Major article

Health care—associated infection prevention in Japan: The role of safety culture

Fumie Sakamoto BSN, MPH, CIC [a,*], Tomoko Sakihama RN, CNS, MSN [b],
Sanjay Saint MD, MPH [c,d,e], M. Todd Greene PhD, MPH [c,d], David Ratz MS [d,e],
Yasuharu Tokuda MD, MPH [f]

[a] Center for Quality Improvement, St Luke's International Medical Center, Tokyo, Japan
[b] Division of Infection Control and Prevention, Mito Kyodo General Hospital, University of Tsukuba, Ibaraki, Japan
[c] Department of Internal Medicine, University of Michigan Health System, Ann Arbor, Michigan
[d] Department of Veterans Affairs/University of Michigan Patient Safety Enhancement Program, Ann Arbor, Michigan
[e] Center for Clinical Management Research, Department of Veterans Affairs Ann Arbor Healthcare System, Ann Arbor, Michigan
[f] Department of Medicine, Mito Kyodo General Hospital, University of Tsukuba, Ibaraki, Japan

Background: Limited data exist on the use of infection prevention practices in Japan. We conducted a nationwide survey to examine the use of recommended infection prevention strategies and factors affecting their use in Japanese hospitals.

Methods: Between April 1, 2012, and January 31, 2013, we surveyed 971 hospitals in Japan. The survey instrument assessed general hospital and infection prevention program characteristics and use of infection prevention practices, including practices specific to preventing catheter-associated urinary tract infection (CAUTI), central line—associated bloodstream infection (CLABSI), and ventilator-associated pneumonia (VAP). Logistic regression models were used to examine multivariable associations between hospital characteristics and the use of the various prevention practices.

Results: A total of 685 hospitals (71%) responded to the survey. Maintaining aseptic technique during catheter insertion and maintenance, avoiding routine central line changes, and using maximum sterile barrier precautions and semirecumbent positioning were the only practices regularly used by more than one-half of the hospitals to prevent CAUTI, CLABSI, and VAP, respectively. Higher safety-centeredness was associated with regular use of prevention practices across all infection types.

Conclusions: Although certain practices were used commonly, the rate of regular use of many evidence-based prevention practices was low in Japanese hospitals. Our findings highlight the importance of fostering an organization-wide atmosphere that prioritizes patient safety. Such a commitment to patient safety should in turn promote the use of effective measures to reduce health care—associated infections in Japan.

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Health care–associated infection (HAI) is a major cause of patient morbidity and mortality. In high- and middle-income countries, HAI affects an estimated 5%-8% of patient populations.[1] Major types of HAI include catheter-associated urinary tract infection (CAUTI), central line–associated bloodstream infection (CLABSI), and ventilator-associated pneumonia (VAP).[1] It has been reported that as much as 65%-70% of CAUTI and CLABSI and 55% of VAP could be prevented by practicing current evidence-based strategies.[2]

Starting in 2005, the World Health Organization started an initiative to campaign for patient safety through the 2005-2006 Global Patient Safety Challenge project "Clean Care is Safer Care." The primary focus of that project was on the prevention of infections associated with health care through the implementation of low-cost, simple, and effective strategies, such as hand hygiene and evidence-based practices, to prevent HAI.[3] Although the project started with a focus on hand hygiene, there is an appreciation of the need for attention to additional strategies specific to the prevention of different clinical infections (eg, CAUTI, CLABSI, VAP) to improve patient safety and quality of care in hospitals worldwide. Although Japan did not sign the pledge to support the "Clean Care is Safer Care" campaign until June 2010, guidelines and recommendations to prevent several types of HAI, published by several organizations and government agencies,[4-10] have been widely implemented by health care providers in Japan. Despite this, however, data on the use of various strategies to prevent HAI are limited.

To date, 2 surveys have been conducted with the goal of describing infection prevention practices in Japan. A survey study conducted in 2004 found a relatively low frequency of use of evidence-based practices, ranging from 20% for HAI surveillance to 39% for maximum sterile barrier precautions.[11] That study also found that in more than one-half of the hospitals studied, infection prevention practitioners spent less than 20% of their working hours on infection prevention. A separate survey study targeted a representative sample of hospitals to study the association between CAUTI prevention practices and hospital size, and found that a higher proportion of larger hospitals practiced evidence-based CAUTI prevention measures compared with smaller hospitals.[12,13]

Although the foregoing surveys provided valuable information regarding infection control in Japan, we are unaware of any other studies that have investigated both the extent to which evidence-based practices are used to prevent multiple types of HAI and factors that predict their use in Japan. As such, we conducted a nationwide survey study to elucidate the use of a comprehensive set of currently recommended infection prevention strategies and to examine various structural and organizational factors affecting their use in hospitals across Japan.

