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RESEARCH ARTICLE

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Underreporting of work-related low back pain among registered nurses: A mixed method study

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Abstract

Background: Identifying and addressing work-related health problems early is crucial, but workers often perceive barriers in reporting these to management. This study aimed to investigate the factors associated with nurses' reporting of work-related low back pain to their managers and explored the reasons why nurses with patient handling injuries did not report them.

Methods: This study is a concurrent mixed-method analysis of data from two statewide cross-sectional surveys of California registered nurses conducted in 2013 and 2016. The reporting of work-related low back pain to management (n = 288) was examined for associations with individual, occupational, and organizational factors. For qualitative analysis, the reasons for not reporting patient handling injuries were explored using open-ended responses (n = 42).

Results: Reporting was associated with BIPOC (Black, Indigenous, and People of Color) men (adjusted odds ratio [AOR]: 1.31, 95% confidence interval [CI]: 1.07–1.59) compared to non-Hispanic White women; being a non-US educated nurse (AOR: 0.90, 95% CI: 0.80–1.01); experiencing greater low back pain (AOR: 1.07, 95% CI: 1.02–1.12); missing work (AOR: 1.38, 95% CI: 1.21–2.62); perceiving high physical workload (AOR: 0.89, 95% CI: 0.81–0.98); perceiving high people-oriented culture (AOR: 1.14, 95% CI: 1.04–1.25); and perceiving high ergonomic practices (AOR: 0.89, 95% CI: 0.81–0.98). Identified themes on the reasons for not reporting injuries included organizational-culture attitudes toward work-related injuries and injury characteristics of musculoskeletal disorders.

Conclusions: The findings indicate a need for management to remove structural barriers and improve organizational practices, and for a culture that promotes trust and open communication between workers and management.

KEYWORDS

incident reports, low back pain, musculoskeletal disorders, nurses, organizational culture, patient handling injury, underreport

1 | BACKGROUND

Musculoskeletal disorders (MSDs) are highly prevalent occupational health problems, accounting for 26% of all occupational injuries involving days away from work in the United States in 2020.[1] Among the private industry sectors, health care and social assistance had the second highest incidence rate of MSDs involving days away from work in 2020, with a rate of 41.0 per 10,000 full-time workers, following transportation and warehousing.[2] Studies analyzing workers' compensation data have found that MSDs account for about 75%

of claims among health care workers,[3] with the lower back being the most frequently injured body part.[4]

Research has indicated that work-related injuries in national statistics have been generally underreported and underestimated in the United States as well as in other countries.[3,5–10] For example, the US Bureau of Labor Statistics conducts the Survey of Occupational Injuries and Illnesses (SOII) among a sample of employers, which serves as the primary data source for national statistics of nonfatal occupational injuries and illnesses. However, SOII is particularly limited in its ability to capture work-related illnesses that are slow to develop, such as cumulative MSDs.[11,12] Only work-related injuries and illnesses that went through three consecutive steps are reflected on SOII data. These steps are: (1) workers report their injuries to supervisors, (2) employers determine the work-relatedness and recordable cases (deaths, days away from work, restricted work or transfer to another job, medical treatments beyond first aid, loss of consciousness, etc.), and (3) employers record their workers' injuries on the Occupational Safety and Health Administration (OSHA) 300 Logs.[13] According to the Filter Model,[14] each step filters cases between the steps and, if filtering is less or selectively permeable, the cases at the subsequent steps will be fewer and biased toward those that are more severe or visible in nature (e.g., fractures rather than pain). To accurately assess the impact of MSDs on the workforce, it is necessary to investigate the first filter—when workers disclose potentially work-related MSDs to managers or through the work-injury systems.

Barriers to reporting of work-related injuries and illnesses have been identified among workers, health care providers, and employers. The reasons for underreporting by workers include fear of retaliation, loss of job, not serious enough to report, doubt of work-relatedness, losing future career prospects, bad self-image or reputation (being labeled as a complainer, unable to do the job, careless worker), employers' incentive and disincentive programs, lengthy bureaucratic procedures to report, no perceived merit in reporting, and a climate of blame for workers' injuries.[8,13,15–18] The recognition of work-relatedness has also been a major barrier due to the lack of training in occupational medicine among health care providers.[13,19,20] Moreover, some employers lack knowledge of the reporting requirements or do not have an effective system to record occupational injuries. Also, some employers may intentionally underreport injuries to avoid higher insurance premiums, audits by OSHA, and the possibility of losing business contracts due to bad safety records.[12,13]

Underreporting occurs disproportionately, with higher rates of underreporting in more vulnerable populations (such as racial minorities, immigrant workers, and temporary workers) and in small organizations,[18,21,22] which can result in serious outcomes. According to a study using national survey data from the US Census Bureau, Black or immigrant workers have higher rates of occupational injuries or more severe work disabilities than White workers.[23] In a hospital setting, nursing aides showed higher rates of occupational injuries than nurses.[24] Underreporting—as determined by the difference between self-reported and administratively reported injury data—was greater among Black workers than among White workers.[21] In the health care industry, lower intention to report has been observed more frequently in ambulatory care settings than in hospital settings, among staff nurses compared to other positions, and among workers in nonstandard work arrangements than in permanent positions.[18]

While organizational factors may shape the procedures for workers to report their work-related injuries or illnesses to their supervisor, only a few studies have examined the effect of organizational factors on reporting work injuries to managers.[18,25,26] Brown et al.[18] showed that a higher intention to report work injuries was observed if an organization had on-site occupational health services or a health and safety committee that included staff nurses and occupational health representatives, and if their managers were concerned about their workers' welfare. A qualitative study of nursing homes[26] showed that openness in communication over MSDs in an organization determined how middle managers dealt with employees' MSDs. The openness in the organization was facilitated by four conditions: (1) employees disclosing their pain, (2) coworkers' culture of handling pain, (3) managers' perceptions of the role of employees' pain, and (4) formal or informal procedures and approaches in dealing with pain.[26] Therefore, the culture for dealing with MSDs in an organization may determine whether workers will report their pain to managers.

