

Nursing Students' Experiences with Needlestick Injuries

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Abstract

The purpose of this study was to determine the incidence of needle sticks among nursing students at a small liberal arts university and evaluate the circumstances around this situation. The study was conducted by 12 junior and senior nursing students and their instructor. After giving informed consent, 99 of the 102 (97%) nursing students completed an online survey regarding needlesticks they had incurred and the surrounding conditions. Students from the second sophomore semester forward were included in the study because this is when exposure to the clinical hazards of needle sticks starts in this program. Of the students surveyed, nine reported having experienced a needle stick, but only seven of those were in the student role at the time of the incident. Surprisingly, none of the injuries were reported to agency personnel. Findings suggest that annual education about the incidence, risks and policies regarding needlesticks should be provided to both clinical instructors and nursing students.

Introduction and Background

Needlestick injuries are a frequent occurrence among healthcare nurses. The Centers for Disease Control (CDC) estimates that about 600,000 to one million needlestick injuries occur each year. Unfortunately, about half of these needlestick injuries go unreported (CDC, 2007). The American Nurses Association (ANA) estimates that of the numerous needlestick injuries only about 1,000 healthcare workers actually contract an infection. Besides exposure to bloodborne pathogens, the nurse is also at risk for about 20 other infections that can be transmitted through a needlestick, including tuberculosis, syphilis, and malaria. When a nurse is exposed to a needlestick, the risk of transmitting various types of bloodborne pathogens (i.e. Human Immunodeficiency Virus [HIV], Hepatitis B, or Hepatitis C) from an infected patient to a health care worker is greatly increased (ANA, 2007). Despite the growing body of knowledge concerning needlesticks in practicing nurses, there has been little research focusing on needlesticks in the student population. The purpose of this study was to determine the incidence of needle sticks among the nursing students at a small liberal arts university and evaluate the circumstances around this situation.

Review of Literature

Drexler, Schmid, and Schwager (2007) reported that one half of all medical students and nursing students have experienced an exposure to blood or body fluids during the final two years of study. One study reported that only five out of twelve nursing students exposed to biologically hazardous material reported the incident. This study also found that students exposed to biological hazards experience fear of contracting potential infections such as HIV/AIDS, Hepatitis B and C. They also experienced feelings of fear, insecurity, and low self esteem (Elucir Gir, & Canini, 2004).

In one study concerning exposures to blood and bodily fluids in health care workers, findings revealed that on average 93.7 per 1000 health care employees were exposed annually. The majority of these exposures were found to occur in nursing personnel, with 35% of total exposures occurring via needlesticks (Goob, Yamada, Newman, & Cashman, 1999). Gershon and Flanagan (2000) reported that the number of needlestick injuries in the United States exceeds 500,000 per year, with 1 in 100 involving known HIV infected needles. This same study identified that the majority of needlesticks happened in female nurses between the ages of 23 - 65. Most of those exposed reported that this was not their first exposure. One interesting study conducted by Alam (2002) stated that between 21% and 30% of the workers surveyed were unaware that HIV and Hepatitis C could be transmitted by needle sticks, and that as many as 70% admitted to having a previous history of needlesticks.

The risk factors involved in needlestick injuries have been extensively studied. Aiken, Klocinski, and Sloane (1997) suggested that many of the needlestick injuries occur during needle recapping. Another study focused on working conditions, short staffing, and the influence on increases in accidental injuries (Stone, Clarke, Cimiotti, & Correa, 2004). Jagger and Perry (2005) reported that critical care areas have a high risk of having needlestick injuries, and suggested that this is related to the pressure involved in crisis situations and the fast response that is needed from staff.

There have been fewer studies conducted on nursing students regarding needlesticks and blood exposure. A seven-year study of the incidence of needlesticks among medical students concluded that workload and education of safe practice should be taken into consideration (Osborn, Papadakis, & Gerberding, 1999). Another study explored how different levels of education and work environment influenced needlestick exposures in a medical student population, concluding that there is more risk between the fourth and fifth year of medical training (Deisenhammer, Radon, & Nowak, 2001). McCarthy and Britton (2000) reported that 27% of the nursing students they studied experienced exposure to bloodborne pathogens through needlesticks. They suggested that a high risk for nonsterile occupational injuries existed because these students were doing invasive procedures with minimal experience. One study, focused solely on nursing students, determined that uncapping needles resulted in the highest incidence of injury. The researchers suggested that additional emphasis should be placed on reporting injuries (Smith, & Leggat, 2005). Knowledge deficit regarding reporting practices seemed to be a major reason that students do not report an injury. One study found that students did not report needle stick injuries due to lack of knowledge of how to report the injuries (Cervini & Bell, 2005). In another study, Mendias and Ross (2001) identified that having a clear policy pertaining to reporting and post-exposure chemoprophylaxis was imperative.

Theoretical Framework

The Neuman Systems Model served as the theoretical framework for this study. This model identifies the client as a central core surrounded by three types of defense mechanisms: flexible line of defense (FLD), normal line of defense (NLD), and lines of resistance (LOR). As the client encounters stressors, the FLD serves as protection. For the purpose of this study, the client was identified as a nursing student. If the FLD is penetrated by the stressor, then the client depends on the NLD. The FLD is maintained and strengthened by such things as healthy lifestyle, nutritious diet, adequate rest, and exercising physical activity, while the NLD is considered the baseline of the client's well-being. Once the NLD is penetrated, the client's only defense are the LOR, which protect the core; penetration of the core may result in death.

