen and biological hazards, potential chemical and drug exposures, waste anesthetic gas exposure, ergonomic hazards (lifting, repetitive tasks), and laser, x-ray and radioactive hazards. They also noted that historically the practice of occupational health in health care areas has been poor. In the United States of America (USA) the practice of occupational health dates back to the late 1800's. National professional societies in occupational medicine and nursing were established in 1916 and 1942 respectively. The hospital and health care environments did not become a focus of study and prevention until much later. Professional associations and the federal government began to address health care worker health and safety in the mid 1950's. Criteria for effective hospital occupational health programs; however,

was not published by the USA, Center for Disease Control (CDC) and the USA, National Institute for Occupational Safety and Health (NIOSH) until 1977 and as recently as 1982 the CDC published the Guideline for Infection Control in Hospital Personnel.

In spite of impressive health and safety activities in the 80's and 90's, health care worker protection has lagged behind that afforded other workers with similarly increased risks. Possible explanations for the delay in focusing on occupational hazards faced by the health care workers are many and likely include the focus of curative rather than preventive medicine in the hospital environment, the focus on patient health over worker health, and the focus within occupational health on traditionally male occupations and hazards rather than female workers (NIOSH, 1988).

NIOSH (1988) has demonstrated in its many studies that primary prevention has been effective where implemented and needs to be the focus of future actions. Examples include the substitution of a non-hazardous substance for a hazardous one, isolation of workers from a hazardous exposure, engineering controls such as local and dilution ventilation, administrative controls including work practices and personal protective equipment. Lipscomb and Rosenstock (1997), noted that compliance with such safe work practices, needs more research among health care workers. They further highlight that several psychosocial and organizational factors have been identified that are important correlates of poor compliance practices

namely risk taking personality profiles, perceived poor safety climate at the workplace, staffing and appropriate staff mix for the acuity of patients and perceived conflict of interest between providing optimal patient care and protecting oneself from exposure.

The issue of compliance and poor reporting of injuries and exposures in health and safety is a serious matter, yet there has been little recognition of the problem in the current literature. This study aimed to document personal opinions, experiences and actions of nurses who have had occupational injuries and exposures that they have failed to report. It also provides suggestions for improving the current system of reporting, within the facility that this study takes place and can be used as a reference guide to other health care facilities experiencing poor safety compliance.

1.1 Background of the Study

There has been very little research on the problem of nurses failing to report work-related injuries and accidents and the reasons behind this phenomenon. Studies involving needle stick injuries within the United States of America have recognized that a number of these types of injuries do go unreported with rates varying from 21% to 95%, depending on the study (Porta et al, 1999). These studies however have not determined why underreporting occurs and places little significance on the problem.

Members of the CDC compiled a report on the evaluation of safety devices for preventing percutaneous injuries among health care workers in 1997. They noted that failure to report percutaneous injuries may compromise appropriate post exposure management, such as in post exposure prophylaxis for the human immunodeficiency virus (HIV), and the assessment of occupational hazards and preventive interventions. They concluded that health care institutions and health care workers must further assess reasons for underreporting and improve reporting of all occupational blood exposures.

The intent of this qualitative study was to follow up on this report and determine why underreporting occurs, not just for needle stick injuries, but all occupational injuries that nurses face, to provide methods to ensure the accurate collection of health and safety data, and to identify ways that the health and safety needs of nurses were met.

The results of this study found a significant problem of non reporting of occupational health and safety injuries, accidents and exposures. Commonly non reported occurrences included strikes and pinches from patients, needlestick injuries, body fluid splashes and lacerations or abrasions. Influencing factors identified included poor training on what should be reported, unclear policies and procedures, unfamiliarity with the method of reporting an occurrence and poor staffing.

1.2 Significance of the Study

This study identified appropriate strategies for employers to use to rectify the problem of reporting occupational injuries and accidents, as well as describing and analyzing the current systems in place. It provided a basis for further research into safety compliance issues, and the role of the employee's opinions and beliefs in occupational health and safety. In addition, the findings of the research identified appropriate interventions to be used in the workplace and provide education to nurses to minimize the circumstances that give rise to underreporting, therefore ensuring all injuries and accidents get reported, and ultimately providing a safer work environment for all employees.

1.3 Research Question

Why do nurses working in a Californian community hospital fail to report all occupational injuries, accidents or exposures?

1.4 Sub Questions

- a) What are the nurses personal experience regarding the reporting of occupational injuries, accidents or exposures?
- b) What factors contribute to nurses not reporting an occupational injury, accident or exposure?
- c) What are the current methods for reporting occupational injuries, accidents or exposures?

1.5 Limitations of the Study

- a) The study took place in one medical center, which may have produced results that are specific to that facility only. In an attempt to reduce this, results were compared against similar studies that occurred within the United States and other developed countries. This comparison in the literature review determined general trends in underreporting and the trends that were specific to the facility used in the study.
- b) A small sample size was used. This could have been overcome by using a number of similar sized medical centers within the same city. The pilot test window period of two days was too short. Subjects would potentially still remember their previous responses. A time period of two weeks between testing would have improved the reliability of this tool.

c) The data requested in the questionnaire required the subject to recall the previous twelve months and any incidents that occurred during that time period. As Landen & Hendricks (1995) states, difficulties with recall of injuries can result in underestimates of injury incidence and bias in risk estimates. A twelve-month or longer period of time is needed in injury surveys, in order to obtain an adequate number of injuries for analysis. A shorter reference period would have been desirable and may have provided more accurate estimates, however this would have necessitated an increase in the size of the sample and the cost of the overall project.

d) Furthermore the study did not fully evaluate the nurse's knowledge on occupational health and safety issues. Quinlan and Bohle (1991) highlight the importance of workers being familiar with who their safety representative is, the role of the safety committee, and the available health and safety services of the facility.

1.6 Definition of Terms

Occupational Injury - harm or damage to an individual within the workplace resulting from an occupational accident.

Occupational Accident - an unintended happening within the work place.

Occupational Exposure - a condition of being exposed to elements within the work place.

Hazard - exposing oneself to risk or a source of danger.

Report - to give an account or a formal presentation of facts.

Compliance - the act or process of complying to desired occupational health and safety policies and procedures within the work place.

Percutaneous Injury – exposure of an individuals skin to blood and other potentially infectious material.

2.0 LITERATURE REVIEW

2.1 Introduction

Until recently, safety and health policies in hospitals were developed mainly for patients not workers. Traditionally, hospital administrators and workers considered hospitals safer than other work environments and recognized mainly infectious diseases and physical injuries as risks in the hospital environment. Administrators had therefore emphasized patient care and allocated few resources for occupational health. It was believed that hospital workers were capable of maintaining their health without assistance, the availability of informal consultations with hospital physicians reduced the use of worker health services and hospitals were oriented towards treating disease rather than maintaining health. It is now well recognized that there are numerous health and safety issues associated with health care facilities. These, according to the Occupational Safety and Health Administration (OSHA, 1998), include but are not limited to bloodborne pathogen and biological hazards, potential chemical and drug exposures, waste anesthetic gas exposure, ergonomic hazards from lifting and repetitive tasks, laser hazards associated with laboratories and radioactive material and x-ray hazards.

Today, there are a variety of local, State and Federal Agencies and Organizations responsible for recommendations to protect the health and

safety of health care workers (National Institute of Occupational Safety and Health, {NIOSH}, 1988). These agencies provide guidelines, standards and regulations for all health care facilities to adhere to. All support the notion that health and safety committees should be set up in each hospital or health care center to provide seven major functions. These include:

- inspect workplaces regularly to identify health and safety hazards
- regularly review accident rates, results from prevention activities and other relevant workplace data
- prepare information for workers on identified hazards
- organize educational classes
- review health and safety aspects when planning new construction or renovating facilities
- investigate accidents; and
- establish motivational programs to stimulate worker participation in health and safety activities (examples include recognition, awards and dinners).

It has been proven that these factors have played an important role in articulating worker concerns, identifying potential hazards, educating all employees and improving work practices. With such recommendations implemented, specific actions can be initiated to correct unsafe work practices and conditions, such as the underreporting of injuries, accidents and exposures (NIOSH, 1988).

2.2 Reporting of Occupational Needlestick Injuries

A thorough review of the literature found that there have been very few direct studies on nurses and other health facility employees failing to report occupational injuries or accidents. Evidence of underreporting was highlighted in many research articles on needle stick injuries (Hamory, 1983, CDC, 1997, Jeffress, 1998, Luthi, 1998, Haiduven, Simpkins, Phillips and Stevens, 1999, and NIOSH, 2000,). It is widely accepted in most of these studies, that there is a significant number of injuries and exposures that do go unreported. The earliest study on underreporting of needle stick injuries was completed in 1983, by Dr Bruce Hamory. The study occurred in a University hospital in Missouri and involved employees in ten hospital departments who were considered most likely to suffer needle stick injuries based on previous studies, and a review of the author's experience of individuals who received this type of injury. The study used a simple anonymous questionnaire randomly administered to individuals who reported to work over a three-day period. Response to the survey was just over 50% with particular departments responding at a higher percentage than others. The results determined that 40% of needle stick injuries in the past 3 months and 75% in the previous 12 months had not been reported. These results were determined by comparing the number of needle stick injuries that had been reported to the employee health service over the same period of time. An assumption used by the author of the study was that those individuals responding to the survey were

more likely to have been those who had had a needle stick injury during the time period.

Further study of the results determined that the employees who did not report the injuries were more likely to be new employees with less than two years in the facility. This factor has not necessarily been found in other facilities or studies, as was recognized by the author, and could have been related to that particular facility. The reasons given for not reporting these injuries included the following responses;

- it was not worth reporting (43%),
- too time consuming and/or inconvenient (34%),
- didn't know I was supposed to (8.6%),
- unable to get to the emergency department (4.8%), and
- other (9.6%).

Many employees also reported that since the needle was clean and had not been used on a patient it was not worth reporting. Hamory (1983) notes however, that employees remain at risk for developing tetanus or the accidental injection of drugs including chemotherapeutic agents, so believes each injury needs to be evaluated.

Suggestions given for improved reporting included more extensive training for new employees regarding potential hazards of puncture wounds and a simplified reporting system such as a checklist versus a lengthy written

description. It also highlighted that changes in the prevention of hepatitis and requirements of workers' compensation laws may increase reporting rates.

The Center for Disease Control (CDC) produced a paper in 1997 evaluating safety devices for preventing percutaneous injuries among health care workers. They stated that clinical evaluation of these devices proved difficult for many reasons, including that many injuries go unreported. It was determined through the use of an anonymous survey and comparison against employee health data that only 54% of needle stick injuries were reported to the hospital surveillance system. They also found particular groups of employees' were more likely to report injuries such as phlebotomists who reported 90% of their injuries as compared to nurses who reported only 68%. They concluded their study by suggesting that healthcare institutions and health care workers must further assess reasons for underreporting and thus improve reporting of all occupational blood exposures.