When MSDs involve a discernible causal event at work, workers easily perceive their condition as work-related and can report it promptly. On the other hand, MSDs that are caused by cumulative micro-injuries induced by repetitive and continuous strain and that are slowly aggravated make the determination of work-relatedness and timing for reporting more unclear.[3,27] Even though typical musculoskeletal pain can resolve naturally with rest, some musculoskeletal pain develops into chronic MSDs involving work disability and exit from employment.[28] When workers have musculoskeletal pain interfering with work, the workers would need to discuss their pain with their supervisors. However, if the workers perceive barriers to disclosing their health conditions to supervisors, they may not report and continue working despite their pain,[29] which may lead to chronic MSDs.

Few studies have comprehensively examined the individual, occupational, and organizational factors that influence the reporting of work-related MSDs, and little is known about the barriers to reporting musculoskeletal injuries at work. Therefore, the purpose of the present study was to examine the underreporting of work-related MSDs among registered nurses. The first aim was to examine the level of reporting of work-related low back pain among nurses and the relationship of reporting with individual, occupational, and organizational factors. The second aim was to explore the reasons why nurses who had patient handling injuries did not report their injuries.

2 | METHODS

2.1 | Design, sample and procedure

This study is a secondary analysis of the data from the Nurses' Safety Study, which was two statewide surveys of registered nurses in

California, conducted in 2013 and 2016.[30] The survey samples were registered nurses with an active license who were selected from the list of the California Board of Registered Nursing by stratified random sampling for nine regions of California.[31] In 2013, 526 out of 2000 nurses responded to the survey (a response rate of 26%). In 2016, 592 out of 3000 nurses (new cross-sectional sample excluding 2013 survey participants) responded to the survey (a response rate of 20%). In addition, a follow-up survey was sent to 278 participants in the 2013 survey[32] and 169 nurses responded (a response rate of 61%). Figure 1 describes the flow diagram of the study sample, pooling the three survey samples. The survey collected data through postal questionnaires or the Qualtrics online survey tool (Provo). The sampling and data collection information is described in detail elsewhere.[30]

This study used a concurrent mixed method design. The reporting status was assessed twice, serving as a contingency question. The first assessment took place when participants reported low back pain (quantitative data); the second assessment occurred when participants experienced a patient handling injury (qualitative data). First, the quantitative study utilized only 2016 survey samples, because the question asking about the reporting status of work-related low back pain was not included in the 2013 survey. Among the 761 respondents, after excluding those not currently employed, had no back pain during the previous 12 months, or did not consider their low back pain to be work-related, 288 respondents were included in the study. For the qualitative study part, we analyzed answers to an open-ended question from all three samples in 2013 and 2016. Among 986 currently employed nurses, 189 experienced a patient handling injury within 1–3 years. The reporting status of these injuries was as follows: reported ($N = 93$), not reported ($N = 54$), and no response ($N = 42$). About 91% of eligible participants (49 out of 54 nurses) provided reasons for not reporting. After excluding 7 nurses due to clarity problems, 42 quotes were included for content analysis.

The original study was granted ethical approval by the Committee on Human Research at the University of California, San Francisco. Participants were given the opportunity to enter a raffle for gift cards ($20–$100) as a token of appreciation. This secondary analysis was conducted using deidentified data.

2.2 | Variables and measures

2.2.1 | Work-related low back pain and reporting status

Low back pain was defined as any pain, aching, stiffness, burning, numbness, or tingling in the lower back during the past 12 months. Work-related pain was defined as pain caused by work or made worse by work. For low back pain, the intensity, duration, and frequency were assessed through the following questions: "How severe has the pain from this problem been, on average?," "When you have this problem, how long does it last, on average?," and "How often did you have this problem?" A low back pain index (0–3) was created as a composite score, with 1 point assigned for each of the following criteria: moderate or higher intensity, at least 3 months of duration, and daily frequency. As pain intensity, duration, and frequency were found to be correlated in our study, and no previous studies had investigated workers' perceptions of pain that was serious enough to be reported to a supervisor, we created this composite index by assigning 1 point for each cut-off point for intensity, duration, and frequency that was associated with reporting. The cut-off point was determined for each level where the proportion of reporting nurses was greater than the proportion of

