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## Nurses' but not supervisors' safety practices are linked with job satisfaction

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### Abstract

**Aims**—To test the associations of safety practices as reported by nurses and their respective unit supervisors with job satisfaction.

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Ethical Approval

Harvard School of Public Health Institutional Review Board

**Background**—Psychosocial workplace factors are associated with job satisfaction; however, it is unknown whether nurses and supervisors accounts of safety practices are differentially linked to this outcome.

**Methods**—Cross-sectional study design including nurses ( $n = 1052$ ) nested in 94 units in two hospitals in Boston (MA, USA). Safety practices refer to the identification and control of occupational hazards at the unit. Safety practices were measured aggregating nurses' responses per unit, and supervisory levels. Individual's job satisfaction for each nurse was the response variable.

**Results**—Supervisors assessed safety practices more favourably than their unit nursing staff. Adjusted random intercept logistic regressions showed that the odds of higher job satisfaction were higher for nurses at units with better safety practices (OR: 1.67, 95% CI: 1.04, 2.68) compared with nurses at units that averaged lower safety practices. Supervisors' reports of safety practices were not correlated with the job satisfaction of their staff.

**Conclusions**—Adequate safety practices might be a relevant managerial role that enhances job satisfaction among nurses.

**Implications for nursing management**—Nursing supervisors should calibrate their safety assessments with their nursing staff to improve nurses' job satisfaction.

## Keywords

job satisfaction; multilevel studies; nurse management; safety practices

## Introduction

Job satisfaction is a critical outcome for managing a health care workforce. Job satisfaction is related to lower turnover rates and increased hospital quality (Lu *et al.* 2005, Aiken *et al.* 2012). Research has linked job satisfaction with salient psychosocial characteristics at health care organisations such as autonomy and control (Elovainio *et al.* 2000, Aiken *et al.* 2002), leadership styles (Utriainen & Kyngas 2009) and an ethical and caring organisational culture (Gershon *et al.* 2007). However, the impact of safety-related factors on job satisfaction among nurses has been less studied, despite the fact that nursing is a high-risk occupation, exposed to multiple hazards that may result in work-related diseases and injuries. This inquiry is significant because evidence from other workforces indicates that organisational policies and practices related to safety are associated with fewer occupational injuries and higher job satisfaction (Clarke 2006). Only one study has specifically investigated the association between safety factors and nurse job satisfaction, but its analysis only controlled for one confounder (hospital size) (Barling *et al.* 2003), thus minimising its potential internal and external validity. More research is needed to examine whether hazard management would be a relevant strategy to enhance nurses' job satisfaction.

## Safety practices: need to assesses multiple factors and actors

According to Amick *et al.* (2000), safety practice refers to the extent to which workers perceive that safety and hazard management are priorities at their workplace. Safety practices have been related to disability management and occupational injury (Dennerlein *et al.* 2012). Given that safety practices are embedded in an organisational context, it is

fundamental to account how different workplace actors such as supervisors, groups and individuals perceive them (Elovainio *et al.* 2000, Zohar & Luria 2005, Zohar & Tenne-Gazit 2008, Huang *et al.* 2012). In that sense, aggregating individual reports of safety practices by groups, for example nurses who work at the same unit, can provide a more accurate description of the safety actual situation at the unit, above and beyond varying self-reports of the same issue (Huang *et al.* 2007). However, very few studies have contemplated a multilevel framework to inquire about the role of safety practices, and consequently, more research is needed regarding how individual nurses, groups and supervisors jointly perceive safety practices at their respective units (Christian *et al.* 2009).

Multilevel modelling is particularly suitable for nursing research because nurses are typically organised into units under the direction of a nursing supervisor, so individual-level outcomes might be related to unit-level aggregated experiences as well as supervisor-level characteristics. Despite the appropriateness of conducting multilevel research, systematic reviews on job satisfaction in nursing and other occupations has mostly relied on self-reports without much consideration for workplace contextual actors and factors (Lu *et al.* 2005). This omission is significant because nurses' health and well-being have been associated with team-aggregated assessments of the psychosocial work environment (e.g. shift control, meal break support) (Hurtado *et al.* 2015a,b). Consequently, less is known if psychosocial workplace experiences such as job satisfaction are also sensitive to supervisors' assessments of their work environment. For instance, a study among manufacturing workers reported that job satisfaction was higher when employees perceived that their supervisor was responsive to their safety concerns (Ayim Gyekye & Salminen 2007). These analyses, however, relied on what workers reported about their supervisors lacking actual assessments from supervisors.