In 1998 Jeffress spoke at the Frontline Healthcare Workers Safety Conference in Washington DC, on the health and safety of health care workers. He advocated for a nationwide study to be completed on needle stick injuries and the engineering and work practice controls used to eliminate or minimize the occupational exposure to bloodborne pathogens due to percutaneous injuries from contaminated sharps. During his speech he stated that it was widely agreed within the healthcare community that needle sticks are under reported, although he provided no evidence to support this

statement. The nationwide study that he proposed was completed and will be discussed later in this section.

Luthi, (1998) completed a cross sectional survey in seven Swiss hospitals in 1995, to estimate the incidence of percutaneous injuries among nurses, surgeons, anesthetists and domestic personnel. There was an overall response rate to an anonymous questionnaire of 72%. The questionnaire only asked for information from the last working day and the previous month. The incidence for nurses for these two time periods was 0.49 and 2.23. These results were then used as an estimated annual rate of occurrence. It was determined that most of the injuries occurred in a "normal" situation (no emergency, no stress, no fatigue) and were described as avoidable. Compliance with universal precautions was determined not optimal and the report rate was only 39.7%. A limitations of this study was that it only assessed needlestick injuries with material contaminated with blood or other biological fluids.

Dale, Pruett and Maker (1998) demonstrated the value of a comprehensive approach in a report on the decreased number of needlesticks obtained by phlebotomists at a well-known institute. The rate dropped from 1.5 to 0.2 per 10 000 venipunctures performed. Changes in worker training and work practices, the implementation of devices with safety features and encouragement of injury reporting as well as the implementation of the CDC's published guidelines and the OSHA bloodborne pathogens standard were all associated with the decline in injury rate. Dale, Pruett and Maker

(1998) also noted that an important factor towards the success was a thorough understanding of the injuries that occurred among their staff.

A survey on percutaneous injury reporting completed by Haiduven, Simpkins, Phillips and Stevens (1999), reported reasons for not reporting including sterile/clean needle (39%), little or no perception of risk to employee (26%), too busy (9%) and dissatisfaction with follow-up procedures (8%). They suggested that continued education is required in the risk of acquiring bloodborne pathogens from such injuries and that particular at risk groups need to have specific target prevention efforts.

A literature review by Porta, Handelman and McGovern (1999) on needle stick injuries among health care workers in the United States discussed injury rates and trends. It highlighted the problems with gathering data on injuries including the lack of a national database to track or tabulate data about needle stick injuries and the lack of a universal denominator for determining needle stick injury rate. They also highlighted that underreporting is a confounder to determining not only a national injury rate but also an understanding of the scope of the problem. Porta, Handelman and McGovern (1999) found that studies addressing underreporting cited rates ranging from 21% to 95%, including a CDC report of a rate of 46% and other studies reporting 20% to 50%. They summarize that rates of underreporting are estimates at best, however the estimates that exist support substantial underreporting of needle sticks.

In recent years there has been the recognition that needle stick injuries are a major occupational health hazard (Porta, Handelman and McGovern, 1999). Due to this increase in awareness and concern, many interventions have been attempted to reduce the number of needle stick injuries. Most studies thus far have been on reducing the number of needle stick injuries through the use of engineering controls such as safer needle devices, administrative controls and personal protective equipment. Many of these studies have recognized underreporting of injuries has not only occurred in the past, but continues to happen today.

A study completed in May 2000 by OSHA that involved more than 300 individual health care facilities, including nursing homes, clinics, acute care, tertiary care, rehabilitation and pediatric hospitals. In addition, individual healthcare workers, researches, unions, educational institutions, professional and industry associations and manufacturers of medical devices also responded.

The summary noted that the rate of underreporting was difficult to determine and that the rate may vary between facilities. Studies from some of the contributing facilities showed underreporting rates of between 39% and 59%. Reasons for underreporting were identified but lacked supporting data for the percentage of each response. Responses included the perception of employees that a low risk of infection is associated with certain types of injuries and or patients, lack of knowledge of appropriate procedures to

follow after an injury has occurred, time constraints, and the fact that some facilities require remedial training if a review of the circumstances surrounding the injury reveals improper employee procedures or work practices as a contributing factor to the injury.

NIOSH (2000) recently sent out an alert to employers, manufacturers, editors of professional journals, safety and health officials and labor unions on needlestick injuries. It recognized the extent of needlestick injuries and the problem of underreporting. It also included many recommendations for needlestick injury prevention and ways to improve safety compliance.

NIOSH (2000) highlights that health and safety issues can best be addressed within the setting of a comprehensive prevention program that considers all aspects of the work environment and that has employee involvement as well as management commitment.

It is well known that improved engineering controls can be the most effective approaches to reducing occupational hazards. This is also the case for needlestick prevention programs. In addition modification of hazardous work practices, administrative changes to address needle hazards in the environment, safety education and awareness, feedback on safety improvements and action taken on continuing problems are also recommendations of NIOSH (2000).

Eliminating the unnecessary use of needles and implementing devices with safety features is an example of an engineering control. It is important to note that many of these devices are new and there is an increasing number and variety now available. Many of these devices have only had limited use in the workplace and workers and health care facilities may find it difficult to select an appropriate device. These devices need to be assessed for their use, desirable features and supporting data of their effectiveness. To assist in the selection of a safety device, NIOSH (2000) recommends that they should be evaluated to ensure that

- the safety feature works effectively and reliably
- the device is acceptable to the health care worker, and
- the device does not adversely affect patient care.

It should be noted that there are many resources available to employers to assist them in selecting a safety device that is appropriate for their facility. These include publications, websites, professional organizations, trade groups and manufacturers.

NIOSH (2000), offers a combination of prevention strategies to employers as recommendations for reducing needlestick injuries and improving safety compliance. They also suggest that employees should be involved in all changes. Primarily employers need to offer a safe working environment, including safer needle devices and effective safety programs.

As previously noted engineering controls should be implemented or improved to reduce needlestick injuries. These include

- eliminate the use of needle devices where safe and effective alternatives are available
- implement the use of needle devices with safety features and evaluate their use to determine which are most effective and acceptable
- analyze needlestick and other sharps related injuries in your particular workplace to identify hazards and injury trends
- set priorities and prevention strategies by examining local and national information about risk factors for needlestick injuries and successful intervention efforts
- ensure that health care workers are properly trained in the safe use and disposal of needles
- modify work practices that pose a needlestick injury hazard to make them safer
- promote safety awareness in the work environment
- establish procedures for and encourage the reporting and timely follow-up of all needlestick and other sharps related injuries, and
- evaluate the effectiveness of prevention efforts and provide feedback on performances.

In addition to engineering controls, administrative changes should also be addressed. Examples of these include providing sharp boxes in accessible

positions from where a procedure involving sharps is performed and the prompt removal of filled sharps disposal boxes. NIOSH also offers recommendations for employees to follow to protect themselves and their coworkers.

Employees should be aware of the hazards posed by needlestick injuries and improve their work practices and use safety devices. The following are suggestions for employees that NIOSH (2000) submitted in their recent alert on needlesticks;

- avoid the use of needles where safe and effective alternatives are available
- help your employer select and evaluate devices with safety feature
- use devices with safety feature provided by your employer
- avoid recapping needles
- plan safe handling and disposal before beginning procedure using needles
- dispose of used needle devices promptly in appropriate sharp disposal containers
- report all needlestick and other sharp related injuries promptly to ensure that you receive appropriate follow-up care
- tell your employer about hazards from needles that you observe in your work environment, and
- participate in bloodborne pathogen training and follow recommended infection prevention practices, including hepatitis B vaccination.

Needlestick injuries continue to pose a serious problem for health care workers in the United States. Multiple strategies are available for implementation to attempt to reduce the risk and subsequent rate of needle stick incidents. Further research is needed to clarify accurate needlestick injury rates among health care workers and to determine strategies to improve reporting rates.

2.3 Reporting Occupational Exposures To Body Fluids

Other than studies on needle stick injuries in the hospital environment there are very few published studies on underreporting of occupational injuries. Ramsey and Glen (1996), completed a cross sectional study on the frequency of body fluid exposures and reporting in a Tennessee hospital. The findings indicated that only 4.1% of all exposure incidents reported by this survey were reported to the employee health department, even though mandatory reporting was a requirement of the facility. Body fluid exposure incidents accounted for the most common form of exposure (81%) and the most underreported. This report however did not provide any reasons for underreporting or suggestions to rectify the matter.

Burke and Madan (1997) studied contamination incidents among Doctors and Midwives in England to determine reasons for non-reporting and knowledge of risks. They used a six month retrospective self administered questionnaire. The study revealed that only 9% of the Doctors and 46% of the

Midwives had reported contamination incidents they had received. Reasons for not reporting included "too time consuming" and "did not consider that anything could be done". An assessment of the subjects knowledge on occupational health and safety reporting was made along with the risk of acquiring Hepatitis B or HIV infection. The study reported that all employees involved had a good understanding of the facilities occupational health and safety guidelines, however 52% of the Doctors and 36% of the midwives underestimated the risk of acquiring HIV and 77% of the Doctors and 69% of the midwives underestimated the risk of acquiring Hepatitis B, from exposures to contaminated body fluids.

The Department of Health and Human Services with the CDC (2000) recognized the risk that health workers are subjected to in terms of occupational exposures to bloodborne pathogens. They developed a paper on what health care workers need to know about exposures to blood. They highlighted the importance of reporting any exposure to the department responsible for managing exposures. Prompt reporting ensures that individuals receive postexposure treatment that may be recommended for particular types of exposures, as early as possible. They noted important factors that may determine the overall risk for occupational transmission include the number of infected individuals in the patient population, the chance of becoming infected after a single contact with an infected patient and the type and number of contacts. They recommend employers have a system in place for reporting exposures that can quickly assess the risk of infection,

inform workers of their treatment options to prevent infection, monitor for side effects of given treatments and determine if infection does occur. They also recommend that employees use safe techniques of practice such as the avoidance of recapping needles, disposing of used needles in appropriate sharp containers and using medical devices with safety features designed to prevent injuries. In addition they stated that many exposures to the eyes, nose, mouth or skin can be prevented through the use of appropriate barriers such as gloves, eye and face protectors and gowns, especially in settings where contact with blood and other bodily fluids is expected. Dorevitch and Forst (2000) supported this in their study on emergency room physicians. They stated that universal precautions and immunization are often not used by groups who are at risk for exposure.

Exposure to body fluids is a significant risk to all health care workers and one that could be easily avoided with the correct use of personal protective equipment. Further research is needed to clarify accurate exposure rates among health care workers and to determine strategies to improve reporting rates.

2.4 Reporting of Workplace Violence Incidents

Violence in the workplace is an ongoing concern for any business or industry. This is particularly the case for health care and social services as data released by the Bureau of Labor and Statistics (BLS) in 1993 demonstrated that more assaults occur in these industries than in any other. This information was collected through workers compensation claims or such statistical databases such as the National Traumatic Occupational Fatality database. Toscano and Weber (1995) found that almost two thirds of all non-fatal assaults in the United States occurred in nursing homes, hospitals and establishments that provide residential care or other types of social services. In addition OSHA 1998 also supported that health care and social services have the highest incidence of assault injuries. Although these studies highlighted the problem of workplace violence within the health care setting they did not recognize underreporting as a problem or suggest that this could be an issue.

