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## Factors influencing nurse compliance with Standard Precautions

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**Background:** Exposure to blood and bodily fluids represents a significant occupational risk for nurses. The most effective means of preventing bloodborne pathogen transmission is through adherence to Standard Precautions (SP). Despite published guidelines on infection control and negative health consequences of noncompliance, significant issues remain around compliance with SP to protect nurses from bloodborne infectious diseases, including hepatitis B virus, hepatitis C virus (HCV), and HIV.

**Methods:** A descriptive correlational study was conducted that measured self-reported compliance with SP, knowledge of HCV, and perceived susceptibility and severity of HCV plus perceived benefits and barriers to SP use. Relationships between the variables were examined. Registered nurses (N = 231) working in ambulatory settings were surveyed.

**Results:** Fewer than one-fifth (17.4%) of respondents reported compliance with all 9 SP items. Mean score for correct responses to the HCV knowledge test was 81%. There was a significant relationship between susceptibility of HCV and compliance and between barriers to SP use and compliance.

**Conclusions:** This study explored reasons why nurses fail to adopt behaviors that protect them and used the Health Belief Model for the theoretical framework. It concentrated on SP and HCV because more than 5 million people in the United States and 200 million worldwide are infected with HCV, making it 1 of the greatest public health threats faced in this century. Understanding reasons for noncompliance will help determine a strategy for improving behavior and programs that target the aspects that were less than satisfactory to improve overall compliance. It is critical to examine factors that influence compliance to encourage those that will lead to total compliance and eliminate those that prevent it.

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Exposure to blood and body fluids and health care-associated infections are serious problems that threaten the safety of both patients and health care workers, including nurses. Contracting an infection can result in serious morbidity and mortality. Acute infection leads to chronic infection in 60%–80% of cases, 20%–50% develop cirrhosis in 2–3 decades, and 11%–50% will develop liver cancer. Chronic hepatitis C virus (HCV) is 1 of the most frequent indications for liver transplantation in the United States. The disease is referred to as a silent killer and goes undetected for decades because it often causes no symptoms until serious liver damage has occurred.<sup>1</sup>

Numerous international self-report studies describe poor Standard Precaution (SP) compliance rates among health care professionals, including nurses, with regard to eye protection,<sup>2–5</sup> needle recapping,<sup>2,4,6</sup> appropriate glove use,<sup>2,4,7,8</sup> handwashing before and after patient contact,<sup>2,7</sup> use of face masks,<sup>5</sup> avoidance of a used needle that is disassembled from a syringe,<sup>8,9</sup> and the implementation of SP for all patients.<sup>9</sup>

The unpredictable nature of trauma resuscitation leads to a higher risk of transmitting bloodborne pathogens. One study<sup>5</sup> based in the United States was unique because the researchers directly observed 104 doctors and nurses in performance of 12 trauma resuscitations. Full compliance was reported in 3% of workers and individual rates varied with 98% compliance reported for gloves, 51% for eye protection, 41% for gowns, and 10% for masks. Perioperative nursing is a high-risk specialty because of the increased likelihood of occupational exposure to blood and other body substances. In Poland 601 surgical nurses were surveyed

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with only 5% of respondents reporting full compliance with all SP items and was highest for glove use (83%) and lowest for protective eyewear (9%).<sup>3,4</sup> Kermode et al<sup>4</sup> conducted a survey of health care workers in rural north Indian settings with similar results. Only 11% of workers reported being compliant with all SP items and 67% reported always wearing gloves, 32% eye protection, 54% gowns, and 59% masks.<sup>4</sup> An Egyptian study<sup>10</sup> conducted among surgeons reported a compliance rate of 57.5% with the proper and consistent use of personal protective equipment during surgical procedures.

Participants in studies investigating compliance with SP were asked about a range of other factors that potentially influence compliance, including knowledge of bloodborne diseases. Stein et al<sup>7</sup> investigated knowledge of bloodborne pathogen transmission in teaching hospitals in Birmingham, United Kingdom, and found that doctors, nurses, and laboratory technologists exhibited substantial lack of knowledge—38.1% correctly identified risk for HCV. In Ireland, 3 groups of nurses working in practices, public health, and addiction services were queried regarding transmission, treatment, disease progression, and exposure risks.<sup>4</sup> The researchers concluded that gaps in knowledge exist and identified substantial differences among the 3 groups, with 96% of respondents working in addiction services reporting being “well informed” about HCV in comparison to respondents from the practices and public health.<sup>11</sup>

## HEALTH BELIEF MODEL (HBM)

The HBM was 1 of the first models that adapted theory from behavioral sciences to health problems for the purpose of studying and promoting use of health services. An assumption of the HBM is that an individual will engage in a recommended health action if he or she believes that a negative health condition can be avoided and that the presence of illness has at least a moderate threat to some aspect of his or her life.<sup>12</sup> This model includes 4 constructs: perceived susceptibility, severity, benefits, and barriers.

