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Long work hours and chronic insomnia are associated with needlestick and sharps injuries among hospital nurses in Taiwan: A national survey

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ABSTRACT

Background: Needlestick and sharps injuries are prevalent work-related injuries among nurses. Safety devices prevent only one-quarter of related injuries. More studies of modifiable risk factors are needed.
Objectives: To examine whether long work hours and chronic insomnia are associated with needlestick and sharps injuries among hospital nurses in Taiwan.
Design: Cross-sectional survey.
Settings/participants: This analysis included 19,386 full-time bedside nurses working in 104 hospitals across Taiwan.
Methods: Participants filled out an anonymous questionnaire from July to September 2014. Chronic insomnia, needlestick injuries, and sharps injuries during the past year were each measured by a yes/no question. Multivariate logistic regression models were applied to examine the effects of long work hours and chronic insomnia on needlestick and sharps injuries, given with control for sex, marital status, educational level, age, years of practice, work unit, and hospital level in the model.
Results: More than 70% of study nurses worked long hours during the previous week (>50 h: 27.5%; 41–50 h: 43.2%), and 15.5% of nurses reported chronic insomnia. The percentage of sharps injuries (38.8%) was higher than that for needlestick injuries (22.4%) during the previous year among nurses. After adjusting for potential confounders, logistic regression yielded significant results showing that those who worked 41 to 50 h per week, >50 h per week, and had chronic insomnia were 1.17 times (95% C.I. = 1.04–1.32), 1.51 times (95% C.I. = 1.32–1.72), and 1.45 times (95% C.I. = 1.25–1.68) more likely to experience needlestick injuries, and 1.29 times (95% C.I. = 1.17–1.42), 1.37 times (95% C.I. = 1.23–1.53), and 1.56 times (95% C.I. = 1.37–1.77) more likely to experience sharps injuries, respectively, than those who worked fewer hours and did not have insomnia.
Conclusions: This nationwide nurse survey showed that high rates of needlestick and sharps injuries persist in hospital nurses in Taiwan. The common problems of long work hours and chronic insomnia increase the risk of these injuries. We suggest that hospital managers follow regulations on work hours and optimize shift schedules for nurses to decrease related injuries.

What is already known about the topic?

- Sleep problems and long work hours are common among hospital nurses.
- Needlestick and sharps injuries are prevalent work-related injuries in nursing practice. Nurses have the highest rate of these injuries among healthcare workers.
- Although safety devices may have potentially prevented some needlestick and sharps injuries among healthcare workers, risks for these injuries have persisted in hospitals. More studies on related factors are needed.

What this paper adds

- High rates of needlestick and sharps injuries persist in hospital nurses in Taiwan.
- Sharps injuries were more prevalent than needlestick injuries among hospital nurses.

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- Long work hours and chronic insomnia were significant factors for needlestick and sharps injuries among hospital nurses.

1. Background

Needlestick and sharps injuries are prevalent work-related injuries in nursing practice. Nurses have the highest rate of these injuries among healthcare workers (Frijstein et al., 2011; Raghavendran et al., 2006). Researchers indicated that more than 70% of nurses have experienced needlestick and/or sharps injuries in their nursing career (Cho et al., 2013). Each year, there were 384,325 of these injuries among hospital-based healthcare workers in the U.S. (Panlilio et al., 2004). A review indicated that the incidence rates of needlestick and sharps injuries were 6.3 and 6.2 per 100 beds in French and Japanese hospitals, respectively (Floret et al., 2015; Yoshikawa et al., 2013). This high incidence has persisted in many hospitals, even though safety devices may have potentially prevented 26% of these injuries (Centers for Disease Control and Prevention, 2011).

Needlestick and sharps injuries increase the potential risk of hepatitis B, hepatitis C, and human immunodeficiency virus (HIV) infection among healthcare workers (Frijstein et al., 2011). In 2011 in Taiwan, researchers analyzed a national database of needlestick and sharps injuries and found that 13%, 13.8%, and 1.1% of needles were contaminated by patients with hepatitis B, hepatitis C, and HIV, respectively (Wu et al., 2015). In order to decrease the risk, safety devices were gradually adopted in hospitals after legislation in 2012 in Taiwan. The legislation demands that healthcare workers have to use safety needles when they contact blood or other body fluids, from a percentage of at least 20% in 2012 and gradually increase to 100% in year 2016. Besides, provision and use of safety devices have been listing as one of the criterion in hospital accreditation since 2013. Researchers indicated that the rates of these injuries decreased in hospitals after adopting these devices (Chambers et al., 2015). However, a national survey indicated that an estimated 30% of percutaneous injuries occurred during the use of safety devices, 27% of needlestick injuries were uncontrolled events, and useful preventive strategies for 17% of percutaneous injuries could not be assessed based on available information (Centers for Disease Control and Prevention, 2011). This evidence suggests that changes and strategies in fostering a safe work environment are still needed, and risks for needlestick and sharps injuries have persisted in hospitals. More studies on related factors are needed.