Unit supervisors merit attention because they not only are typically responsible for overseeing patient care within units but also have a critical role in safety management (Lin *et al.* 2011). Managerial and leadership roles have a positive impact on workplace safety, particularly if supervisors are perceived as receptive and responsive to workers' concerns (Kelloway & Barling 2010). Consequently, evaluating how nursing supervisors appraise workplace safety is important given their central managerial role, particularly if safety-related factors are also likely to be associated with the job satisfaction of their staff (Duffield *et al.* 2009).

### Study aims and hypotheses

This study aimed to address scientific gaps related to lacking multilevel evidence examining the associations between job satisfaction and safety practices as reported by nurses and their respective supervisors. Two hypotheses were tested: first, that assessments of safety practices would not differ between supervisors and their nurses (e.g. aggregated responses) (Hypothesis 1). Second, it was tested whether the job satisfaction of a given nurse would be higher if her unit-mates or unit supervisors reported safer practices (Hypothesis 2).

## Methods

### Participants

**Design and context of the study**—This was a cross-sectional study among hospital nurses and unit supervisors at two large academic hospitals in Boston, MA (USA).

**Inclusion/exclusion criteria**—Eligible participants included unit supervisors and registered nurses (RNs) working 20 work hours/week or designated as a minimum 0.5 full-time equivalent. Excluded workers were patient care assistants, those assigned to environmental services and physical medicine units (e.g. physical therapy, occupational therapy), those on an extended absence greater than 12 weeks and those deemed travelling or contract nurses.

**Sample**—Eligible participants were invited via e-mail to complete an online survey. E-mail reminders were sent after the fourth, sixth and 10th weeks, and paper versions of the survey were mailed to the non-respondents. A total of 1103 of RNs completed at least half of the online or paper survey (response rate of 79%). Likewise, 89 of 94 unit supervisors completed the survey (response rate of 84%). In this study, however, analyses were limited to nurses who provided information for all of the covariates (complete case analyses), for a total of 1052 RNs and 79 Supervisors in 79 units. All workers provided signed informed consent, and appropriate Institutional Review Boards approved methods and all project materials.

### Measures

**Response variable**—Each nurse assessed job satisfaction with a widely used single item (Mangione & Quinn 1975, Lu *et al.* 2005): ‘all in all, how satisfied would you say you are with your job?’ Survey participants selected from a five-point ordinal response scale, from 1 (not at all satisfied) to 5 (extremely satisfied).

**Predictor variable**—Safety practices were measured with a subscale from the Organisational Policies and Practices questionnaire, an instrument developed to address organisational factors leading to injury and disability (Amick *et al.* 2000). The safety practices subscale encompassed five items measured on a five-point ordinal scale (1: strongly disagree, 5: strongly agree), regarding nurses’ assessments of the identification and improvement of unsafe conditions, e.g. ‘employees on this unit are trained in safe work practices for the job hazards they will encounter’. Individual responses of safety practices were aggregated (arithmetic mean) for all RNs at the same unit. Safety practices were also measured independently for each unit supervisor. The subscale had very high internal reliability coefficients for both supervisors and nurses, with corresponding Cronbach’s alphas of 0.83 and 0.81.

### Control variables

We controlled for nurses’ individual-level characteristics. Socio-demographic and socio-economic covariates included age (18–24, 25–34, 35–44, 45–54, 55 years), race/ethnicity (non-Hispanic white vs. other), educational attainment (<12 years, 1–3 years of college or

technical school, 4-year college degree, graduate school or more) and difficulty in paying bills as a proxy for income situation (1: great deal, 2: some, 3: a little, 4: not at all). Occupational covariates included shift work (working only on daytime or not), and hours worked per week (<30, 30–34, 35–39, 40–44, 45 hours).