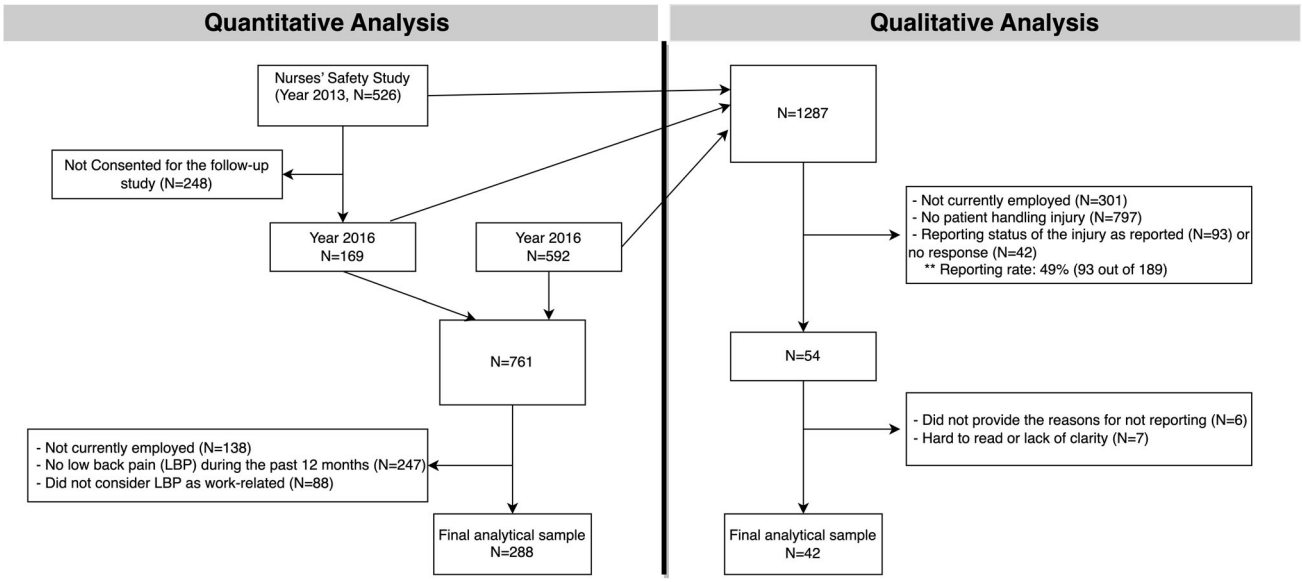

FIGURE 1 Flow diagram of study participants.

nonreporting nurses (See the Results section, Table 2 under the subheading of sample characteristics for detailed information). Participants were also asked whether they had missed work or sought health care due to work-related low back pain. For reporting, participants were asked whether they reported their low back pain to their managers or completed a work-related injury report.

2.2.2 | Demographic characteristics

Demographic information was collected, including age, gender, race/ethnicity, education, and country of initial nursing education. Gender and race/ethnicity were merged and categorized into four groups: non-Hispanic White women, BIPOC (Black, Indigenous, and People of Color) women, non-Hispanic White men, and BIPOC men. The country of initial nursing education was used as a proxy for determining immigrant worker status.

2.2.3 | Occupational factors

Psychosocial job factors were measured using the Job Content Questionnaire,[33] which included 5 items for job demand and 9 items for job control. Job demand assessed the psychological load of aspects such as speed, exertion, amount of work, limited time, and dealing with conflicting demands. Job control assessed the level of control over work using skills, creativity, and autonomy. Participants responded to each item on a 4-point Likert scale (1-Strongly Disagree to 4-Strongly Agree). Participants were classified as having high job demand or high job control if they scored above the median value for job demand (range: 16–48) or job control (range: 44–90), respectively.

Physical workload was measured using a modified 19-item Physical Workload Index Questionnaire (PWIQ) developed by Hollmann et al.[34] and modified by Janowitz et al.[35] The PWIQ estimates the physical load on the lower back based on the frequency of awkward body postures when performing work tasks and the frequency of forceful tasks of lifting or carrying weights. The modified PWIQ included additional descriptions of pushing and pulling, along with lifting and carrying. Each response was recorded on a 5-point Likert-type scale (0-Never to 4-Very often). The total scale was calculated by applying the weights per specific questions ranging from 0 to 56.17, with a higher PWIQ score indicating a higher physical workload.

Other items on job characteristics included the type of workplace (hospital, ambulatory/outpatient clinic, nursing home/long-term care, or others), job title (staff nurse, nurse manager/supervisor, or others), tenure in the current workplace, and employment status (full time or part time/per diem).

2.2.4 | Organizational factors

The Organizational Policies and Practice scales[36] were used to measure the safety climate (7 items), people-oriented culture (4 items), and ergonomic practices (6 items). The safety climate measured top management's commitment to and actual activities for safety in the organization. People-oriented culture assessed the degree of employee involvement in planning and decision-making based on trust and open communication between management and employees. Ergonomic practices measured how the organization designed the work to decrease ergonomic risks. Dennerlein et al.[37] made modifications to measure the ergonomic practices in patient care settings; the Nurses' Safety Study[38] made minor wording changes to the modified version. Each response was recorded on a 5-point Likert scale (1-Strongly Disagree to 5-Strongly Agree). The average score was calculated for each subscale, and those who scored above the median value were grouped into the high safety climate, people-oriented culture, and ergonomic practice groups.

2.2.5 | Reasons for not reporting

Participants who had experienced a patient handling injury but had not reported it to a supervisor were asked an open-ended question to explain why they chose not to report the injury. When asked whether they had incurred a patient handling injury, a different time frame was used for the follow-up data in 2016. Participants recruited in 2016 and 2013 were asked about injuries in the past 12 months, while participants from the follow-up study in 2016 were asked about injuries in the past 3 years.