Sleep health among nurses is a global concern. Sleep disturbance and insomnia have been reported at rates from 25% to 75% in hospital nurses in Taiwan, China, Switzerland, Norway, and Japan (An et al., 2016; Asaoka et al., 2013; Chien et al., 2013; Eldevik et al., 2013; Schmidt et al., 2015). Sleep problems are common among hospital nurses. Researchers found that sleep problems caused a deterioration in brain function, including working memory, executive function, and sustained attention (Lo et al., 2016), which then increases the risk of work injuries (Uehli et al., 2014). Therefore, an exploration of the effects of chronic insomnia on needlestick and sharps injuries should be taken more seriously.

Studies have reported that long work hours are another common problem among hospital nurses. From 2001 to 2015, the legislated maximum number of work hours in Taiwan was 84 h every two weeks. At the beginning of 2016, this was changed to 40 h a week. A review indicated that about 60% of hospital nurses worked overtime in Taiwan (Liu et al., 2012), and the average amount of overtime among new nurses was 1.74 h per day (Liu et al., 2016). A study across 12 European countries indicated that about 27% of nurses worked overtime (Griffiths et al., 2014). Overtime working have also been reported at rates from 14% to 60% in hospital nurses in Australia, America, Japan, and New Zealand (Anzai et al., 2014; Geiger-Brown et al., 2011; Schluter et al., 2012; Stimpfel et al., 2015). Previous studies have indicated that long work hours increase the risk for needlestick injuries (Caruso, 2014; Olds and Clarke, 2010; Stimpfel et al., 2015).

To the best of our knowledge, the relationships between long work hours and sharps injuries among hospital nurses have not been studied. This is a gap that needs to be addressed because percutaneous injuries caused by sharp objects like broken glass ampoules and vials are more common than needle injuries among clinical nurses nowadays (Smith et al., 2010). The objectives of this study were to examine the effects of long work hours (41–50 h per week and >50 h per week) and chronic insomnia on needlestick and sharps injuries using national survey data from 19,386 full-time hospital nurses in Taiwan.

2. Methods

2.1. Design and participants

This cross-sectional questionnaire survey was conducted by the Taiwan Health Promotion Administration. The study participants were all full-time staff members working in 113 health care settings across Taiwan (13 medical centers, 59 regional hospitals, 32 district hospitals, 8 public health centers, and 1 long-term care institution), of which 92 were certified health promoting hospitals (81.4%). The survey broadly examined workplace safety, physical and mental health needs, work hours, stress, and expectations of organizations among staff of medical institutions. The study protocol was approved by an institutional review board at the Health Promotion Administration (HPA investigation number EC1030308-F-W).

The study questionnaires were distributed to 111,110 full-time staff members at the study hospitals. Participants filled out a structured, anonymous questionnaire from July to September 2014. The staff members were asked to return the completed questionnaires in sealed envelopes to collection sites at the hospitals. A total of 89,014 questionnaires were returned and the overall response rate for this survey was 80.1%. A total of 27,166 participants indicated that their professional background was nursing. We included 19,876 nurses who worked in the general wards, emergency room (ER)/intensive care unit (ICU), operating room (OR)/delivery room (DR), or outpatient department (OPD) to focus on clinical nurses. Then we excluded nursing managers (head nurses or higher rank; n = 474) and nurses working at public health centers and long-term care institutions (n = 16) in order to restrict the samples to bedside clinical nurses. Finally, this analysis included 19,386 full-time nurses (631 nurse practitioners and 18,755 registered nurses/licensed practical nurses) working in 104 hospitals across Taiwan.

2.2. Measurements

The study variables included sociodemographics (sex, educational level, age, and marital status), work characteristics (accredited hospital level, work unit, years of practice at the hospital, and weekly work hours), chronic insomnia, needlestick injuries, and sharps injuries.

Weekly work hours were self-reported work hours during the previous week. Weekly work hours were divided into >50 h, 41–50 h, and <=40 h. Chronic insomnia, needlestick injuries, and sharps injuries during the past year were each measured by a yes/no question. Chronic insomnia was measured by the question "Please tick which chronic diseases you have", and chronic insomnia was one of the items. Chronic insomnia is defined as difficult sleep at least three nights per week which has continued