### Statistical analyses

Safety practices were measured with questionnaires applied for both nurses and their respective unit supervisors. The aggregation of individual responses by unit was performed after examining intra-unit correlations (e.g. the proportion of shared variance of safety practices of nurses at the same unit). Differences in safety practices between nurses and supervisors were examined with a paired *t*-test, and a Pearson correlation (Hypothesis 1). Though job satisfaction was measured with an ordinal, five-point Likert scale, diagnostic statistics showed a skewed positive distribution (e.g. only four nurses answered not being satisfied at all). Hence, the lowest two response options (not at all and not too satisfied) were merged into one category. As a result, the associations between safety practices with job satisfaction (Hypothesis 2) were tested logistic regression models in three steps; in the first step, unit-aggregated and supervisors' safety practices scores were examined separately (a model for each predictor), adjusting only for individual-level confounders. The second step expanded the prior regression models, this time controlling for individual-level assessments of safety practices to account for potential residual or cross-level confounding. In the third step, the previous regression models were expanded including supervisors' assessments of safety practices together. All analyses were two-tailed with a 0.05 level of statistical significance.

### Results

Table 1 shows the distribution of socio-demographic and occupational characteristics of the sample. Among 1052 nurses, 92.6% were female and 89.1% were non-Hispanic white. Most nurses did not have a second job (85.2%) and worked regularly during the day shift (73.1%). Most supervisors were women (92%), over 50 years of age (66%) and with more than 4 years of tenure at their current units (45%) (Table 2).

#### Differences in supervisors' and nurses' assessments of safety practices

Results from a *t*-test paired by units showed that supervisors assessed safety practices more favourably than their unit staff (Hypothesis 1). In a Likert scale from 1 to 5, supervisors' average of safety practices was 4.02, whereas nurses' aggregated average was 3.74, and this difference was statistically significance ( $P < 0.001$ ). Moreover, supervisors' and nurses' aggregated scores of safety practices were not correlated ( $r = 0.10$ ,  $P = 0.4$ ).

#### Multilevel associations of safety practices with job satisfaction

The intra-unit correlation for safety practices was 0.11, meaning that about a tenth of the individual-level variance of this variable was attributable to the unit clustering. Table 3 shows the summary of the regression models that examined the association of job satisfaction with nurses' aggregated responses and supervisors' safety practices. Model I shows that nurses' aggregated safety practices were positively associated with

job satisfaction, independently of individual-level confounders. However, the association between job satisfaction and staff-aggregated scores of safety practices was attenuated after controlling for individuals' assessments of safety practices (Model II), indicating the interference of residual confounding (i.e. differences in self-reports of nurses within each unit). This association remained statistically significant, and the adjusted odds of being in a higher category of job satisfaction were 1.67 times higher per one unit increment of safety practices. This association remained statistically significant after controlling for supervisors' assessments of safety practices (Model II), which were not associated with job satisfaction, even when modelled independently of nurses' aggregated responses (Model I).

## Discussion

This study examined whether nurses and supervisors would differ in their assessments of safety practices, and if nurses' personal job satisfaction would be higher if supervisors and unit-mates reported safer practices at their respective units. Supervisors' safety practices were not associated with the job satisfaction of their staff. However, the odds of higher job satisfaction were 67% higher for nurses at units with better safer practices, compared with nurses at units that averaged lower safety practices. Supervisors' and nurses' safety assessments were not correlated, yet supervisors tended to assess the safety practices at their units more favourably than their supervised staff.

Further investigation on the sources of this difference would be important to understand fully why supervisors' assessments were not associated with the job satisfaction of their staff. However, differences in safety practices could be explained by the fact that nurses' aggregated assessments are more likely to reflect actual practices at their units, whereas supervisors' assessments would mostly be based on formal procedures (Ossmann *et al.* 2005). Other supporting evidence has shown that supervisors may overestimate characteristics of the work environment, perceiving them more favourably than their supervised staff (Carson *et al.* 1998, Huang *et al.* 2012). These findings suggest the possibility that supervisors, despite their critical leadership role, may not always accurately assess the safety situation at their units.

Results are parallel to the conclusions reached by an extensive international study where less than half of surveyed nurses reported that nursing management was responsive to their concerns or that they were provided opportunities to participate in decision-making (Aiken *et al.* 2001). This study complements previous evidence showing how safety-related factors affect other relevant outcomes such as medical errors (Hofmann & Mark 2006). Salient safety practices include supervisors' responsiveness and proactiveness to employees' concerns (Kelloway & Barling 2010). Yet, these results showed that supervisors' safety assessments and nurses' job satisfaction are independent, despite evidence linking job satisfaction with supervisory leadership styles such as inspiring a shared vision (Chiok Foong Loke 2001), or supervisory practices such as patient-focused work allocation and accountability for patient care (Makinen *et al.* 2003). Future studies, then, should investigate more closely how different dimensions of organisational behaviours are related to nurses' job satisfaction depending on the actors that report them.

