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Needlestick Injuries to Nurses, in Context

Editor's Note: Injuries with used needles and other "sharps" put health care workers at risk for serious bloodborne infections, such as HIV and hepatitis B and C. To some extent, this risk can be lessened through safer techniques (such as not recapping needles) and safer devices (such as needleless and self-sheathing equipment). But these injuries occur within a context (often a hospital unit) with organizational features that may themselves contribute to an increased or decreased risk. This Issue Brief summarizes a series of studies that investigate whether workplace aspects of the hospital (such as staffing levels, and organizational structure and climate) affect the risk of needlestick injuries to nurses.

Needlestick injuries are common and largely preventable

The Centers for Disease Control and Prevention (CDC) estimates that hospital workers sustain about 384,000 injuries annually involving contaminated sharps, including 236,000 needlesticks. Nurses sustain about 40% of these injuries, by far the largest single professional group at risk. The CDC projects that about 75% of these needlesticks are preventable by eliminating unnecessary use of needles, using needles with safety features, or using safer work practices.

- Although the overwhelming majority of these injuries do not transmit bloodborne diseases, the potential exposure can have severe physical and mental health consequences. These injuries remain a serious occupational health concern for nurses and other health care workers.
 - In the last decade, hospital restructuring has led to heavier workloads for nurses and may have increased their risk for exposure to used needles. A common cost-cutting measure, disbanding dedicated teams for intravenous (IV) therapy, often meant that nurses assumed new responsibilities for routine blood draws and IV starts.
 - In response to ongoing concern over needlesticks and the technological developments that can increase employee protection, Congress passed the Needlestick Safety and Prevention Act of 2000. New regulations require health care facilities to select safer needle devices as they become available, involve employees in identifying and choosing those devices, and maintain a log of injuries from contaminated sharps.
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AIDS care study first to look at organizational risk factors for needlestick injuries

The investigators began to analyze the effects of hospital staffing and organizational climate on needlestick injuries in a 1990-91 study of AIDS care provided in 20 hospitals in 11 U.S. cities.

- Nurses working on 40 inpatient units were surveyed on the number of times they were injured with a blood-contaminated needle in the prior year and month. In addition, they were asked to report needlestick injuries and “near-misses” at the end of every shift over two 1-month periods. These retrospective and prospective reports provided nearly identical information, indicating that needlesticks are a memorable event that can be measured retrospectively.
- The survey included questions on many “human factors” that might affect the risk for needlestick injuries, such as the frequency of recapping used needles and inexperience or carelessness of other unit staff. Nurses were asked about their own level of emotional exhaustion with work, and their perceptions of the adequacy of resources and nurse manager leadership in the hospital unit.
- The ratio of registered nurse positions and average daily patient census on each unit was calculated from administrative data. Lower-staffed units had ratios of about one nurse for every 10 or more patients, on average.

Results suggest link between nurse staffing work environment and needlestick injuries

Adjusting for the hours worked by each nurse, the study showed that the individual nurses’ risk of sustaining an injury with a used sharp was related to aggregate-level characteristics of their hospital units.

- Of the 962 nurses in the prospective study, 53 (5.5%) reported an injury involving a needlestick or sharp containing blood, and 228 (23.7%) reported a near-miss.
- Nurses on units with less adequate resources, lower staffing, less nurse leadership, and higher levels of emotional exhaustion were typically twice as likely to report the presence of risks due to staff carelessness and inexperience, frequent recapping of needles, and inadequate knowledge and supplies.
- Nurses on units with less adequate resources, lower staffing, less nurse leadership, and higher levels of emotional exhaustion were twice as likely to incur needlestick injuries and near-misses as their counterparts in better-managed units.

Larger study examines needlestick injuries in “magnet” hospitals

The investigators replicated and extended their earlier findings in second dataset involving a different set of hospitals in 1998. They surveyed 2,278 nurses working in medical and surgical units in 22 U.S. hospitals, all with a reputation for excellence. Most of the hospitals were designated “magnet” hospitals, distinguished by their success in recruiting and retaining nurses.

- The nurses were asked to report on the number of needlestick injuries incurred in their careers, in the past year, and in the past month.
 - They were also asked to report their years of experience, their tenure at the current hospital, hospital organizational climate, and their patient load for the last shift worked.
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- In addition to nurse questionnaires, the investigators surveyed hospital administrators to learn the types of safety devices used at their institution in 1998 that might prevent needlestick injuries.