2.3 | Statistical analysis

The number of missing data per each variable was examined, and the missing rate per each variable was found to be under 15%. Job title ($n = 42$) had the highest missing rate, followed by physical workload ($n = 22$). Multiple imputations were applied to all variables through the mice package for imputing missing values.[39] To prevent loss of the information, imputation was applied at the item level for a composite scale such as job demand, job control, physical workload, people-oriented culture, safety climate, and ergonomic practices. Each composite scale score was calculated after performing the imputation.

Descriptive analysis was conducted based on the status of reporting. The effect size of the mean difference was assessed with Cohen's d,[40] which is interpreted as a value of 1 differing by 1 standard deviation (SD). A multivariable logistic regression was then performed to examine the effect of individual, occupational, and organizational factors on the reporting of work-related low back pain. For a parsimonious model, variables were selected based on bidirectional Akaike Information Criterion selection. As a result, the final model did not retain the following variables: educational status, tenure, type of workplace, job title, employment status, job demand, and job control. The goodness of fit was assessed by checking McFadden's pseudo-R^2, with values of 0.2–0.4 indicating excellent fit.[41] Additionally, the final model was checked for multicollinearity.

Descriptive analysis showed that health care-seeking was associated with reporting, but it was not included in the final model due to its high correlations with the low back pain index ($r = 0.41$) and missed work ($r = 0.41$). The correlation between low back pain and missed work was small at 0.24. Instead, further analysis was performed by stratifying the sample by the status of health care seeking. Odds ratios (OR) and 95% confidence intervals (CI) were computed. Lastly, we conducted sensitivity analysis using complete cases without missing data. The results were consistent with the results of imputed data. All of the analyses were conducted using open-source R software.

For qualitative data, each response to an open-ended question was analyzed by inductive content analysis[42]: (1) selecting the unit of analysis; (2) open coding; (3) creating categories; and (4) abstraction. The unit of analysis is the whole response, but we focused on manifest contents to create categories from the data. Two authors independently coded the written responses. Discrepancies were discussed until an agreement was reached.

3 | RESULTS

3.1 | Sample characteristics

Table 1 displays the characteristics of 288 participants based on their reporting status. Only 20% of the participants reported their work-related low back pain to their supervisors. The majority of participants were non-Hispanic White women (50%), had bachelor's degree (53%), had obtained their initial nursing education in the United States (79%), worked in a hospital setting (75%), were staff nurses (75%), and were employed as full-time workers (74%). The mean age was 47.7 years (SD: 11.9), and the mean job tenure in the current workplace was 9.73 (SD: 9.2) years. No statistically significant differences were found in demographic and occupational characteristics by reporting status, except for age and physical workload. Nurses who reported their low back pain were older (Cohen's d: 0.32, $p = 0.03$) and reported lower physical workload (Cohen's d: 0.36, $p = 0.01$).

Table 2 presents pain characteristics by reporting status. A higher proportion of reporting nurses was observed among those experiencing pain with moderate or severe intensity, daily frequency, and a duration of more than 3 months compared to the proportion of nonreporting nurses. Reporting was associated with a higher low back pain index score (Cohen's d: 0.34, $p < 0.001$), pain resulting in health care-seeking (OR: 3.99, 95% CI: 2.09–7.88), and pain resulting in missing work (OR: 7.23, 95% CI: 3.68–14.42).

3.2 | Factors associated with reporting work-related low back pain

Table 3 displays the results of the multivariable analysis on the effect of individual, occupational, and organizational factors on reporting work-related low back pain to managers. Reporting showed a statistically significant association with the following factors: race/ethnicity and gender, physical workload, people-oriented culture, ergonomic practice, missed work, and low back pain index. Higher reporting was associated with BIPOC men (OR: 1.31, 95% CI: 1.07–1.59) compared to non-Hispanic White women, high people-oriented culture (OR: 1.14, 95% CI: 1.04–1.25), those who missed work (OR: 1.38, 95% CI: 1.24–1.54), and greater low back pain severity (OR: 1.07, 95% CI: 1.02–1.12). Lower reporting was associated with high physical workload (OR: 0.89, 95% CI: 0.81–0.97) and high ergonomic practice (OR: 0.89, 95% CI: 0.81–0.97). Individuals who received nursing education outside of the United States tended to underreport work-related low back pain (OR: 0.90, 95% CI: 0.80–1.01), with marginal statistical significance ($p = 0.07$). This model showed a McFadden's pseudo R^2 of 0.27, indicating an excellent fit, and no multicollinearity was observed.

The results of the stratified analysis by the status of health care seeking due to work-related low back pain provided different sets of significant variables for reporting. Among those who saw a health care provider, BIPOC men (OR: 1.55, 95% CI: 1.12–2.14) compared to non-Hispanic White women, those who missed work (OR: 1.31, 95% CI: 1.11–1.55), and those perceiving a high people-oriented culture (OR: 1.21, 95% CI: 1.02–1.44) were more likely to report, adjusting for age, country of initial nursing education, physical workload, ergonomic practice, and low back pain index. Among those who did not see a health care provider, reporting was significantly associated with age, ergonomic practice, missed work, and physical workload. While older nurses (OR: 1.01, 95% CI: 1.003–1.012) or those who missed work (OR: 1.40, 95% CI: 1.16–1.68) were more likely to report, those who perceived high ergonomic practice (OR: 0.88, 95% CI: 0.79–0.98) or had high physical workload exposure (OR: 0.89, 95% CI: 0.81–0.98) were less likely to report.