A study completed by Lamar, Gerberich, Lohman and Zaidman (1998) looked at assaults within a one year time period in the state of Minnesota, USA. They recognized that literature is limited on non-fatal events with the primary focus on fatal outcomes. In addition they reported little research has been completed on the magnitude of non-fatal work related assaults and potential risk factors. The results of their study found that the overall rate of

physical assault for industries were 38 per 100 000 workers and 47 per 100 000 full time employees. Analysis by industry classification found that among the top 20 assault rates the highest rate per 100 000 full time employees within services was social services (340), followed by health services (202) which had the greatest number of workers assaulted and second highest rate of assault. They also determined that nursing aides, orderlies and attendants had the highest percentage of worker assaults (26%). The majority of assailants were individuals with whom the workers were in contact as part of their job. The authors recognized pertinent research is essential to identify more specific risk factors that will serve as a basis for development of the most effective modes of prevention and control. They also recommended that the industries demonstrating the highest rate of work related physical assaults, including health services require further research. There were several limitations of this study. Workers compensation records were used which do not cover all classifications of worker. Not all the files were complete and these were excluded from the study. Also if the worker intimately knew the perpetrator the assault is not classified as compensatable under Minnesota workers compensation system. It was also limited as it did not cover the issue of non-reporting and only used assault data that required the employee to take more than three days off from work. It did highlight that violence is a big issue in the health care setting that requires further investigation to determine its true prevalence.

OSHA (1998) recognized that there was likely underreporting of workplace violence which was a cause for concern. In addition it was felt that health care industry personnel have the perception that assaults are part of the job. They suggested that underreporting may reflect a lack of institutional reporting policies, employee's beliefs that reporting will not benefit them or employee fears that employers may deem assaults the result of employee negligence or poor job performance.

The International Council of Nurses (ICN) estimates that only 20% of workplace violence incidents are officially reported (Lybecker, 1998). In addition to the reasons suggested by OSHA, the ICN believes other contributing factors include, employer pressure to not report, threat of reprisals, the belief that reports will not be taken seriously and that the effort isn't worthwhile. Lybecker (1998) found in her literature review other reasons, however did not provide any statistical support or analysis of these findings. For example; a study from Canada listed, a lack of employer policy and procedure and the devaluation of nurses and their work by employers, the public and the nurses themselves. Another study Lybecker (1998) used to support her case found Australian nurses reported prior experience with the employer (blaming the nurse, lack of support, and denial of the problem) reduced their confidence and that they feared for their jobs as a result of reporting workplace violence. Lybecker concluded that in general nurses and organizations say that management is the least supportive of nurses who have experienced violence. Employer responses frequently include blaming the

nurse, minimizing the event, invalidation and ridicule and reprisals, particularly when the perpetrator is a physician. This article would have been of more value had it provided statistical evidence of the problem of workplace violence and the reason it goes unreported. It did highlight that there is reason to believe that a problem exists and further research into this is required.

In 1998 OSHA provided guidelines for violence prevention programs in the health care setting, which are advisory in nature rather than regulatory. They highlight that as with any effective health and safety program there must be management commitment and employee involvement, worksite analysis, hazard prevention and control and health and safety training. The expectation of management is to

- demonstrate organizational concern for employee emotional and physical health and safety
- ensure equal commitment to worker health and safety and patient safety
- assign responsibility for the various aspects of workplace prevention programs to ensure that all managers, supervisors and employees understand their obligation
- allocate authority and resources to all responsible parties appropriately
- provide a system of accountability for involved managers, supervisors and employees
- provide a comprehensive program of medical and psychological counseling and debriefing for employee experiencing or witnessing assaults and other violent incidents, and

- demonstrate a commitment to support and implement appropriate recommendations from health and safety committees.

Employees also need to be involved as it provides feedback on design, implementation and evaluation of programs. It also allows employees to express their own commitment to health and safety. Employees need to

- understand and comply with the workplace violence prevention program and other safety and security measures
- participate in employee complaint or suggestion procedures covering safety and security concerns
- promptly and accurately report any violent incidents
- participate on health and safety committees, make facility inspections and respond with recommendations for corrective strategies, and
- take part in a continuing education program that covers techniques to recognize escalating agitation, assaultive behavior or criminal intent, and discuss appropriate responses.

OSHA also strongly recommends that a zero-tolerance policy should be implemented throughout any workplace dealing with workplace violence.

A survey completed by Nursing Times in the United Kingdom on workplace violence found a large discrepancy between what is statistically reported and what they found in their study (ICN, 1999). The survey collected information on types of abuse experienced by UK nurses in the previous twelve months. 97% of the respondents knew a colleague who had

been subjected to a violent attack, 45% had been attacked by punching or tapping and 85% had been verbally abused. Furthermore it was found that 75% of these nurses felt vulnerable at work as compared to a third who felt at risk of assault off duty. Four out of five nurses felt that nursing was more dangerous currently than at the start of their careers. This study did not determine who was abusing the nurses, or if any of the incidents were reported. The survey did ask the nurses what they believed would solve the problem and responses included increased penalties against those found guilty of assaulting healthcare workers and a zero tolerance policy within health care institutes. In addition the authors suggested improvements on policies and guidelines on workplace violence and finding practical models for prevention (ICN, 1999).

Nurse Advocate (2000) noted that many government reports on workplace violence typically measure only "serious" physical violence resulting in injuries and/or time off work and therefore underestimates the incidence of violent events experienced by nurses. They also believe that nurses tend to minimize and ignore violence and in addition do not report violence. Nurse Advocate did not have any statistics to support this argument but cited that nurses who responded to their website reported a lack of support from employers and fear of retaliation as reasons for not reporting such occurrences. Further research into these matters is sorely needed to provide statistical evidence of the problem and determine methods for reducing this problem.

The studies and articles found on workplace violence in the health care arena all gave reasons why workplace violence occurs and gave suggestions on how to reduce and/or prevent the problem. None, however, had supportive data on the effectiveness of such programs. A study by Runyan, Zakocs and Zwerling (2000) on administrative and behavioral interventions for workplace violence prevention found that of one hundred and thirty seven papers that they reviewed, forty one of these suggested intervention strategies but provided no empirical data. Only nine of them reported results of intervention evaluations. All the intervention studies were based in the health care industry, but only addressed violent encounters between workers and patients. They felt that overall the research designs used were weak and the results inconclusive.

Many gaps have been noted in the literature of workplace violence including the actual prevalence of the problem within the health care setting. Strategies are required to improve reporting of workplace violence. It can also be concluded that there is a significant gap in assessing administrative and behavioral measures to address workplace violence and that intervention research into the problem is required.

2.5 Reporting of Latex Hypersensitivity

A relative new comer to the occupational health and safety arena of health professionals is latex hypersensitivity. A study by Grzybowski et al (1996) reported prevalence of latex allergy among non-volunteer populations of health care workers ranging from 2% to 25%. They completed a latex allergy prevalence study of Registered Nurses in a large Metropolitan hospital. Latex exposure data was obtained through self-administered questionnaires and subject serum samples. They had a participation rate of 90.6% among eligible nurses. Prevalence of anti-latex IgE antibodies was 8.9%. They determined no difference in latex positivity among 5 nursing specialties. They recognized their limitation of not collecting long-term employment histories. This could have captured if latex sensitive employees had transferred out of areas such as operating rooms that are exposed to greater amounts of latex. They decreased volunteer bias by enrolling a defined group of health care workers, however had the problem of recall bias. They were unable to determine if atopic diseases reported on the questionnaires had been reported in the participant's medical records, and they identified this as a study limitation also.

NIOSH (1997) stated that surveys they reviewed showed that 10% of all health care workers are sensitized to latex. The Food and Drug Administration (FDA) received reports of 1000 systemic allergic reactions to latex, 15 of which were fatal between 1988 and 1992 (NIOSH, 1997). In

1997, NIOSH issued a press release concerning work related latex allergies with recommended steps to reduce exposures. They recommended the selection of products and implementation of work practices that reduce the risk of allergic reactions. They also suggested employee education about latex allergies and improving monitoring of allergy symptoms. They also admitted that further study was required into developing technologies for manufacturing latex products and to improve methods for measuring exposures. They felt that these areas would lead to changes for future recommendations.

Bolyard et al (1998) recognized that since the introduction of universal precautions the use of latex gloves has become commonplace in health care settings. This increased use of latex gloves has been accompanied by an increase in reports of allergic reactions to natural rubber latex among health care employees. In comparison to the NIOSH (1997) study, Bolyard et al (1998) found the prevalence of this problem ranged considerably with rates as low as 2.9% and as high as 17%. They determined that certain studies they looked at were biased as they only used subjects who had symptoms rather than randomly testing personnel. They also believe that it is only a minority of health care personnel who actually seek evaluation or treatment for latex allergic conditions even if they have symptoms. Due to this underreporting they feel that the true prevalence of this condition is unknown.

The primary prevention strategy for latex allergies recommended by Bolyard et al (1998) is to avoid latex products to prevent sensitization and reactions. To reduce the risk of reactions to latex they suggest using nonlatex products such as vinyl, either alone or in combination with latex products, using powder free latex gloves or powdered latex gloves that have been washed to remove the powder or "low-protein" latex gloves. Bolyard et al (1998) do highlight that these recommendations have not been prospectively studied in controlled clinical trials to assess cost-effectiveness or efficacy in preventing sensitization or reactions. They also highlight that latex products can be aerosolized when powdered gloves are donned or removed and systemic symptoms caused by latex aeroallergens may not be alleviated by simply avoiding latex products. They too conclude that more study is required on latex allergies to determine the actual prevalence of the problem and to determine low cost efficient methods of prevention.

Page et al (2000) notes that exposure to natural rubber latex may cause immediate hypersensitivity reactions. They reported latex sensitization prevalence rates ranging from 2.9% to 22% among health care workers as compared to 0.12% to 20% in occupationally unexposed populations. Their study involved a self-administered questionnaire for two groups of staff members, at a Denver Hospital: those who regularly used latex gloves and those who did not. In addition they completed serum testing on subjects and took air, surface and air filter samples from work areas. The prevalence of latex sensitization was 6.3% in the non-users and 6.1% in the latex glove

users. Reporting of work-related hand dermatitis was more common in the latex glove users (23.4%) than in the non-users (4.9%). They determined that occupational latex glove use was not a risk factor for sensitization. The studies limitation was that it was a cross sectional study and didn't capture possible sensitized workers who were symptomatic and had left the workplace. In addition they felt that as latex allergy is a high profile issue among health care workers symptom reporting of subjects might have been subject to an awareness bias.

Dorevitch and Forst (2000) also note that latex allergy is a hazard of health care workers. They recognized that its prevalence is reported to be quite high, but feel these findings are difficult to interpret in the absence of a universally accepted definition of the condition. Standards also need to be set in the measurement of the condition, as some reports compared serum sampling results against skin testing results.

2.6 Reporting of Work Related Physical Injuries

A review by the Bureau of Labor Statistics (1983) on compensable injury and disease showed that sprains and strains and cuts, lacerations and punctures account for a significant number of hospital workers compensation claims. There were no other studies identified on the prevalence of cuts, lacerations and punctures other than this report. Potentially many cuts, lacerations and punctures may go unreported. These injuries have the potential

for contamination with blood and other body fluids. Each needs to carefully monitored and recorded. It is recommended that employers should provide medical consultation for workers who sustain puncture wounds involving potentially infectious materials (NIOSH, 1988).