METHODS

Survey instrument

Between April 1, 2012, and January 31, 2013, we surveyed 971 hospitals in Japan that had at least 1 nurse certified in infection prevention by the Japanese Nursing Association. The survey instrument, developed by Krein, Saint, and colleagues,[14-16] was translated into Japanese by a panel of bilingual infection prevention professionals. The translated surveys were mailed to each hospital and addressed to the lead infection preventionist. The survey responses were anonymized. The instrument contained questions about general hospital characteristics, structure and staffing of the infection prevention program, use of general infection prevention practices such as hand hygiene, and use of specific practices related to the prevention and monitoring of CAUTI, CLABSI, and VAP.

Responses about the frequency of use for each infection prevention practice were assigned a value between 1 (never) and 5 (always). A response of 4 (almost always) or 5 (always) was defined as regular use of the particular prevention practice. All prevention practices examined were dichotomized into binary dependent variables, with regular use coded as 1 and 0 otherwise. A safety score was defined as the summation of responses regarding agreement to 2 statements about safety: "Leadership is driving us to a safety-centered institution" and "I would feel safe being treated here as a patient." These statements were selected for conceptual reasons stemming from previous work.[14] Each of these survey items was scored from 1 (strongly agree) to 5 (strongly disagree), and before responses were combined they were reverse-scored, with a higher score indicating a more safety-centered culture.

Statistical analysis

Bivariate associations between hospital characteristics and regular use of infection prevention practices were assessed using unadjusted binary logistic regression models. Pearson correlation coefficients were obtained for all pairs of independent variables to avoid multicollinearity in our multivariate analyses. Logistic regression was used to examine multivariable associations between hospital characteristics and the use of the various prevention practices. Several practices were excluded owing to low frequency of use (ie, <5%), including 1 practice for CAUTI (antimicrobials in the drainage bag), 1 practice for CLABSI (antimicrobial dressing with chlorhexidine), and 3 practices for VAP (oscillating/kinetic bed, antibiotics for digestive tract, and silver-coated endotracheal tubes). Avoiding routine central line changes to prevent CLABSI also was excluded owing to nearly universal regular use (ie, >95%). The number of acute care hospital beds, presence of infectious disease physicians, presence of hospitalists, safety score, and whether the lead infection preventionist is a registered nurse (RN) were included as independent variables in all models.

RESULTS

A total of 971 hospitals met the inclusion criteria, of which 685 (71%) responded to the survey. The hospitals included in this study were larger, with an average of 322 acute care beds, compared with a random sample of Japanese hospitals.[17] Table 1 presents descriptive characteristics of the responding hospitals. Of the 685 responding hospitals, 41% had hospitalists, 20% had hospital epidemiologists, 18% had infectious disease physicians, and 62% had an RN as the lead infection preventionist. The vast majority (92%) reported participating in a collaborative focusing on HAI prevention. These collaboratives typically were smaller regional collaboratives consisting of only a few hospitals. Nurse staffing issues were reported by many responding hospitals. In addition, very few hospitals reported receiving adequate support from hospital leadership for infection prevention efforts. A total of 49% agreed (reported as "agree" or "strongly agree") with the statement that "leadership is driving us to be a safety-centered institution," and 31% agreed with the statement that "I would feel safe being treated here as a patient." Responses to these 2 statements were positively correlated ($r = 0.54$; $P < .001$). Combining the responses for these 2 statements to generate a safety score yielded a mean score of 6.3.

Figure 1 shows the percentage of hospitals that reported regular use of the various infection prevention practices examined. For general infection prevention practices, the majority of hospitals had a daily oral care regimen (87%) and used alcohol-based hand rub (85%). Direct monitoring of hand hygiene compliance (29%) and active surveillance cultures for multidrug-resistant organisms (24%) were less frequent. For CAUTI, aseptic technique during