3.3 | Reasons for not reporting a patient handling injury

This result includes 45 nurses who had a patient handling injury but did not report it (Table 4). The reporting rate of patient handling injuries was 49% (Figure 1). Two main themes emerged as the reasons why nurses did not report their patient handling injuries to their supervisors: organizational culture toward work-related injuries and the injury characteristics of their MSDs. The first theme—organizational culture—included the following three subthemes: blame or lack of support by management ($n = 5$), reporting system ($n = 7$), negative consequences ($n = 6$), and incentives for no injury ($n = 1$). Two nurses described the blame and lack of support by management as their own or their co-workers' experiences, as follows: "Our manager blames the employees for their injuries; reporting just causes too much aggravation" and "Administrators gave me [a] hard time. [When] I tried to report my last injury, I could not get the name of WC [sic] the workers' compensation worker to approve my MD [sic] medical doctor visit, despite several attempts. It

TABLE 1 Reporting status of work-related low back pain among registered nurses.

	Report (*N* = 59)		No report (*N* = 229)		
	Mean (SD)	*N* (%)	Mean (SD)	*N* (%)[a]	*p*
Age (years)	50.7 (11.3)		46.9 (11.9)		0.03
Race/Ethnicity and Gender					
Non-Hispanic White women		25 (42)		118 (52)	0.16
BIPOC[b] women		24 (41)		91 (40)	
Non-Hispanic White men		3 (5)		10 (4)	
BIPOC men		7 (12)		10 (4)	
Country of initial nursing education					1.00
United States		47 (80)		180 (79)	
Other[c]		12 (20)		49 (21)	
Highest education					0.40
Diploma or Associate degree		18 (31)		88 (38)	
Bachelor's degree		36 (61)		117 (51)	
Master or Doctoral degree		5 (8)		24 (10)	
Tenure in the current job (years)	10.2 (9.0)		9.6 (9.2)		0.67
Type of workplace					0.90
Hospital		44 (75)		173 (76)	
Ambulatory/Outpatient clinic		7 (12)		27 (12)	
Nursing home/Long term care		3 (5)		15 (7)	
Other[d]		5 (8)		14 (6)	
Job title					0.72
Staff nurse		43 (73)		173 (76)	
Nurse manager/supervisor		2 (3)		13 (6)	
Other[e]		14 (24)		43 (19)	
Employment status					1.00
Full time		44 (75)		170 (74)	
Part time/per diem		15 (25)		59 (26)	
Physical workload (0–56.17)	23.8 (12.5)		28.6 (13.3)		0.01
Job demand (16–48)	36.2 (5.9)		37.4 (6.3)		0.84
Job control (44–90)	69.0 (9.2)		69.2 (10.2)		0.87
People-oriented culture (1–5)	3.20 (0.74)		3.19 (0.91)		0.91
Safety climate (1–5)	3.33 (0.73)		3.41 (0.80)		0.43
Ergonomic practices (1–5)	2.88 (0.75)		2.98 (0.85)		0.41

[a]It may not add up to 100% due to rounding.

[b]BIPOC (Black, Indigenous, and People of Color) includes Asian, Black, Hispanic, and mixed race/ethnicity groups.

[c]Includes Philippines, Canada, South Korea, India, Netherland, Brazil, Australia, United Kingdom, Ethiopia, China, Mexico, and Cameroon.

[d]Includes school/university, health plan, corporate, hospice, correctional facility, and clients with various settings.

[e]Includes quality improvement nurse, case manager, nurse liaison, regulatory enforcement, school nurse, telephone triage nurse, clinical coordinator, and home health nurse.

TABLE 2 Reporting of work-related low back pain to supervisors by pain characteristics among registered nurses ($N = 288$).

		Report ($N = 59$) N (%)	No report ($N = 229$) N (%)	p
Intensity				0.02
	Mild/Minimal	10 (17)	81 (35)	
	Moderate	43 (73)	132 (58)	
	Severe/Worst pain ever in my life	6 (10)	16 (7)	
Frequency				0.002
	Daily/Almost daily	35 (59)	78 (34)	
	Weekly	9 (15)	56 (24)	
	Monthly	3 (5)	42 (18)	
	Less frequent than monthly	12 (20)	53 (23)	
Duration				0.02
	Less than 1 day	15 (25)	59 (26)	
	Less than 1 week	18 (31)	93 (41)	
	Less than a month	4 (7)	28 (12)	
	1–3 months	2 (3)	14 (6)	
	More than 3 months	20 (34)	35 (15)	
Low back pain index[a]				<0.001
	0	6 (10)	67 (29)	
	1	20 (34)	91 (40)	
	2	15 (25)	43 (19)	
	3	18 (31)	28 (12)	
Saw a health care provider				<0.001
	Yes	41 (69)	83 (36)	
	No	18 (31)	146 (64)	
Missed work				<0.001
	Yes	32 (54)	32 (14)	
	No	27 (46)	197 (86)	

[a]Made by giving 1 point for equal to or more than a moderate intensity, more than 3 month-duration, and daily frequency.

is easier [for me] to pay [for it] myself." Two barriers were identified in the reporting system. One was the lengthy procedure to report, which was described as "Too much of a hassle filling out paperwork." The legitimacy of reporting work-related injuries within a time frame was also described as "I felt the pain the day after and was told that I had to report it the same day." Six nurses described negative consequences of reporting work-related injuries. One nurse expressed concerns over the risk to future assignments and fear of being labeled as a complainer, such as "Didn't want to miss days of work or potentially lose the assignment or future assignments from being known to complain." Another nurse expressed concerns about self-image as "Didn't want to be perceived as being weak or unfit." Lastly, the organizational incentive practice for no injury was described as a barrier as "If no one reports, the staff gets bagels."