Lloyd and Torling (1987) found the most common causes of all work-related back strain identified in their study included (1) job performance by a worker who is unfit or unaccustomed to the task, (2) postural stress, and (3) work that approaches the limit of a workers strength. Factors that contribute to these causes are understaffing, the lack of regular training programs in proper procedures for lifting and other work motions and inadequate safety precautions. Studies such as Bernacki et al (1999) only studied reported strains that had resulted in compensatable injuries. They did not identify non reporting as a potential limitation to their study. Simpson and Severson (2000), however included all injury data regardless of lost time.

Simpson and Severson (2000) looked at the risk of injury in African American health care workers, who are highly represented in health care occupations. They recognized that health care workers are at a high risk for injury and that nursing aides, orderlies and attendants have nearly three times the risk of work related back pain compared with female workers in general. The study examined the risk for work-related injury in African American hospital workers. Hospital Occupational Health Service medical records and a hospital human resource database were used to compare risk of injury between

African American and white workers after adjusting for gender, age, physical demand of the job, and total hours worked. Risk of work-related injury was found to be 2.3 times higher in the African American population. This difference was not explained by the other independent variables, although a trend was noted for increased risk with advancing age and a greater number of hours worked, for both populations. They recognized their study was limited in that there was potential reporting bias. They recognized additional research is needed to investigate possible differences in injury reporting behavior. Their results may have been affected if African Americans were more likely to report injuries and visit occupational health services than their white counterparts. Race may be a surrogate measure for psychosocial factors relevant to work related injuries. They summarized that differences in injury reporting, intra-job workload, psychosocial factors, and organizational factors are all potential explanations for racial disparity in occupational injury, and recognized that more research is needed to clarify their findings.

Udasin (2000) recognized that physical hazards especially ergonomic ones account for the majority of the disability faced by health care workers. They reported that nursing and personal care facilities had an incident rate of 318 injuries per 10 000 workers in the United States in the year 1994.

There have been many recommendations for ergonomic controls within health care settings by government agencies such as OSHA (2001), including better reporting systems. The primary approach to preventing strains involves

reducing manual lifting and other load handling tasks that are biomechanically stressful. Secondary approach relies on teaching workers how to perform stressful tasks while minimizing the biomechanical forces on their backs and to maintain flexibility and strengthen the back and abdominal muscles.

The true incidence of work place injuries is difficult to assess and requires further study and evaluation. New methods for capturing injury data is required to determine the true prevalence of this issue.

2.7 Reporting of Occupational Chemical Exposures

Berhrens and Brackbill (1993), conducted a study that found hospital employees had a 62% difference between observed and perceived exposure to chemicals. Worker safety in histology and pathology laboratories was highlighted in an article by Roy (1999). She found that hospital employees have the potential for exposure to a variety of hazards, yet employees often do not perceive exposure to chemicals as hazardous. Roy (1999) also found that although most laboratory personnel have concerns about chemical odors, they often will not wear respirator protection, such as when handling samples preserved in formalin even when proper personal protective equipment is provided.

In addition to perception problems on recognized health hazards, Williams (1999) noted that the attitudes and beliefs of health care workers

have long supported the misconception that hospital health hazards escape health care workers. She found that on many occasions health care workers have expressed the belief that they develop immunity to pathogens in the workplace due to exposures. In addition to this belief is the practice of health care workers to diagnose and treat themselves and coworkers in the workplace.

A study conducted by Kanmura, Sakai, Yoshinaka and Shirao (1999) determined incidences of contamination and the factors that may increase concentrations of ambient anesthetic gases in operating rooms. Nitrous oxide (N_2O) has been associated with hepatic, renal, immunologic, neurologic, psychiatric and hematologic abnormalities. Concentrations of N_2O were monitored in ten operating rooms in one health care facility, over a three month period. Air was sampled every 22 minutes and when abnormally high levels were determined the source was sought.

This produced a sample of 402 cases with 104 recording abnormally high concentrations (25.9%). The causes were found to be mask ventilation (40.4%), unconnected scavenging systems (19.2%), leaks around uncuffed pediatric endotracheal tube (12.5%), equipment leakage (11.5%) and other (16.4%). It was concluded that N_2O contamination was common during routine circumstances in the operating room. Unconnected scavenger systems lead to the highest concentrations of N_2O recorded.

The study discussed staff knowledge. They noted that all staff were aware of constant monitoring for ambient gases and the alarm systems that were in place. They did determine that in 20 cases anesthesiology did not use the scavenging system properly. They were concerned with staff knowledge of the risk factors of being exposed to N₂O and realize this was an area requiring further study and evaluation. Although they did not compare the cases of reported contamination against the results of their study, they recognized that many contamination occurrences go unreported. In addition to this study a NIOSH report noted that approximately 400 000 dental personnel are exposed to N₂O and more than 50 000 operating personnel are exposed to waste anesthetic gases (Udasin, 2000).

Dorevitch and Forst (2000) studied occupational hazards of emergency physicians. One area observed was the use of nitrous oxide. It was determined that 25% of emergency medicine residences used N₂O for patient analgesia and sedation. A scavenger unit is recommended to be used when administering N₂O but in this study it was found that this did not always occur. It also suggested that most physicians did not perceive exposure to N₂O as a risk to their health.

These studies all recognized that exposure to chemicals in the workplace occurs and is a serious problem. Perception of risk, failure to use personnel protective equipment, lack of knowledge on correct use of equipment and poor reporting habits are all identified reasons for why this problem exists.

For any health and safety program to be effective these issues must be fully understood by those responsible for training health care employees.

2.8 Conclusion

A discussion by Lipscomb and Rosenstock (1997) on the protection of health care workers in health care environments recognized that studies on compliance with safety work practices among health care workers had identified several psycho social and organizational factors that are important correlates of these practices. These included risk taking personality profiles, perceived poor safety climate at the workplace and perceived conflict of interest between providing optimal patient care, and protecting oneself from exposure. They recognized as did many of the other studies that additional research is sorely needed to elucidate the relationship between work organization factors and workplace injury and illness. They also advocated for further studies on safety compliance, including underreporting, to determine the extent of the problem.

The following pages describe the research methodology used to identify and evaluate current practices of nurses in response to occupational injuries and exposures.

3.0 METHODOLOGY

3.1 Sample and Setting

The participants were a random sample of Registered Nurses (RN's) employed in four departments of a California Health Care Center. Random sampling was used as it enables each member of a population to have an equal probability of being included in the study (Polit and Hungler, 1995). The departments used in the study were selected randomly through manual selection of pieces of paper with department names on them out of a container. The management of the health care facility dictated that only four out of the possible seven nursing departments be used for the study to minimise work interruptions and ensure that the nursing staff did not feel as if management were focusing on safety habits. The departments selected included two medical surgical floors, the coronary observation unit, and the emergency department. This provided a total population of 84 RN's who could participate in the study. From this a sample of 72 RN's were used in this study (n=72).

3.2 Research Design

This study was conducted as a quantitative study using a survey technique with data collected by a self-reporting questionnaire (see appendix

B). A survey was used as they are designed to obtain information regarding the prevalence, distribution and interrelationships of variables within a population (Polit and Hungler, 1997). In addition other studies as noted in the literature review such as Harmony (1983), Burke and Maden (1997) and Grzybowski et al (1996) also used survey methods. Quantitative designs employ a formal objective and a systematic process of using numerical data to gain information about a subject, issue or theme. They are used to test relationships and examine cause and effect relationships (Mussett and Nedved, 1999). It is recognized that there are other research designs in addition to surveys, including historical, experimental, descriptive, field studies and case studies (Mussett and Nedved, 1999). Surveys obtain information from a sample of people by means of self-reporting, in other words participants respond to a series of questions posed by the investigator. They enable the collection of information on people's actions, knowledge, intentions, opinions, attitudes and values (Polit and Hungler, 1997).

There are two forms of survey, descriptive and explanatory. Descriptive surveys aim to estimate as precisely as possible the nature of existing conditions or attributes of a population while explanatory surveys seek to establish cause and effect relationships but without experimental manipulation (Burns, 1994). Both descriptive and explanatory studies can be carried out in the same enquiry, as is the case for the survey used in this study. The aim of this survey was to determine the existing reporting habits by nurses of

occupational accidents, injuries and exposures to establish if any cause and effect relationships exist.

It is important to note that descriptive studies must ensure that they use a representative sample of the population otherwise the statistics will not be accurate (Burns, 1994). The population for this study was Registered Nurses of a Californian community health care facility and a representative sample was randomly selected.

Burns (1994) notes that control is crucial for explanatory surveys. Research control attempts to eliminate any contaminating factors that might otherwise obscure the relationship between the variables that are of interest (Polit and Hungler, 1997). In this case the questionnaire was designed to reveal opinions and beliefs of the nurse in regards to occupational health and safety and work practices. Leading questions were avoided to reduce potential bias. For the purpose of analysis, a range of replies based on previous research was provided for the respondents to choose, with an area to provide extra information that may prove useful to the investigation. The use of check boxes and avoiding lengthy questions was used to encourage participation and avoid inaccurate answers.

Surveys have 5 characteristics:

- They require a sample of respondents to reply to a number of standard questions under comparable conditions.

- The respondents represent a defined population
- The results of the sample survey can be generalized to the defined population
- They can be administered by a face-to-face interview, interviews by the telephone or self administered questionnaires distributed through the mail
- The use of standard questions enables comparisons of individuals to be made.

The aim of a survey is to select an approach that will generate reliable and valid data from a high proportion of the sample within a reasonable time period at a minimum cost (Burns, 1994). Prior review of techniques used to administer surveys demonstrates that interview-administered surveys are more accurate and obtain more returns than self-completion surveys (Burns, 1994). In consideration of the nature of the topic however, it was felt that a self-reporting questionnaire would aid the participants in feeling more comfortable with providing accurate answers to the questions.

Burns (1994) highlights the strengths of surveys. He notes that they are often the only way to obtain information about a subjects past life. This study sought to determine the reporting habits of RN's from a previous 12-month period. Surveys are also one of the few techniques available to provide information on beliefs, motives and attitudes. They can be used on all normal human populations except young children, are an effective way of collecting

data in large amounts at low cost in a short period of time and structured surveys can be used for statistical analysis (Burns, 1994).

There are advantages and disadvantages to using a survey in research. On a positive note they elicit information from a respondent that covers a long period of time in a few minutes. In addition with comparable information on a number of respondents, they can go beyond description to looking for patterns in data. However a flaw to this is that attempts to produce comparable information by standard questions can lead to the obscuring of subtle differences. Also simplifying an act or behavior is the price paid to find patterns and regularities in behavior by standard measures (Burns, 1994). To remove ambiguity, test adequacy of response categories and test the method of administration the questionnaire used was tried out in a pilot study. Results of the pilot study will be discussed in Section 3.5.