### Study limitations and strengths

This study has two main limitations. First, job satisfaction was measured with a widely used single-item question that, however, does not capture specific dimensions of job satisfaction related to working conditions, self-growth and promotion and job security (Lin *et al.* 2011). Second, because of the cross-sectional survey design, reverse causation cannot be ruled out, for example, if workers who were not satisfied with their job were more likely to report less safe practices. To circumvent this potential bias, regression models accounted for individual-level assessments; even though these assessments attenuated the association between unit-level nurse assessments of safety practice and job satisfaction, the magnitude of the coefficient was still statistically significant. In turn, this study also has several strengths including a large random sample of nurses with high response rates (which favours the external validity of the findings) and the inclusion of multiple control factors relevant to health care settings (Williams *et al.* 2007).

### Implications for nursing management

Results suggest that safety practices might affect job satisfaction in a high-risk industry such as nursing. This study highlights the importance that nursing leaders such as directors of nursing or unit supervisors routinely calibrate their personal safety assessments with in-depth evaluations of their supervised staff. The risk of adverse occupational outcomes could be lower if nursing supervisors are proactive addressing safety concerns (Kelloway & Barling 2010), a practice that could also boost job satisfaction. This study is one of the few in nursing research to measure safety aspects at multiple levels, including assessments of supervisors and their staff. Results showed that job satisfaction was higher at units with safer practices. Supervisors' safety assessments were not associated with the job satisfaction of their staff. Future studies are required to examine the role of safety practices in enhancing job satisfaction as well as supervisors' roles and responsibilities in enhancing both safety practices and workers' job satisfaction.

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**Table 1**Descriptive statistics for registered nurses ( $n = 1052$ )

Characteristics	N (%)
Sex	
Male	78 (7.4)
Female	974 (92.6)
Age (years)	
18–24	52 (4.9)
25–34	288 (27.4)
35–44	260 (24.7)
45–54	291 (27.7)
55	161 (15.3)
Race	
Hispanic	22 (2.1)
White, non-Hispanic	937 (89.1)
Black, non-Hispanic	43 (4.1)
Other	50 (4.8)
Education	
1–3 years of college	187 (17.8)
Baccalaureate degree	650 (61.8)
Graduate degree	215 (20.4)
Difficulty in paying bills	
Great deal of difficulty	30 (2.9)
Some difficulty	182 (17.3)
A little difficulty	224 (21.3)
No difficulty	582 (55.3)
Refused	34 (3.2)
Hours worked per week	
<30	263 (25.0)
30–34	135 (12.8)
35–39	348 (33.1)
40–44	265 (25.2)
45	41 (3.9)
Having a second job	
Yes	156 (14.8)
No	896 (85.2)
Having only day shift, %	
Yes	769 (73.1)
No (also night shift)	283 (26.9)

Table 2

Descriptive statistics for supervisors (*n* = 79)

Characteristics	N (%)
Age (years)	
29–39	9 (12.0)
40–49	16 (21.3)
50–59	38 (51.7)
60–66	12 (16.0)
Sex	
Female	69 (92.0)
Male	6 (8.0)
Race	
White	75 (98.7)
Black	1 (1.3)
Education	
Baccalaureate degree	2 (2.6)
Graduate degree	75 (97.4)
Tenure years at unit	
1	3 (3.8)
2	16 (20.3)
3	24 (30.4)
4	15 (19.0)
5	21 (26.6)

Table 3

Multilevel relationships of safety practices showing the odds ratio (OR) of nurses' scoring a higher category of job satisfaction ( $n = 1052$ )

	Model I		Model II		Model III	
	OR	95% CI	OR	95% CI	OR	95% CI
Nurses' aggregated safety practices	4.69**	3.08, 7.13	1.67*	1.04, 2.68	1.65*	1.02, 2.66
Supervisors' safety practices	1.17	0.87, 1.58	1.09	0.85, 1.39	1.05	0.83, 1.34

\*  $P < 0.05$ ,

\*\*  $P < 0.001$ .

Model I: Separate models for each predictor, adjusting for individual-level confounders including demographic (age, race, gender), socio-economic conditions (education level and capacity to pay the bills), occupational conditions (day shift or not, hours worked per week).

Model II: Expanded model I, adjusting also for individual-level assessments of safety practices.

Model III: Expanded model II, but both predictors were included in the model simultaneously.