A Hierarchical Model of Occupational Burnout in Nurses Associated With Job-Induced Stress, Self-Concept, and Work Environment

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ABSTRACT

Background: Nurses may experience different levels of occupational burnout in different unit and hospital settings. However, pooling multilevel data in an analysis ignores independent, environmental, and sociocultural contexts of ecological validity.

Purpose: This study aimed to explore a hierarchical model of occupational burnout that is associated with job-induced stress, nurse self-concept, and practice environment in nurses working in different units and hospitals.

Methods: A cross-sectional study was conducted, and 2,605 nurses were recruited from seven hospitals. The outcomes were measured using the Maslach Occupational Burnout Inventory-Human Services Survey, Nurses’ Self-Concept Instrument, Nurse Stress Checklist, and Nursing Work Index-Revised. Hierarchical Linear Modeling 6.0 software was used to conduct hierarchical analysis on the study data.

Results: On the nurse level, job-induced stress was a significant factor affecting emotional exhaustion (β = 0.608, p < .001) and depersonalization (β = 2.439, p < .001), whereas nurse self-concept was a significant factor affecting emotional exhaustion (β = −0.250, p < .001), depersonalization (β = −1.587, p < .001), and personal accomplishment (β = 4.126, p < .001). Furthermore, emotional exhaustion and depersonalization were significantly related to level of education (β = 0.111, p < .01; β = 0.583, p < .05). No significant unit-level associations were identified between occupational burnout and the factors of job-induced stress, nurse self-concept, and practice environment (p > .05). The intragroup correlation coefficient for emotional exhaustion was 2.86 (p < .001).

Conclusions/Implications for Practice: The findings of this study confirm that individual nurse characteristics are strong predictors of emotional exhaustion, depersonalization, and personal accomplishment as these relate to occupational burnout. In addition, nurse self-concept was identified as the most important predictor of all three aspects. In clinical practice, self-concepts about nursing may reduce occupational burnout. Nursing managers formulating new policies should consider nursing background and offer autonomous control over practice.

KEY WORDS: occupational burnout, job-induced stress, self-concept, practice environment, nurse.

Introduction

Nursing has been ranked as the fourth most stressful profession (Jodas & Haddad, 2009). Nurses face many challenges, including managing complex medical care needs and keeping up to date on current best practices. Job satisfaction is influenced by the exercise of job autonomy and the receipt of sufficient support from the organization. Conflicts between nurses and physicians and between nurses and hospital administrators also sometimes occur. In the practice environment, nurses are often criticized, which leads to increased job-induced stress (Gasparino & Guirardello, 2015).

Job-induced stress, which may cause occupational burnout, has been recognized as a reality within the nursing profession for quite some time (Maslach & Leiter, 2016). Rates of professional burnout among nurses range between 29% and 36% in the United States (Aiken et al., 2010) and are 66% in Taiwan (Chou, Li, & Hu, 2014). Nursing care is a profession that requires striking an equitable balance between providing high-quality care to patients and managing personal emotions during periods of job-induced stress (Khamisa, Peltzer, Ilic, & Oldenburg, 2016).

Level of occupational burnout in nurses relates to job-induced stress, self-concept, and work environment and influences their practice efficacy and patient care (McHugh et al., 2013; Panunto & Guirardello Ede, 2013). The term “burnout” refers to an individual’s feeling of being unable to cope with emotional stress, of being drained of energy and resources, and of exhaustion (Maslach & Leiter, 2016). According to Maslach, Schaufeli, and Leiter (2001), burnout consists of three dimensions: emotional exhaustion, depersonalization,
and a reduced sense of personal accomplishment. Emotional exhaustion is a state of emotion and, sometimes, physical depletion. Depersonalization reflects feelings of detachment and having an impersonal response toward care recipients. These behaviors are associated with psychological strain and escape as a way of coping (Wilkinson, Whittington, Perry, & Eames, 2017). A reduced sense of personal accomplishment fosters a negative self-image, particularly in relation to one’s work with service users (Maslach et al., 2001).

Burnout in nurses may be because of several factors, including critical decision making in the absence of complete information, facing life-threatening or traumatic situations, making rapid decisions regarding a complex disease, concerns over litigation, and pressures regarding patient safety and quality of care (Wu et al., 2014). One study found a moderate level of occupational burnout among South African nurses (van der Colff & Rothmann, 2014). Similarly, a study of nurses in Brazil found a moderate level of emotional exhaustion and depersonalization but a severe level of reduced personal accomplishment (Panunto & Guirardello Ede, 2013). In Taiwan, depersonalization levels are moderate, whereas emotional exhaustion and reduced personal accomplishment are severe (Shih et al., 2013).

The relationship between job-induced stress and burnout in nurses may be explained using Maslach’s Burnout Model (Maslach et al., 2001), which relates exposure to environmental and situational stressors to job-induced stress. Job-induced stress contributes to negative burnout in nurses and is associated with low levels of job satisfaction. One study pointed out that nurses may be dissatisfied with their income, job promotions such as with a nursing clinical ladder level, and nurse-physician relationships (Khamisa et al., 2016). Moreover, being unable to share frustrations with others and not receiving positive feedback from colleagues or superiors have been shown to lead to feelings of exclusion and loneliness and then to burnout (Wu et al., 2014). Conversely, positive relationships with colleagues and superiors are protective factors against burnout (Wu et al., 2014).