The Neuman System Model identifies the client as consisting of five variables: physiological, psychological, developmental, sociocultural, and spiritual. Physiological variables are variables that include the client's body and its function; physiological stressors in the nursing student could be factors such as hours of sleep and skin integrity. The psychological variable focuses on the client's mental well-being and how the client interacts with others; for nursing students this could encompass anxiety (e.g. getting a needlestick, fear of punitive measures for experiencing a needlestick). The developmental variable focuses on life's developmental processes. Erikson's developmental stage for the majority of subjects in this study is Intimacy vs. Isolation; the client that experiences a needlestick may face intimacy issues related to fear of contracting or spreading a bloodborne disease. Another developmental variable may be level of experience in the nursing program, as experience should lead to more proficient handling of medical devices. The sociocultural variable deals with society's outlook and the culture in which the client is immersed; some sociocultural stressors affecting the nursing student who has experienced a needlestick are monies used for healthcare in treatment of the injury or illness contracted through the injury, what others think regarding the injury, and various family issues. The spiritual variable is what the client believes. The nursing student's spiritual variable can include moral obligations held by the individual or may lead the student to feel that the needlestick is punishment for poor performance. Each of these variables is also a source of stressors (see Figure 1). The Neuman Systems Model also focuses on interventions, including primary, secondary, and tertiary. Primary prevention prevents encounters with stressors. Secondary prevention involves screening for stressor penetration, while tertiary prevention is centered on reconstitution of the FLD and NLD. Primary prevention includes engineered safety devices, no recapping of needles, and educational programming. Secondary interventions for nursing students include peer and instructor evaluations of performance, "check-offs" of various nursing skills, and continuing assessment of incidence of needlesticks. An example of tertiary intervention would be post-exposure prophylaxis following a needlestick injury.

Methods

A descriptive design was used to explore the incidence and circumstances around needlestick injuries in nursing students at a small public liberal arts university in the southeastern United States. A 20-question web-based survey was posted on site that was available to all students. Likert and numerical scales were used in the survey, as well as items that assessed the student's age, gender, level in the program, and history of needlesticks. The population of interest was all nursing students beyond the first semester sophomore level that were currently enrolled in the nursing program. The sample was comprised of 96 people who completed the survey. Human Subjects Subcommittee and Institutional Review Board approvals were obtained, and all students consented to participate before completing the survey. Confidentiality was maintained, as there was no identifying information as part of the survey. Those students who had received a needlestick were asked to answer additional survey questions, such as the total number of needlesticks, reporting of the occurrence, amount of supervision, and whether or not post-exposure measures were taken. After data were collected, they were analyzed by investigators using SPSS 14.0. Descriptive statistics such as measures of central tendency and frequencies were used to analyze all variables.

Results

The sample consisted of 96 participants with a mean age of 23.02 years (SD 5.54 years). Of these participants, 90.6% ($n = 87$) were females, 8.3% ($n = 8$) were males, and one subject did not identify gender. The frequency of each academic class was 21.9% ($n = 21$) second semester

sophomores, 11.5% ($n = 11$) first semester juniors, 25% ($n = 24$) second semester juniors, and 41.7% ($n = 40$) seniors. Of the total sample, nine people reported receiving a needlestick injury, one injury per participant, resulting in a 9.4% injury rate. Five out of the nine needlestick injuries were received while in the student role; the remaining four occurred in the employee role, although these were not examined. When surveyed regarding the self-assessed level of knowledge related to procedures for reporting sharps injuries, 10.4% ($n = 10$) stated an understanding of “not at all,” 44.8% ($n = 43$) stated an understanding of “somewhat,” 27.1% ($n = 26$) stated an understanding of “good,” and 17.7% ($n = 17$) stated an understanding of “very good.” One student reported receiving the injury as a second semester sophomore, three students as first semester juniors, and one as a second semester junior; there were no reported injuries during the senior year. Only four students (4.2%) reported the incident. Two subjects (2.1%) experiencing needlesticks reported receiving only three to five hours of sleep on the night prior to the incident, while three (3.1%) reported receiving six to eight hours of sleep. The majority of injuries occurred on a Medical-Surgical unit ($n = 3$, 3.1%). Subjects were also asked to rate, on a scale from 0 to 10 (0 being no anxiety and 10 being extreme anxiety), their anxiety regarding needlestick injuries. The mean level of anxiety was 4.72 ($SD = 2.31$) when questioned about caring for the general population, while the level of anxiety related to caring for a patient with a known bloodborne pathogen was 7.09 ($SD = 2.58$).

Implications

This study has many implications for nursing programs, nursing students, and clinical sites nationwide. Nursing students have reported being more anxious while administering care to those patients with a known bloodborne pathogen. It should be reinforced that despite no known history of disease, patients may still be infected with a bloodborne pathogen. It should also be noted that students with sharps injuries may have had less than optimal sleep on the previous night; therefore, students should be educated at the beginning of the nursing program that sleep is an important part of safe patient care. Other implications include increased education on the appropriate use of sharps devices, competency “check-offs” to validate proper use, and increased supervision of nursing students while preparing medications, which is the time when most students reported receiving the sharps injuries. Strategies to reduce students’ knowledge deficit regarding agency protocol surrounding sharps injuries should be implemented for each clinical site utilized for the duration of the nursing program. This includes providing students with agency protocols and reinforcing appropriate actions at the beginning of each clinical rotation. Students should also be reassured that a needlestick injury would not result in punitive action, and that any sharp injury received should be reported to the appropriate personnel so that necessary post-exposure prophylaxis may be provided. The findings of this study are consistent with existing literature reporting that nursing students indeed experience needlesticks but are not likely to report them. It is only through accurate reporting that true incidences can be identified and changes made in practice and reporting techniques to support these students and ensure their safety in the clinical practice setting.

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