The second theme—injury characteristics of MSDs—included the following three subthemes: cumulative injury with gradual progress ($n = 4$), uncertainty about work-relatedness ($n = 16$), and not serious enough to report ($n = 13$). One nurse described that an MSD was hard to recognize at first as "It was a slow process. I just thought it was normal aches and pains from 12 h shifts with few breaks and the normal again [sic] aging process." Additionally, 16 nurses expressed difficulty determining whether their pain was work-related or not, as there was no clear-cut way to differentiate between pain caused by work and other factors, as evidenced by the statement: "Not sure it's work related. Because low back pain is exacerbated by patients handling and computer use." The severity of injury was also a reason for not reporting, as described by two nurses: "Felt it was just soreness from overdoing on a busy day, did not seek treatment, just

TABLE 3 Factors associated with reporting of work-related low back pain to supervisors among registered nurses: Stratified analysis by health care seeking status.[a]

	All (*N* = 288) OR (95% CI)	Saw a health care provider	
		Yes (*N* = 124) OR (95% CI)	No (*N* = 164) OR (95% CI)
Age (years)	1.00 (0.99–1.01)	1.00 (0.99–1.01)	1.01 (1.00–1.01)*
Race/Ethnicity & Gender (Ref: Non-Hispanic White women)			
Non-Hispanic White men	0.99 (0.80–1.21)	1.13 (0.77–1.66)	0.93 (0.74–1.17)
BIPOC[b] women	1.07 (0.96–1.18)	1.14 (0.94–1.38)	1.02 (0.91–1.14)
BIPOC men	1.31 (1.07–1.59)**	1.55 (1.12–2.14)**	1.06 (0.82–1.37)
Country of initial nursing education: Non-US (Ref: US)	0.90 (0.80, 1.01)	0.86 (0.69–1.07)	0.94 (0.82–1.07)
Physical workload: High (>27.71)[c]	0.89 (0.81–0.97)**	0.88 (0.75–1.05)	0.89 (0.81–0.98)*
People oriented culture: High (>3.25)[c]	1.14 (1.04–1.25)**	1.21 (1.02–1.44)*	1.10 (1.00–1.22)
Ergonomic practice: High (>3)[c]	0.89 (0.81–0.98)*	0.91 (0.76–1.08)	0.88 (0.79–0.98)*
Low back pain index (0–3)[d]	1.07 (1.02–1.12)**	1.08 (0.99–1.18)	1.05 (0.99–1.10)
Missed work: Yes (Ref: No)	1.38 (1.24–1.54)***	1.31 (1.11–1.55)**	1.40 (1.16–1.68)***
Model fit: McFadden's pseudo R^2[e]	0.27		

[a]Adjusted for all variables in the tables. Ref: reference group *$p < 0.05$, **$p < 0.01$, ***$p < 0.001$.

[b]BIPOC (Black, Indigenous, and People of Color) includes Asian, Black, Hispanic, and mixed race/ethnicity groups.

[c]These variables were dichotomized by the median values.

[d]Made by giving 1 point for equal to or more than a moderate intensity, more than 3 month-duration, and daily frequency.

[e]Values of 0.2 to 0.4 indicated excellent fit.

TABLE 4 Reasons for not reporting patient handling injuries to supervisor.

Theme	Sub-theme	Quote
Organizational culture toward work-related injury	Negative consequences (n = 6)	"Didn't want to miss days of work or potentially lose the assignment or future assignments from being known to complain"
		"Didn't want to be perceived as being weak or unfit"
	Blame or lack of support by the management (n = 5)	"Our manager blames the employees for their injuries; reporting just causes too much aggravation"
		"Administrators gave me [a] hard time. [When] I tried to report my last injury, I could not get the name of WC [*sic*] the workers' compensation worker to approve my MD [*sic*] medical doctor visit, despite several attempts. It is easier [for me] to pay [for it] myself"
	Reporting system: strict time frame of reporting (n = 4)	"I felt the pain the day after and was told that I had to report it the same day"
	Reporting system: time consuming (n = 3)	"Too much of a hassle filling out paperwork"
	Incentives for no injury (n = 1)	"If no one reports, the staff gets bagels"
Injury characteristics of musculoskeletal disorders	Uncertainty about work-relatedness (n = 16)	"Not sure it's work related. Because low back pain is exacerbated by patients handling and computer use"
	Not serious enough to report (n = 13)	"Felt it was just soreness from overdoing on a busy day did not seek treatment just ice & heat at home"
		"Mild pain only-it has happened before. I did not feel I need to report as it resolves in a day or two"
	Cumulative injury with gradual progress (n = 4)	"It was a slow process. I just thought it was normal aches and pains from 12hr shifts with few breaks and the normal again [*sic*] aging process"

ice & heat at home" and "Mild pain only-it has happened before. I did not feel I need to report as it resolves in a day or two."