3.3 Validity and Reliability

The reliability of a quantitative measure, explained by Polit and Hungler (1995) is a major criterion for assessing its quality. They define reliability as “the degree of consistency or dependability with which an instrument measures the attribute it is designed to measure (Polit and Hungler, 1995, p.467). An instrument is more reliable if there are less variations in the results produced from repeated measurements of the same attribute.

For the purpose of this study all data was collected by one researcher using the same format for questionnaire distribution, collection and analysis. This provided reliability to the study as the same protocol was used to collect data from each subject. In addition a pilot study was performed to test the reliability and validity of the research tool.

To further ensure the reliability of the research tool a method known as test-retest was performed. When this method is used a coefficient of stability is obtained (Burns, 1994). There is no standard duration of time that should separate the two administrations. It is suggested by Burns (1994) that a minimum of one day and a maximum of one year are considered acceptable for test-retest reliability estimates. The rationale of the test-retest method implies that the same level of cognitive, intellectual, motivational and personality variables remain the same and that any changes are caused by the instability of the test itself (Burn, 1994).

For the purpose of this study a two-day window between tests was used. This was used to promote accuracy in the event that an additional occupational injury, accident or exposure occurred within the intervening time period, which would have altered the results. A disadvantage of doing the tests this close is that subjects may have remembered the answers they gave on the first occasion, so increasing the consistency of the answers. The correlation between the scores from the two occasions of testing was 0.87. This means that the questionnaire had a reliability of 87%. Polit and Hungler

(1995) report that the higher the value the more reliable the measuring instrument is. Reliability coefficients above 0.70 are considered satisfactory, but coefficients in the 0.85 to 0.95 range are preferable (Polit and Hungler, 1995).

The second important factor by which quality of a quantitative instrument is evaluated is validity. Validity is defined by Polit and Hungler (1995, p. 471) as "the degree to which an instrument measures what it is intended to measure". They add that an instrument cannot validly measure the attribute of interest if it is erratic, inconsistent or inaccurate. An instrument may be reliable but this alone will not support its' validity. Validity has a number of different aspects including face, content, construct, concurrent and predictive validity (Burns, 1994).

Face validity is the extent to which a measuring tool looks as though it is measuring what it is supposed to measure (Polit and Hungler, 1995). This study obtained face validity by measuring data suggested by other researchers in the literature review. Respondents in the pilot study also provided useful suggestions that were implemented to ensure that all reasons for non-reporting were covered by the questionnaire.

Content validity, according to Polit and Hungler (1995) is concerned with the sampling adequacy of the content area being measured. Strong content validity is obtained if the instrument or test used demonstrates the

knowledge of the subject on the area of interest. To ensure this management was questioned on policies and procedures within the health care facility pertaining to occupational health and safety. In addition policy and procedure manuals were read to verify collected information. For further accuracy all forms used to report occupational injuries, accidents or exposures were reviewed as were all current safety systems implemented within the facility.

3.4 Ethical Considerations

This study utilized a questionnaire to obtain data from the subjects. The questionnaire form did not include the name of the subject or any other identifying code that could link the subject to the questionnaire. The completed questionnaires, results and any other relevant records have been kept confidential and were only available to the principle researcher and those assisting with the analysis of the results.

All respondents were provided with an "Informed Consent" that was distributed with the questionnaire. This consent clearly noted that participation was strictly voluntary, non-prejudicial and confidential. It outlined the objectives and the proposed benefits of the study, data collection process and an estimated time of completion after which participants would be able to read a copy of the research.

3.5 Pilot Study

A pilot study was completed on 12 subjects to test the questionnaire's effectiveness to obtain the data needed to complete the research. All participants were informed they were part of a pilot study. These subjects were all Registered Nurses employed at the same facility in which the research took place.

The questionnaire was designed to be easy for all participants to complete requiring a simple check in the relevant response box or boxes with particular questions providing space to input the participant's own response. Minor alterations were needed in the wording of one question to account for multiple responses. It was determined that the questions used adequately answered the research questions.

The questionnaire was given to the participants to repeat two days later to ensure reliability. Similar responses were obtained and as earlier indicated in section 3.3 the correlation between the two scores was 0.87. Recall of a 12-month period is believed to have caused minor differences in the injuries or exposures that were checked; however, this discrepancy did not change the results in any significant way.

The results of the pilot study found that 86% of the subjects who did experience an occupational injury or exposure in the past 12 months did not

report it. The most common injury not to be reported was a needle stick injury with a clean needle. Reasons given for failing to report injuries included, "did not think it was worth reporting" (42 %) and "too time consuming" (25 %). All respondents had received safety training within the past 12 months and 92% believed the training was adequate, however 25% were unfamiliar with how to report an occupational injury or exposure. It was found that only 16% of the participants were not using protective equipment or safety devices when the injury/exposure occurred.

3.6 Data Collection

Data was collected by means of a voluntary, anonymous questionnaire that all Registered Nurses who attended work within the designated departments of the Health Care Center, over a one-week period, were invited to complete. This included both day and nightshift personnel. Drop boxes were placed on each department for the completed responses, and were collected by the researcher at the end of the designated week. The drop boxes were locked to prevent tampering of data and to allow for strict confidentiality. A total of 72 questionnaires were returned producing an 86% response rate.

3.7 Data Analysis

Through the process of statistical analysis information was extracted, trends identified and conclusions drawn. A combination of both descriptive and inferential statistics were used. The descriptive statistics determined the frequency or percentage of nurses who fell into the level of each category variable, as well as the frequency or percentage of nurses who fell into the cells of one variable that was cross-tabulated with another. Inferential statistics were also used as they allowed generalizations to be made about the nurses of the health care facility based on the information obtained from the sample taken from that population. The Chi-square test was used at a level of significance $p = 0.01$, as it can determine the statistical significance of a relationship between two variables that are cross tabulated (Burns, 1994). This level of significance was used as it can determine if the results support a definite relationship other than by chance. Its limitation is that it cannot be performed when cross tabulation involves multiple responses. Chi-square, according to Blackmore (1994) also needs a minimum of five responses in each category to be implemented correctly; however, this was found not to be a problem with the data gathered.

4.0 RESEARCH RESULTS

A total of 72 questionnaires were used in the final analysis. For greater impact and clarity, results are presented in table, graphical or chart format. Areas considered significant were tested using the chi-square test to determine if the results supported a definite relationship other than by chance at a level of significance $p = 0.01$. The following formulae are used:

Degrees of Freedom = $(r-1)(c-1)$ [where 'r' is the number of rows and 'c' is the number of columns.]

Chi-square, $\chi^2 = \frac{(o-e)^2}{e}$ [where 'o' is the observed frequency and 'e' is the expected frequency.]

Employment and experience history was determined and as depicted it was found that 96% of the respondents had been RN's greater than 4 years. 7 subjects had been RN's for 4-5 years while 62 had been RN's for more than 5 years. This accounts for why there are no columns in the 1-2 and 2-3 year categories. It was also found that 62% had been employed at the health care facility for more than 4 years, with 35 of the subjects being employed for more than 5 years.

Employment & Experience History

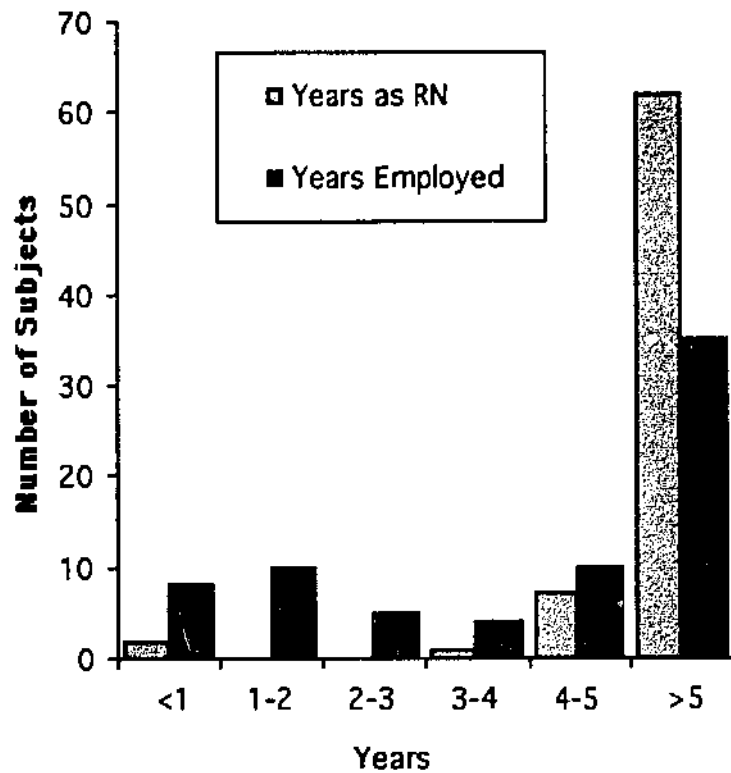


Figure 1. Experience and Employment History of Subjects

Respondents were asked if they had received safety training in the past 12 months and 17% answered no. According to hospital standards, safety training is completed every 12 months and is a mandatory requirement. Subjects were then asked if they thought the safety training provided by the health care center was adequate. Seventy eight percent thought that it was.

When questioned on exposures that respondents had experienced in the past 12 months, 36% of the subjects reported none. The type of exposure experienced by the remaining 64% is shown in Figure 2.

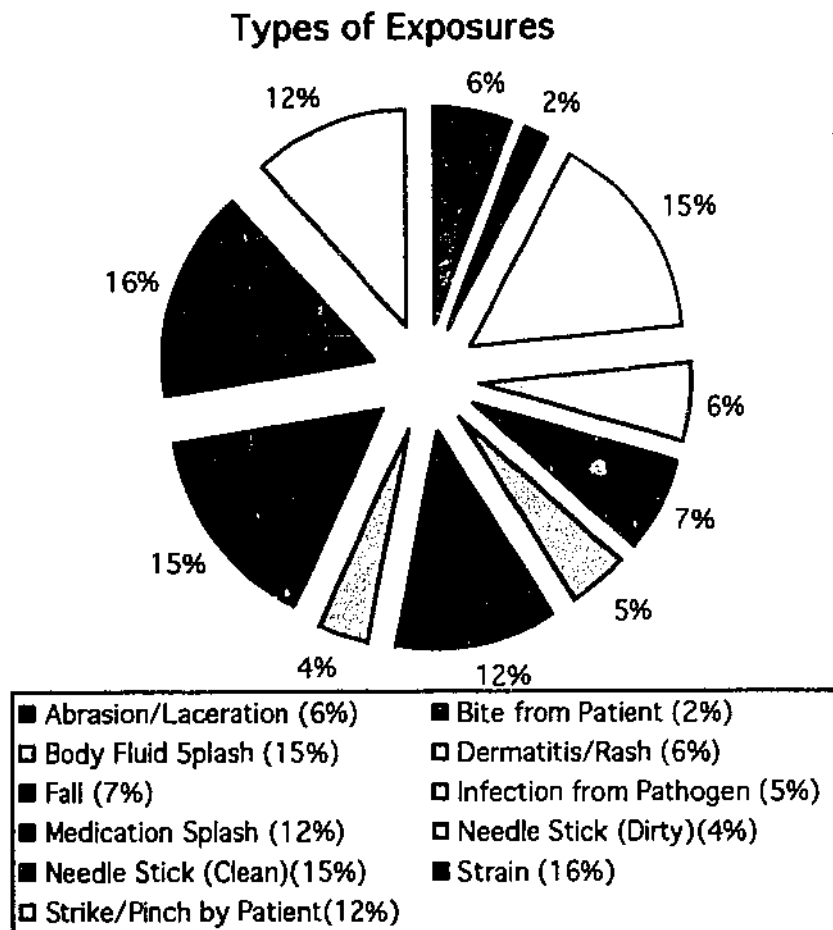


Figure 2. Types of Exposures Reported by Subjects

Body fluid splashes and needle stick injuries with a clean needle accounted for the largest percentage of exposures. Subjects were asked if they had reported all of these exposures to employee health but it was found that only 15% of the total number of exposures were ever reported. Chi-square

test was performed to test the hypothesis that receiving safety training was an influencing variable in a staff member receiving an injury, accident or an exposure to hazards.