Two studies have aimed to determine perceived attitudes affecting compliance of SP using the HBM. Osborne<sup>6</sup> conducted a study to assess the attitudes, beliefs, and level of compliance with SP and identify influences on compliance among operating room nurses in Australia. She focused on 2 SP behaviors: double-gloving during surgical procedures and the wearing of adequate eye protection by operating room nurses in the scrub role. The variable that had the most influence on compliance was the perception of barriers, although the constructs of susceptibility, severity, and benefits also demonstrated correlations with compliance to varying degrees depending on the SP behavior with which they were correlated. Mortada et al<sup>10</sup> assessed surgeon compliance with proper use of personal protective equipment and perceived beliefs affecting their compliance using the HBM. The researchers found a correlation with all HBM subscales and compliance, except perceived barriers. Most of the previous research on compliance with SP and the factors that influence it were conducted in acute care settings and in populations that were considered to be high risk.

In all studies, compliance with SP was suboptimal and varied by the SP behavior being measured. Compliance with SP is clearly a critical issue that needs attention. The lack of studies in ambulatory settings was noteworthy; therefore, the setting for the present study was the ambulatory medical group of a large health system located in the northeastern United States. The HBM provides a useful theoretical framework for understanding why nurses fail to adopt behaviors that protect them.

**Table 1**  
Compliance with standard precautions

- |  |
|--|
| 1. I provide nursing care considering all patients as potentially contagious   |
| 2. I wash my hands after the removal of gloves                                 |
| 3. I avoid placing foreign objects on my hands                                 |
| 4. I wear gloves when exposure of my hands to body fluids is anticipated       |
| 5. I avoid needle recapping  |
| 6. I avoid the disassembling of a used needle from a syringe                   |
| 7. I use a face mask when exposure to air-transmitted pathogens is anticipated |
| 8. I wash my hands after the provision of care                                 |
| 9. I discard used sharp materials into sharps containers                       |

## METHODS

The present study used a descriptive correlational design. A convenience sample of nurses who have daily exposure to blood and body fluids in their work was surveyed. The study was approved by the Institutional Review Board of the Northeastern US Health System. Using a power of 0.80, effect size of 0.30, and an alpha of 0.05, a sample of 82 was needed for statistical significance. Surveys were distributed to 231 of the 300 nurses employed in the ambulatory medical group. The response rate was 50% (n = 116) and the nurses represented oncology, dialysis, medicine, urology, surgery, and cardiology. Data were analyzed from the returned surveys using Minitab 16 (Minitab Inc., State College, PA).

The variables defined for the study were self-reported compliance with SP, knowledge of HCV, perception of susceptibility and severity of HCV illness, and perception of benefits and barriers to SP use. Demographic characteristics included age, years practicing as a nurse, academic degree earned, gender, and race. A 9-item structured self-report questionnaire developed by Efstathiou was used to measure compliance. Each question required the respondents to assess the frequency of performance of the basic requirements of SP (1 = never, 2 = seldom, 3 = sometimes, 4 = often, 5 = usually, and 6 = always) (Table 1). Cronbach's  $\alpha = 0.71$ , demonstrating an acceptable level of internal consistency. For the study questionnaire Cronbach's  $\alpha = 0.66$ .

The instrument to measure knowledge of HCV was developed by Jacqui Richmond while researching whether there was an association between health professionals hepatitis C knowledge and attitudes and the care they provide for people with hepatitis C at The University of Melbourne in 2005. The questions assessed knowledge of transmission, treatment, disease progression, and exposure risks. Reliability and validity were established using Pearson's correlation coefficient test—retest and the score was  $r = 0.8$ . Pearson's correlation coefficient test—retest for the present study questionnaire was  $r = 0.8$ . One point was earned for each correct answer of the 17 true-or-false questions. Thus the range of scores was 0-17 and the total score was used as the knowledge score.

The HBM scales were measured with a questionnaire developed by Osborne.<sup>6</sup> The HBM constructs of susceptibility and severity of HCV illness and benefits of following SP were measured using a Likert-type scale ranging from 5 = strongly agree to 1 = strongly disagree. The scales measured perceptions of risk of contracting the illness, consequences of the illness, advantages of undertaking the recommended health behavior, and obstacles in complying with the health behavior. Construct scales of perception of susceptibility and severity demonstrated Cronbach's alpha coefficients of 0.71 and 0.70, respectively. Osborne<sup>6</sup> subgrouped scales for perception of barriers to SP into double-gloving and wearing adequate eye protection because those behaviors were the focus of her research and yielded consistency coefficients of 0.78 and 0.76, respectively. The scale for perception of benefits demonstrated a consistency coefficient of 0.51 and was

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