4 | DISCUSSION

In our study, which used a statewide sample of California registered nurses, the reporting rate was found to be only 20% among those with work-related low back pain and 49% among those who experienced a patient handling injury. The reporting rate of nurses with a patient handling injury is similar to findings from other studies, such as 51% of work-related injuries among registered nurses[18] and 49%–53% of work-related MSDs among manufacturing workers.[6,17] However, the reporting rate of work-related low back pain was much lower than in those studies. Furthermore, the reporting rate of 65% among those who missed work or saw a health care provider due to work-related low back pain was also lower than findings by Sabbath et al.[21] with a 73% reporting rate for work-related injuries among health care workers requiring medical treatment or advice and lost time from work.

4.1 | Organizational factors

A key finding of the present study was the association between organizational factors and reporting, with a better people-oriented culture contributing to higher reporting. Our finding of the positive effect of a people-oriented culture on reporting is in line with other studies.[18,26] Unexpectedly, our study found that reporting was not associated with safety climate, and that lower reporting was associated with better ergonomic practices. These findings contrast with other studies that suggest better safety climate and ergonomic practices are associated with positive outcomes such as fewer work-related injuries[43] or fewer injuries requiring work limitations.[44] This finding may be related to the fact that ergonomic practices and safety climate are associated with primary prevention, such as preventing work-related injuries from occurring, while people-oriented culture is more associated with secondary prevention, such as how to respond to and manage work-related injuries that have already occurred at work.

Our qualitative analysis findings corroborate and provide more detailed information about the reasons for underreporting related to organizational culture and practice for work-related injuries. Our study identified blame or lack of support by management, lengthy reporting procedures, strict time frames for reporting, negative consequences, and incentives for no injury as main barriers to reporting work-related MSDs. These findings are in line with previous studies.[12,13,15–18] The reluctance to report work-related injuries may not solely be due to workers' perceptions. A prospective study by Okechukwu et al.[45] showed that nursing home workers who reported work-related injuries were more likely to experience involuntary job losses, despite regulatory protections for injured workers.

Our stratified analysis by health care seeking status showed that a people-oriented culture was a significant factor for reporting among those who sought health care, but not among the other group. Among those who did not seek health care, ergonomic practices were associated with reporting. One possible interpretation is that the nurses who perceived their organization as already implementing good ergonomic practices may have felt reluctant to report their pain, especially if they anticipated being blamed for the injury or if the pain was not serious enough to require health care-seeking. This interpretation was supported by our qualitative results. Blame by management was a concern for nurses, and some nurses did not report because their pain could be relieved with ice and heat at home and did not require further medical treatment. In contrast, nurses who received medical treatment for their pain may easily find legitimate reasons to report, and people-oriented culture may reflect the supportive nature of the organization towards these workers and empower them to communicate their safety and health problems.

4.2 | Severity of pain

Our quantitative and qualitative findings corroborate that the severity of pain was associated with reporting. The quantitative results indicated that those who experienced greater low back pain and those who missed work or saw a health care provider due to the pain were more likely to report. Our qualitative findings showed that the perception of pain as not being serious enough to report was a barrier for reporting patient handling injuries. These results are consistent with previous studies.[16,46,47] An interesting finding is that the cut-off points of pain characteristics presenting significant associations with reporting in our study were moderate or higher intensity, daily frequency, and a duration of three or more months, which are more severe than the criteria used in previous occupational health research (i.e., moderate intensity, weekly frequency, and one-month duration).[48] This may reflect that workers may not report their pain to their supervisor until their pain becomes recurrent and chronic.

4.3 | Injury characteristics of MSDs

Our qualitative data findings showed that characteristics of MSDs were a barrier to reporting. MSDs often have gradual onsets from cumulative injuries. If there is no clear accident or if nurses have pre-existing MSDs, they may not be sure whether their MSDs are work-related. Thus, it can be difficult for them to determine whether and when to report MSDs. On the other hand, having a patient handling injury can be a discernable event, but both our quantitative and qualitative findings indicate that nurses may not report if the injury is not serious. Later when the pain or condition becomes serious, they may feel it is too late to report. This finding is consistent with a study among US soldiers, which revealed a higher rate of underreporting to medical providers for gradual onset of MSDs compared to sudden onset of MSDs, particularly in cases involving the back, shoulder, knee, or ankle.[49]

Uncertainty regarding work-relatedness is a well-known barrier to reporting.[13,15,16] MSDs such as low back pain are common in the general population and become more common with aging,[50] making it challenging

for health care providers to determine whether MSD is work-related or not.[51] Our quantitative study defined work-relatedness of low back pain based on self-assessment, not as diagnosed by a physician or employer, and 76% of participants perceived their low back pain as work-related. This rate was lower than that of US packaging workers (86%),[17] but higher than that of manufacturing workers in Korea (41%)[6] and patients visiting general practitioners in the Netherlands (31%).[52]

4.4 | Individual factors

Our study found that reporting was affected by the intersection of gender and race/ethnicity. Previous studies have found women to be less likely than men to report[5,53] and BIPOC individuals to be less likely than Whites to report.[21] In our study, BIPOC men were more likely than non-Hispanic White women to report work-related low back pain, and a significant difference was observed only among those who sought health care. This finding indicates that when nurses experience pain serious enough to require a health care visit, they consider reporting but their gender and race/ethnicity identities together may play a role in their actual reporting behavior. We also found that BIPOC men compared to non-Hispanic White women were more likely to miss work and seek health care, but their low back pain scores were lower. One possible interpretation is that BIPOC male nurses may be more proactive in dealing with low back pain. Alternatively, this could be due to different physical exposures. According to a recent scoping review,[54] men tend to be exposed to more physical hazards than women in the same occupation. We also observed that the physical workload was higher among BIPOC men, but the difference was not statistically significant. Further research is needed to validate these findings.