Exposure vs. Training

	Exposed	Not Exposed	Total
Received Training	31	28	59
No Training	8	5	13
Total	39	32	72

Table 1: Cases of Exposure Among RN's Compared to Receiving Safety Training

From the above results the following was determined:

Safety Training: $\chi^2 = 0.79, df = 1, p = 0.01$

It was found that there was no significant association between safety training and exposure to occupational injuries and hazards. A comparison of exposure to years of service at the health care facility was then done.

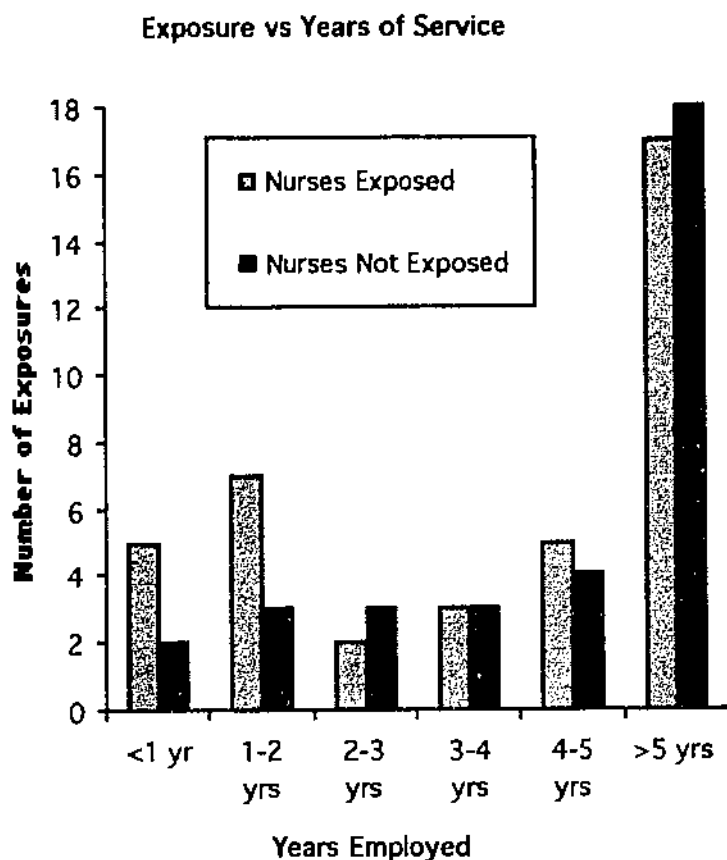


Figure 3: Years of Employment vs. Exposures

As can be seen in Figure 3, 61% of the RN's questioned had worked for the health care center greater than 4 years. In this group an even number reported exposures as compared to those who did not experience exposures. For RN's who had worked less than 4 years, 63% had experienced an exposure within the past 12 months. To test if this was significant a Chi square test was performed, grouping subjects into employment less than 4 years and employment greater than 4 years, as seen in Table 2.

Exposure vs. Employment

	Exposed	Not Exposed	Total
Employed >4yrs	22	22	44
Employed <4yrs	17	11	28
Total	39	33	72

Table 2: Cases of Exposure Among RN's Compared to Years Employed

From the above results the following was determined:

Years Employed: $\chi^2 = 0.84, df = 1, p = 0.01$

Findings demonstrate that the number of years an RN had been employed had no significant association with the number of exposures to occupational injuries, accidents and hazards.

The following, Figure 4 demonstrates the reporting trends of injuries, accidents and exposures to hazards experienced by the subjects. The employees involved in this study reported one hundred and two injuries or exposures. Of these injuries and exposures, 87 were not reported. Based on these numbers it can be presumed that only 15% of all injuries are being reported in the facility.

It was found that strikes or pinches from patients, needle stick injury with a clean needle, body fluid splashes and abrasions and lacerations were never reported. Injuries most likely to be reported included strains, needle stick injuries with a dirty needle, medication splash, falls, dermatitis or rash and bites from patients.

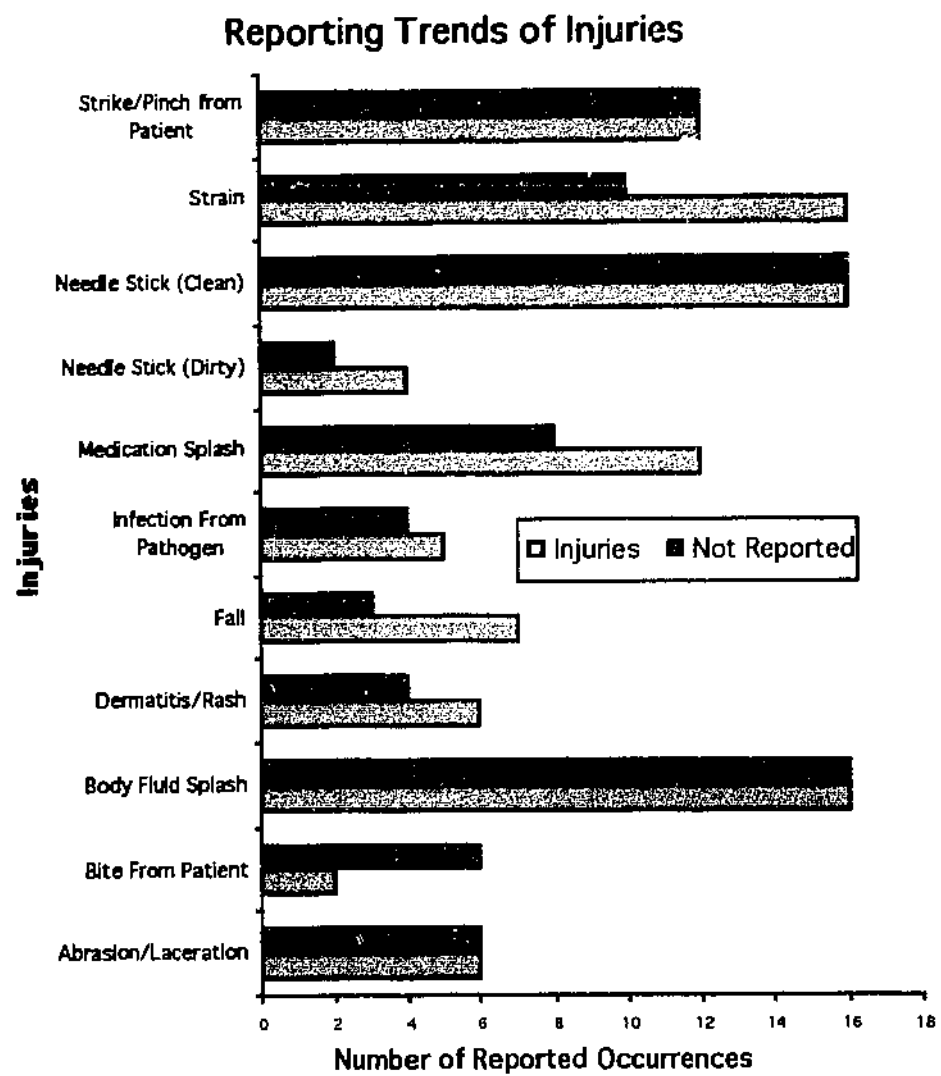


Figure 4. Reporting Trend of Injuries

Subjects were asked reasons for not reporting exposures and were given a selection of choices including a section to document other reasons. Results are depicted in Figure 5. 32% documented that they "did not think the exposure/injury was worth reporting" and 26% believed that reporting was "too time consuming". Other responses included "not enough staff to leave floor", "no injury to person noted from exposure", "afraid to report, but not because of disciplinary action", "overall time to complete forms and then wait to be seen in ER is too time consuming" and "knew it was related to powdered gloves so obtained powderless gloves". It was interesting to note in this case that powderless gloves are provided by management and require documented evidence of a skin reaction to powdered gloves per the policies and procedures manual on safety for the health care facility.

Reasons For Not Reporting Exposures

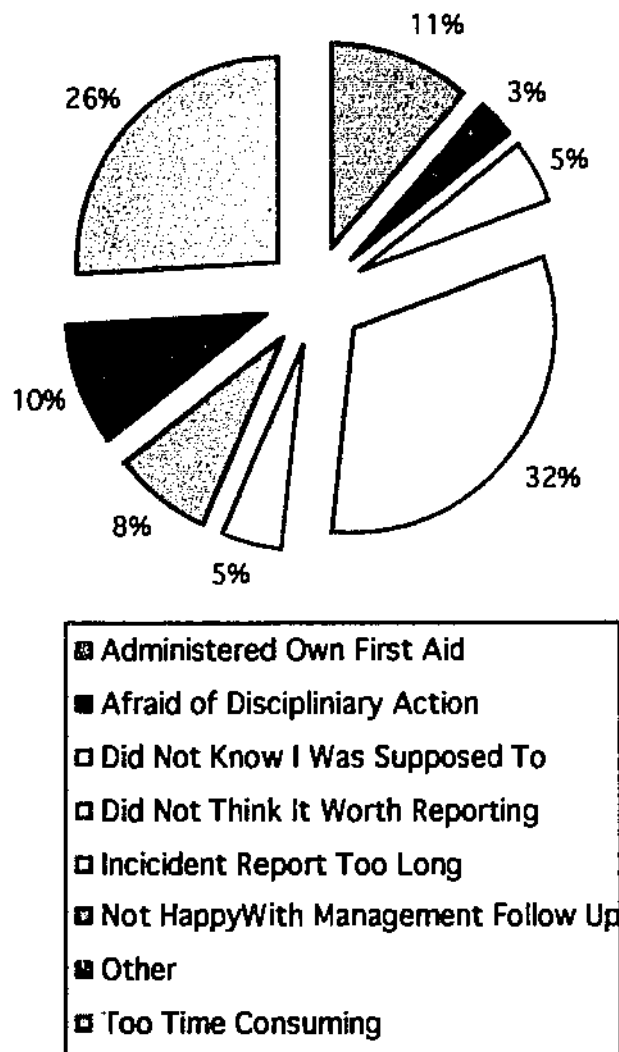


Figure 5. Subjects Reasons for not Reporting Occupational Health and Safety Injuries, Accidents and Exposures to Hazards

The use of personal protective equipment (PPE) during exposures was queried. 83% of those who received an exposure reported they had been using PPE at the time of the occurrence. Of the 17% who did not, 2 respondents documented their reasons for not using PPE. One reported that

there was no available needle less system at the time of the exposure and the second documented that it wasn't applicable in their situation as a patient fell on them, knocking them down. On questioning management it was found that a needle less system had been used in the health care facility since 1996 and there had never been an occasion where supplies of needle less equipment had been depleted. It was also found that as part of the annual safety training personnel are to ask for help when moving or walking patients and not perform these tasks by themselves to prevent patients from falling and injuring staff.