Effects of poor working conditions seen in even the best hospitals

The study findings confirmed the relationship between high workloads, poor organizational climate, and an increased risk for needlestick injuries. The findings also support the use of safety devices for IV access and blood drawing, one of the largest multi-hospital studies to demonstrate the utility of this overall approach.

- Almost half of the nurses (1,097, or 48%) reported having been stuck at least once in their career; 197 (8.6%) reported a needlestick in the past year; and 27 (1.2%) in the last month. Nearly one quarter (532, or 23%) reported a near-miss in the past month.
- Not surprisingly, nurses with more years of service were more likely to have sustained an injury at least once in their career than less experienced nurses. However, inexperience seems to play a role in incurring recent injuries: nurses with less than five years' experience and those who took on routine blood draws or IV insertions as a new task in the previous year were 50% to 100% more likely to report an injury in the previous year than their more experienced colleagues.
- Nurses reporting the highest workloads (more than six patients assigned to them, on average) and those reporting the worst organizational climate were 50% more likely than their counterparts in other hospitals to report needlestick injuries in the past year and near-misses in the past month.
- Nurses in hospitals that used protective equipment for blood draws were 31% less likely to sustain a needlestick injury in the past year than nurses in hospitals that had not yet adopted such devices. However, not all types of equipment were associated with a decreased likelihood of needlesticks and near-misses. Further research is needed to demonstrate the effectiveness of specific types of equipment.

Hospital investment in the quality of nursing care related to needlestick injuries in large North American study

The investigators determined whether these findings persisted when aspects of nurses' work environment were studied in a much larger pool of hospitals across four jurisdictions in North America (Pennsylvania, Ontario, Alberta, and British Columbia), all member sites of the International Hospital Outcomes Research Consortium.

- In 1998, almost 28,000 nurses in 473 hospitals were asked to report sharps injuries in the past year. Overall, 12.4% of the nurses reported at least one injury.
 - The nurses were asked about the presence of five features that indicate a hospital's investment in the quality of nursing care. These features include orientation and preceptorship programs for new nurses, active quality assurance programs, an active inservice or continuing education program, and high standards of care promulgated by the hospital administration.
 - After adjusting for nurse clinical specialty, hours worked, and the availability of safety equipment, the risk of sustaining an injury was twice as high in nurses working in hospitals with the fewest features (lowest investment in the quality of nursing care) as compared with the most features.
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POLICY IMPLICATIONS

Needlesticks and other sharps injuries may be a proxy for a wide range of safety problems in hospitals. These studies add to the growing evidence that the workplace environment for hospital nurses has important implications for both patient outcomes and occupational health.

- Needlesticks, like many errors and adverse events in health care, are not random events, and appear to cluster in nursing units and in hospitals where hospital leaders have not made investments in features like staffing, equipment and organizational climate. These results suggest that remedying understaffing and a poor organizational climate may improve safety in hospitals for providers as well as patients.
- Allocation of resources has important consequences for safety. Cuts in staff orientation and education and quality assurance efforts may be expedient in the short term, but may undercut efforts to prevent adverse events and injuries.
- The use of safety equipment is associated with reductions in the risk for needlestick injuries. But because the proper use of safety equipment involves nurse education and other human factors, poor staffing and practice conditions may undermine the benefits of safety equipment. A systems approach to needlestick prevention is warranted, one that involves examination of factors such as staffing levels, the mix of clinicians in terms of experience in nursing and on a particular unit, and adequate administrative support for nursing practice.

This Issue Brief is based on the following articles: S.P. Clarke, D.M. Sloane, L.H. Aiken. Effects of Hospital Staffing and Organizational Climate on Needlestick Injuries to Nurses. American Journal of Public Health, July 2002, vol. 92, pp. 1115-1119; S.P. Clarke, J.L. Rockett, D.M. Sloane, L.H. Aiken. Organizational Climate, Staffing, and Safety Equipment as Predictors of Needlestick Injuries and Near-Misses in Hospital Nurses. American Journal of Infection Control, June 2002, vol. 30, pp. 207-216; see also S.P. Clarke [September 27, 2002]. Institutional investments in quality of care and sharps injuries in North American nurses: Implications for safety in hospitals. Paper presentation at the State of the Science Conference, Sigma Theta Tau International, Washington, DC. Web: http://stti.confex.com/stti/sos13/techprogram/paper_12119.htm; L.H. Aiken, S.P. Clarke, D.M. Sloane for the International Hospital Outcomes Research Consortium. Hospital Staffing, Organization, and Quality of Care: Cross-National Findings. International Journal for Quality in Health Care, February 2002, vol. 14, pp. 5-13.

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