Previous studies indicated that immigrant status suppressed reporting,[5,13] but our study found only a marginal significance of immigration status in the relationship with reporting. This may be due in part to our measurement of immigrant status, which was based on the country of initial nursing education. If using this proxy measure had introduced a nondifferential misclassification error, it would have led to a bias toward the null.

Our study showed that older age was associated with higher reporting among those who did not see a health care provider. The finding is consistent with a previous study that found that older workers were more likely to report work injuries.[15] Our finding adds that even when work-related pain is relatively minor, not requiring health care, older workers may speak up and report more than younger workers. Older nurses may also be more willing to discuss work limitations related to pain and the needed job accommodations with their supervisors.

4.5 | Occupational factors

We found that reporting was inversely associated with physical workload. Further, the significant association was observed only among those who did not see a health care provider. This finding is different from a study by Qin et al.[47] which showed that higher physical demands were associated with an increased filing of workers' compensation claims. Previous studies[15,17] have shown that workers who perceive work injuries as a normal part of their job are less likely to report them. Nurses who are exposed to a high physical workload may perceive their work-related pain as a normal part of the job, since low back pain is also common among their colleagues. Consequently, these nurses may be less likely to report the pain. Additionally, for nurses with higher physical workloads, their work settings may have fewer resources to address them. If this is the case, those nurses may be hesitant to disclose their condition to their supervisors because they do not expect available job accommodations.

4.6 | Limitations

Our study has several limitations that require caution in the interpretation of the findings. First, due to the cross-sectional design, we could not establish temporality or causality in the relationships between variables. For example, we could not determine whether the reported organizational culture or practices preceded the respondents' experience of low back pain and reporting. It is plausible that the organization may have improved the work environment and designs by ergonomic engineering after the nurses experienced work-related low back pain. Second, while the study sample included various racial/ethnic groups and both genders, the small sample sizes of minority groups and male nurses limited our ability to examine their effects fully. Third, although we used statewide random samples, the low response rates may have introduced potential selection bias. Fourth, since all information in this study was based on self-report, there may be measurement errors of physical workload and work-relatedness of low back pain. Fifth, since we included only currently employed nurses including those who were on disability leave, the effect of severity of pain, organizational factors, and occupational factors may be underestimated due to the survival effect. Sixth, caution should be exercised when generalizing our findings to other health care workers due to the homogeneity of the study sample consisting solely of registered nurses. Lastly, as our qualitative analysis was based on a single, open-ended survey question, we were not able to fully clarify the meaning of some sentences that included typos or unclear abbreviations.

5 | CONCLUSIONS

Disclosing their health condition to managers can be difficult for workers who are seeking job accommodations,[46,55] but reporting musculoskeletal pain as work-related may be even more challenging. Our study showed a high level of underreporting of work-related low back pain among nurses. MSDs typically develop slowly, providing numerous opportunities for early intervention and prevention of chronic MSDs. However, the uncertainty surrounding the work-relatedness of MSDs, combined with a lack of clear guidelines on when to report musculoskeletal pain to managers, can discourage workers from reporting their condition, particularly when it is not yet serious enough to interfere with their ability to work. Our findings indicate a need for employee education on

how to determine work-relatedness of MSDs and the optimal time to report, especially for those experiencing gradual onset of MSDs. In California, the state OSHA standard §5120 Health Care Worker Back and Musculoskeletal Injury Prevention requires hospital employers to provide training to their employees.[56] This training content can include MSD characteristics, 29 § C.F.R. 1904.5 Determination of work-relatedness,[57] and the importance of early reporting.

An organizational environment where workers can disclose their condition and ask for adjustments to their work is crucial for preventing negative health and job outcomes such as the development of more severe and chronic MSDs, reduced job performance and productivity, or job turnover. Our findings suggest that organizations should place more emphasis on creating a more supportive organizational culture that fosters open communication about work-related health and safety and trust in the organization. In addition, employers can begin proactive prevention by conducting surveillance on MSDs among workers and identifying and reducing ergonomic risks at work.

AUTHOR CONTRIBUTIONS

Suyoung Kwon contributed to the conception and design of the study, conducted data analysis, and wrote the manuscript. Soo Jeong Lee obtained funding and acquisition of the original data, conceptualized this study, and contributed to the data analysis, interpretation, and critical revision of the manuscript. Both authors gave approval of the final version to be published, and agree to be accountable for all aspects of the work, ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

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CONFLICT OF INTEREST STATEMENT

The authors declare that there are no conflicts of interest

DISCLOSURE BY AJIM EDITOR OF RECORD

John Meyer declares that he has no conflict of interest in the review and publication decision regarding this article.

DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available on request from Soo-Jeong Lee (soo-jeong.lee@ucsf.edu), upon reasonable request.

ETHICS APPROVAL AND INFORMED CONSENT

The original study was granted ethical approval by the Committee on Human Research at the University of California, San Francisco. Completion of the questionnaire was assumed as evidence of consent to participate. This secondary analysis was conducted using deidentified data.

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