All respondents were asked what method of reporting occupational injuries or exposures to hazards was used within the health care facility and the results are shown in Figure 6.

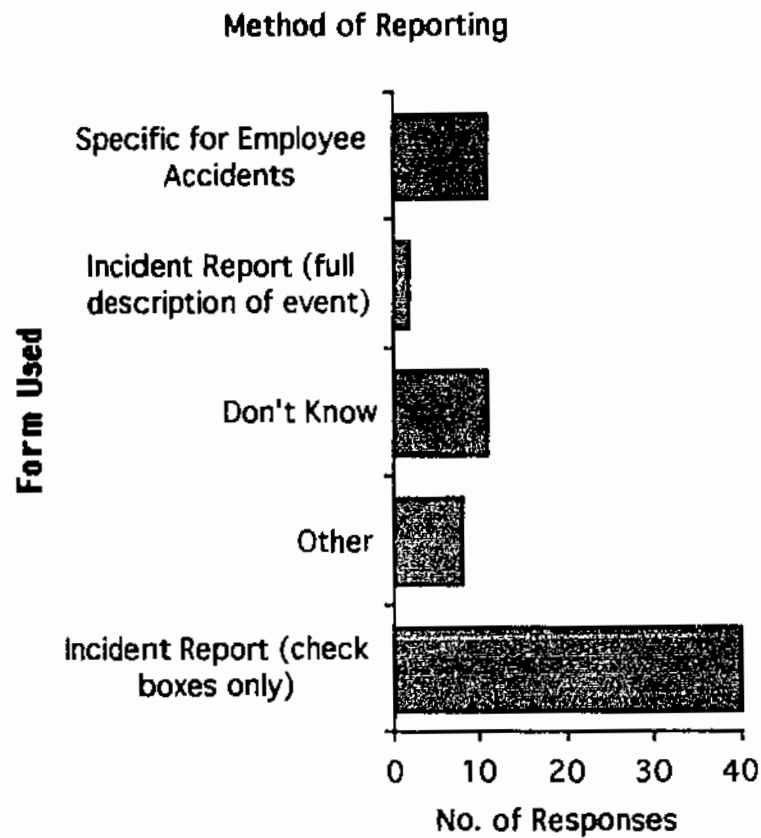


Figure 6. Methods of Reporting Used At The Health Care Facility

The health care facility uses an incident report that asks for a full description of the occurrence. As can be seen 44% of employees were unaware of this and admitted to this or chose other methods. Employees were then asked what method of reporting occupational injuries or exposures to hazards would they find easiest and convenient to complete and these results are depicted in Figure 7.

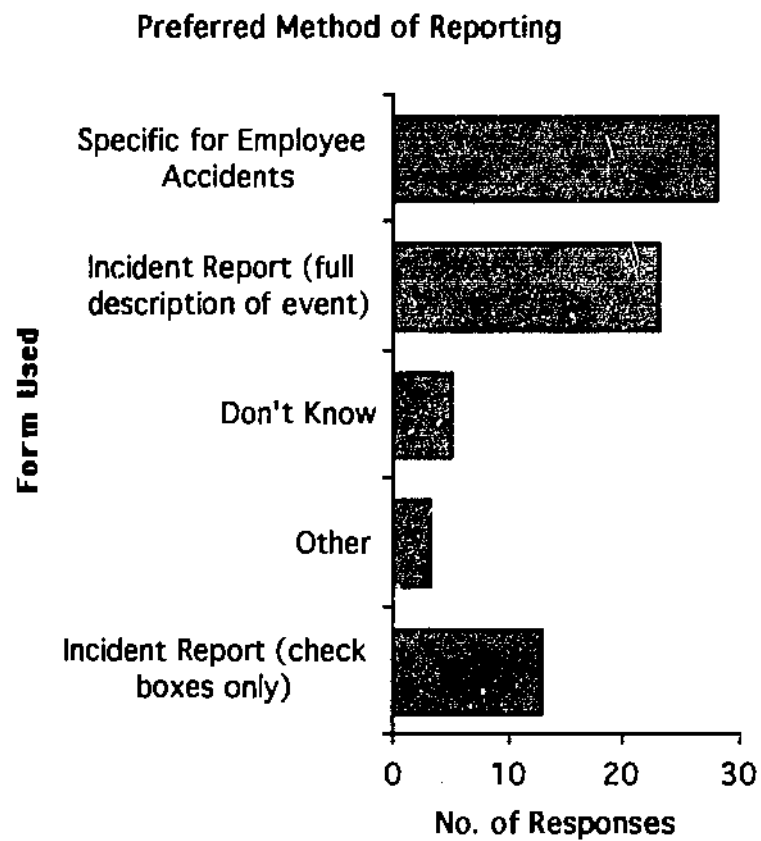


Figure 7. Employee's Preferred Method of Reporting Occupational Injuries, Accidents and Exposures to Hazards

No one method was preferred by a majority, although the most popular request at 39% was for a form that was specific for employee accidents. In the other category responses included one request for verbal reporting and two requests for a combination of check boxes and full description.

5.0 DISCUSSION

The study set out to determine the factors that influence nurses to report occupational injuries, accidents and exposures and provide personal experiences and opinions of nurses in regards to noncompliance of reporting these occurrences. The study found that the majority of occupational injuries, accidents and exposures by RNs within the health care facility went unreported in the past twelve months.

5.1 Interpretation of Findings

It was found during the study that nurses generally did not report strike's or pinches from patients, needle stick injuries with a clean needle, body fluid splashes and abrasions or lacerations. Similar results were seen in selected studies in the literature review. From the needlestick study conducted by Harmony (1983), 75% of needlestick injuries had not been reported. Ramsey and Glen (1996) noted that only 4.1% of all exposures to body fluids had been reported in their study, while Lybecker (1998) found that only 20% of workplace violence incidents (such as strikes and pinches from patients) were officially reported to the International Council of Nurses. In comparison this study demonstrated 50% of dirty needle stick injuries had been reported, while none of the exposures to body fluids or strikes, pinches or bites from patients had been reported. There had been no direct studies on the reporting

habits for physical injuries such as lacerations and abrasions, but it was well recognized in the literature that non-reporting was a significant problem.

There were a variety of reasons given for not reporting these particular occupational injuries or exposures. The reasons suggested also supported prior study findings. In this study the majority of subjects believed these injuries were not worth reporting or that it was too time consuming to make the report.

Results of this study suggested that safety training had no bearing on reporting occupational injuries, accidents and exposure to hazards. It can be noted, however that there was evidence of poor understanding of what is required to be reported. This could be related to a poorly written policy and procedure or to ineffective education. The CDC (1998) highlights the importance of having effective policy and procedures in their guidelines for preventing infections in health care personnel. Their recommendations are based on existing scientific data, theoretical rationale, applicability and potential impact on the health care environment. The policy and procedure needs to clearly state the established system for notifying the employee health program, the infection control program and other relevant departments of the facility. In addition it should clearly state how to complete an occurrence form, what should be reported on the form and when it is appropriate to complete the form. A list of occupational health and safety injuries, accidents and exposures that are expected to be reported may also be helpful to add to

this policy. In addition to improving the policy and procedure, staff should be regularly trained on completing the form and the importance of reporting occupational health and safety related issues.

Llyod and Torling (1987) recognized that lack of regular training is one of the most common causes of work related injuries. NIOSH (2000) also highlights the importance of training in their recommendations for reducing needlestick injuries and improving reporting of latex hypersensitivity (NIOSH, 1997). Haiduven, Simpkins, Phillips and Stevens (1999) supports continued education especially in response to needle stick injuries and suggests emphasis should be placed on the risk of acquiring blood borne pathogens from these types of occupational injuries. They also highlight the importance of targeting specific groups who are found to be noncompliant with reporting.

The health care facility in this study stressed that each staff member completes safety training every twelve months. The format currently in use is a questionnaire that covers the topics of back care, electrical safety, prevention of falls, needle stick injuries, universal precautions and the use of personal protective equipment. This questionnaire has been in use for the past five years at the facility with little or no changes. Basic orientation for all staff members at the time of employment includes videos on fire and electrical safety and back care. Completing an occurrence form is covered in basic orientation, but not annually. In addition, what should be documented on this

form is not clearly stated in the policy and procedure manual, and these two factors could account for the fact that 44% of the employees questioned were unfamiliar with what kind of form is used in the facility. It could also account for the fact that many nurses do not report the injuries and exposures that they received while at work.

The CDC, 1998 recommends that training should be annually and whenever the need arises. Due to their relatedness safety training and infection control education should be completed together. In-service training and education on infection control and employee safety should be appropriate and specific for the work assignment of the employee so that personnel can maintain accurate and up-to-date knowledge about the essential elements of these two issues. Annual training needs to be diverse and not the same questionnaire on a yearly basis. The CDC (1998) suggests that training should cover the topics of hand washing, modes of transmission of infection and importance of complying with standard and transmission-based precautions, importance of reporting certain illnesses or conditions such as generalized rash or skin lesions that are vesicular, pustular or weeping, jaundice, illnesses that do not resolve within a designated period, hospitalizations resulting from febrile or other contagious disease, tuberculosis control, importance of complying with standard precautions and reporting exposure to blood and body fluids to prevent transmission of blood borne pathogens, importance of cooperating with infection control personnel during outbreak investigations and safety personnel during accident

investigations and the importance of personnel screening and immunization programs. Most importantly, as suggested by Quinlan and Bohle (1996) management needs to have a sound educational understanding of occupational health and safety issues and reporting techniques and support health and safety guidelines to set an example to employees.

Training should focus on particular types of injuries, accidents or exposures to hazards that are routinely found not to be reported. In this case emphasis should be placed on strikes and pinches from patients, needlestick injuries, body fluid splashes and abrasions and/or lacerations. To prevent exposure to blood and bodily fluids it is recommended by the Department of Health and Human Services that employees use safe techniques of practice. These include the avoidance of recapping needles, disposing of used needles in appropriate sharp containers and using medical devices with safety features designed to prevent injuries. They also recommend appropriate barriers be worn such as gloves, eye and face protectors, gowns and masks especially when contact with bodily fluids and blood is expected.

Management was questioned on the education, implementation and use of the needle less system. The use of this system is taught to new employees during their orientation to the nursing unit by a designated preceptor. This preceptor is another RN who has been chosen by the manager of the unit, based on their length of service, assessment of skills and knowledge of the nursing area. There is no formal preceptor course offered to staff who assume

this role. It was found that since initial implementation of the needle less system there has been no follow up to ensure that the system is being used correctly. The CDC's study in 1997 found evaluation of such needle less devices a difficult thing to study due to the number of unreported injuries, and this should be highlighted if further studies are to be completed on this aspect of the problem at this facility. A high proportion of needlestick injuries, both clean and dirty, were reported on the study and could demonstrate that the current needleless system that is in place may not be effective. Qualitative studies involving interviewing techniques would be useful to further study this problem.

NIOSH (2000) highlighted the importance of evaluating the use of needleless devices to determine effectiveness and acceptance. It should be determined if staff are using the current needleless system correctly and if it is an effective system for this facility. Replacing the current system may not be an economically viable option, but further education on the correct use of the system could reduce the risk that employees are placing themselves at. It is also suggested that staff be involved in the evaluation of such devices and be able to assist in the selection of a new device if that option is chosen (NIOSH, 2000).

For the staff who identified strikes and pinches from patients as their unreported occupational injury, accident or exposure most reported that they did not see any injury to self so did not report the occurrence, and that they

were unhappy with management's previous follow up of such occurrences. When management was questioned on how violent patients were dealt with in the facility it was found that it was expected that nursing staff would attempt to contact family members to stay with the patient in the hopes that this would keep the patient calm. Secondly the staff could, with a doctors order, use soft restraints. It was found that most physicians are reluctant to use chemical forms of restraint. For patients who are very agitated and at a risk of injury to self and others, physicians could order a twenty-four hour sitter, however due to staffing costs management preferred this option not be used.

OSHA (1998) provides useful guidelines for dealing with workplace violence which includes strikes and pinches from patients. They highlight the importance of an effective health and safety program that has management commitment and employee involvement. Employees need to comply and understand workplace violence prevention programs and security measures. They need to promptly and accurately report any violent incidents and take part in continuing education that covers techniques to recognize escalating agitation and assaultive behavior. OSHA also strongly urges a zero-tolerance policy be implemented throughout any workplace dealing with workplace violence.

The process of reporting an injury, accident or exposure was examined. When a staff member experiences an occupational injury, accident or exposure they are required to complete an occurrence report immediately.

This report requires the staff member involved to give a full description of the incident and what they could have done to avoid the situation. They are then required to notify their supervisor and attend the employee health clinic or the emergency department if it is after hours. Many staff reported that this process was too time consuming and that due to low staffing numbers it was impossible to leave the floor at the time of the occurrence as was instructed. Harmony (1983) also found that a lengthy occurrence report and poor staffing ratio's were factors of non-reporting in his study. It was interesting to note in this study, that although many staff felt this process was too time consuming, when given the choice to choose an alternate form of reporting very few chose the option of a incident report that offered check boxes only. Those who opted to change the current format requested a form that was specific for employee accidents rather than a form that covers any kind of occurrence within the hospital.

5.2 Implications of the Findings

The results of this study suggested that many factors can lead to the serious problem of failure to report occupational health and safety injuries, accidents and exposures. These results may be of value to provide some cost effective simple solutions, or be beneficial in identifying a need to further study the problem.

Factors identified that could possibly be responsible for the problem include poor training on what should be reported, unclear policies and procedures, unfamiliarity with the method of reporting an occurrence and poor staffing. It is advisable to focus on these factors and develop cost effective and immediately implemental solutions.

6.0 RECOMMENDATIONS

In light of the findings, it would be reasonable to consider ways of addressing the poor reporting habits of occupational health and safety injuries, accidents and exposures by nurses. Primarily there was noted to be a poor understanding of the methods of reporting an injury, accident or exposure. The secondary problem was centered on the length of time it took to report such occurrences. The following are recommendations that should be implemented to reduce the incident of non reporting in this facility.

1. Improve the policy and procedure for managing occupational injuries, accidents and exposures.
2. Review the health centers training strategies for occupational health and safety issues and educate staff on occurrence report completion.
3. Have a list of reportable occurrences clearly displayed in the work area, along with other health and safety educational posters.
4. Provide annual safety and infection control education and ensure that education is offered in a variety of modalities.
5. Provide staff with handouts and newsletters on recent occupational health and safety issues.
6. Ensure management personnel have a sound educational understanding of occupational health and safety issues and reporting techniques and that they support health and safety guidelines to set an example to employees.

7. Review the current needle less system for correct use and effectiveness.
8. Encourage staff participation in the implementation of new safety devices.
9. Reassure staff that disciplinary action will not result from reporting occupational injuries, accidents or exposures.
10. Demonstrate organizational concern for employee emotional and physical health and safety and ensure an equal commitment to worker health and safety and patient health and safety.
11. Employ a zero tolerance policy to workplace violence.
12. Improve the current reporting tool. Many of the staff involved in the study requested a form specific for employee accidents rather than a form that covers any kind of occurrence within the hospital.
13. Set up guidelines for handling particular injuries, accidents or exposures. Management could consider staff administering their own first aid for simple injuries such as a stick with a clean needle as long as it was reported correctly. This would reduce the time staff spent away from the work area.
14. Set up an injury hotline where staff can call the employee health department or emergency department after hours to report occurrences. This would provide a triage system where a decision could be made concerning the nature of the event and if it is necessary for the staff member to leave the nursing unit to receive medical treatment. This would be very helpful for nursing departments experiencing poor staffing ratio's.

15. Improve staffing ratio's so staff feel they can comfortably leave the floor to attend employee health or the emergency department.

Although a hotline, changing the current needle less system and improving staff ratios may not be suitable solutions from an economic perspective, it could improve reporting of occupational health and safety injuries, accidents and exposures to hazards.

7.0 CONCLUSION

The study set out to determine the prevalence of under reporting of occupational injuries, accidents and exposure to hazards by Registered Nurses in the health care environment. In addition it sought to determine reasons for this phenomenon. The aim was then to address this problem by simple, cost effective measures.

The study revealed that the majority of occupational injuries, accidents and exposures by RN's in the previous twelve month period had gone unreported. Ineffective education, unfamiliarity with methods of reporting and poor staffing ratios were factors that led to poor compliance of reporting. Other factors such as length of service and experience did not influence reporting habits. Suggestions were made on how these factors may be addressed to improve the situation, based on available literature. This study also demonstrated that there might be other factors involved in safety compliance that requires further study and evaluation.

Future studies should determine the effectiveness of implemented strategies, and assess all health care workers and their reporting habits rather than just RN's. It would also be beneficial to compare reporting behaviour between hospitals of similar size and function against larger facilities to determine if this is an influencing factor. As this study was very generalized

it would be beneficial to individually look at particular areas of concern, such as workplace violence to determine fully the severity of under reporting in the health care environment.

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9.0 APPENDICES

9.1 APPENDIX A

STATEMENT OF INTENT

Study title: The Nurses Response to Occupational Injuries and Exposures To Hazards

I would like to invite you to participate in this study which has been approved by the appropriate committees at Edith Cowan University and this Health Care Center. I am a Registered Nurse undertaking a study on the responses of nurses to occupational injuries and exposures. The study findings will assist management in improving educational needs, improving current intervention policies for reporting occupational injuries and exposures and provide a safer working environment for all employees, through hazard identification and control.

The data will be collected by a simple, anonymous, self-reporting questionnaire, analyzed and recorded. The completion of the questionnaire is anticipated to take less than twenty (20) minutes. Should you wish to read the outcome of the research, this will be available in February 2000.

Your participation is voluntary, and will not influence future care, treatment or employment. All information obtained will be confidential. No information will be reported or published which will identify the participants. All completed questionnaires will be kept in a locked cupboard in the

researchers home to ensure confidentiality and privacy. Only the researcher, will have access to the data and it will be treated as confidential.

Should you wish to contact me at any time to discuss anything to do with the study I can be contacted at home on (310) 450 4320, or via the PACT office at ext. 8313.

Sandra Kilminster-Binder RN (researcher)

9.2 APPENDIX B

QUESTIONNAIRE

(For Registered Nurses)

Instructions: This is an anonymous questionnaire. Please ensure that you do not write your name, or any other comments that will make you identifiable on this form. By completing the questionnaire you are consenting to take part in this research. As such you should first read the attached disclosure statement carefully as it explains fully the intention of this project. Please answer the questions carefully and as accurately as possible and tick only one response unless it is otherwise indicated. On completion, please place your questionnaire inside the envelope and place it in the drop box located at the nurse's station.

1. How long have you been a Registered Nurse?

- | | |
|---|--|
| <input type="checkbox"/> less than 1 year | <input type="checkbox"/> 3 - 4 years |
| <input type="checkbox"/> 1 - 2 years | <input type="checkbox"/> 4 - 5 years |
| <input type="checkbox"/> 2 -3 years | <input type="checkbox"/> more than 5 years |

2. How long have you worked in this hospital?

- | | |
|---|--|
| <input type="checkbox"/> less than 1 year | <input type="checkbox"/> 3 - 4 years |
| <input type="checkbox"/> 1 - 2 years | <input type="checkbox"/> 4 - 5 years |
| <input type="checkbox"/> 2 -3 years | <input type="checkbox"/> more than 5 years |

3. Did you receive safety training in the past twelve months?

Yes

No

4. Did you find the safety training adequately covered how to report an injury or exposure?

Yes

No

5. In the past twelve months have you experienced any of the following occupational injuries or exposures to a hazard? (tick all that apply)

Needle stick (clean needle)

Fall

Needle stick (dirty needle)

Strain

Body Fluid Splash

Burn

Medication/Chemical Splash

Electric shock

Abrasion/Laceration

Dermatitis/Rash

Bite from patient

Strike or pinch from patient

Infection from pathogen

Other occupational injury or exposure to a hazard

(please describe) _____

None of the above (please go to Q10)

6. Did you report all of these injuries or exposures?

Yes (please go to Q9)

No

7. If no, which injury/injuries did you not report? (tick all that apply)

Needle stick (clean needle)

Fall

Needle stick (dirty needle)

Strain

Body Fluid Splash

Burn

Medication/Chemical Splash

Electric shock

Abrasion/Laceration

Dermatitis

Bite from patient

Strike or pinch from patient

Infection from pathogen

other injury or exposure to a hazard

8. What was your reason(s) for not reporting the injury or exposure? (tick all that apply)

- Too time consuming
 - Did not think it was worth reporting
 - Did not know I was supposed to report it
 - Did not know how to report the incident
 - Incident report form not available
 - Incident report form too long
 - Afraid of disciplinary/remedial action
 - Administered own first aid
 - Unable to get to the ER or Employee Health Department
 - Not happy with management or follow up care of a previous injury/exposure
- Other; (please state)
-

9. Were you using available personal protective equipment or safety devices designed for the procedure (e.g.: gloves, mask, needle less system), when this injury/exposure occurred?

Yes

No

10. What is the current method used to report an occupational injury or exposure to a hazard?

Incident Report Form that asks for a full description of the occurrence

Incident Report Form that uses only check boxes

A form that is specific for employee accidents

Don't know

Other; (please state)

11. What method of reporting occupational injuries or exposures to hazards would you find easiest and convenient to complete?

- Incident Report Form that asks for a full description of the occurrence
 - Incident Report Form that uses only check boxes
 - A form that is specific for employee accidents
 - Don't know
 - Other; (please state)
-
-

Thank you for your cooperation

All information will be kept confidential