Self-concept in nursing emphasizes the personal value that nurses derive from their work. One study showed that improving self-concept enhances job satisfaction and retention (Cowin, Johnson, Craven, & Marsh, 2008). Nurses with a poor self-concept are likely to exhibit behaviors that affect patient care negatively, whereas having a positive, professional self-concept facilitates a more positive attitude toward the self and even others (Arthur & Randle, 2007). Guided by a nurse-related self-concept, nurses working in hospital settings may create an environment that promotes active caring, mature work behaviors, and adherence to medical-team-proposed rules, which are all beneficial for the hospital.

With strong support from the work environment, nurses may become more passionate about delivering quality of care and about actively upgrading their care skills in a complex job environment. Control over the environment, supplemental nurse staffing, number of beds, and nonprofit ownership affect the risk of occupational burnout in nurses (McHugh et al., 2013). In addition, autonomy, organizational support, and the nurse-physician relationship in the nursing practice environment are characteristics that drive the development of professional care ability and patient safety (Gasparino & Guirardello, 2015; Li et al., 2013). One study found organizational support from hospital managers to be important in achieving good nursing care through improving nurse autonomy, granting greater control over resources to nurses, and strengthening nurse-physician relations (Panunto & Guirardello Ede, 2013).

According to Maslach et al. (2001), situational factors in the workplace affect burnout in nurses. For instance, the level of occupational burnout varies among nurses who work in different units. Nursing units such as medical, surgical, pediatric, psychiatric, and burn wards are significantly meaningful in the interpersonal environment (Sahraian, Fazelpazeh, Mehdizadeh, & Toobaee, 2008). Nursing units with different patient severity levels, workloads, and nurse staffing numbers are affected by differing levels of nurse burnout (Bogaert, Clarke, Roelant, Meulemans, & Heyning, 2010). The work environment relates dynamically to the burnout experiences of nurses in the context of both their nursing unit and their hospital tier type. One study verified that nurses in medical and surgical units had the highest ratios of occupational burnout, followed by nurses in intensive care units (Gasparino & Guirardello, 2015).

Many studies have found that nurses who are younger, female, and not married have significantly higher incidences of occupational burnout (Lee, Yen, Fetzer, & Chien, 2015; Shih et al., 2013; Thomas, Kohli, & Choi, 2014). In addition, earning a lower salary, having a higher job position, having a higher education level, and bearing a heavier workload have been associated with higher levels of occupational burnout (Gallavan & Newman, 2013; Khamisa et al., 2016; Oyefeso, Clancy, & Farmer, 2008).

Occupational burnout among nurses is affected by a variety of factors that are associated with their unit and hospital. Thus, the pooling of multilevel data together in an analysis would ignore the independent, environmental, and sociocultural contexts of ecological validity. Therefore, this study aimed to explore a hierarchical model of occupational burnout associated with job-induced stress, the practice environment, and nurse self-concept among nurses in different units and hospitals.

Methods

Research Design and Participants

A cross-sectional study was conducted from January 10, 2015, to June 30, 2016. Figure 1 presents a three-level hierarchical model of occupational burnout. This study encompasses data from nurses (Level I, the nurse level) in six nursing units (Level II, the unit level). The participating organizations comprised seven hospitals (Level III, the hospital level) that were located in all four of Taiwan’s principal geographic regions. A convenience sampling method was used for data collection. The inclusion criteria were nurses over 20 years
old who had been working full time in hospitals for at least 3 months. The exclusion criterion was currently working in an administrative capacity.

Ethical Consideration

This study was approved by the institutional review board of the Tri-Service General Hospital National Defense Medical Center (TSGHIRB 1-103-05-107) and by the administrators of the seven hospitals. Written informed consent was signed by and obtained from all of the participants, who were all volunteers, after they were given a detailed explanation of the purpose and procedures of this study. Confidentiality was maintained by assigning code numbers to each answer sheet. All of the participants were made aware that the data collected by the researcher would remain confidential and they would be free to withdraw at any time. The researcher distributed the questionnaires at 125 discrete nursing wards at six nursing units in the seven hospitals. The completed questionnaires were sealed in anonymous envelopes, dropped into reception boxes that were installed in each nursing ward, and then collected by the same researcher.

Measurements

Demographic characteristics

The demographic information collected included age, gender, years of nursing work, marital status (single or not single), educational level (university or above, or less than university), monthly salary ($\leq$ US$1,335, US$1,336–US$1,670, or $>$ US $1,670), nursing clinical ladder level (N vs. N1, N2, or N3–N4), and clinical nursing preceptor (no or yes).

Occupational burnout

Occupational burnout in the participants is widely measured using the Maslach Burnout Inventory-Human Services Survey (MBI-HSS; Maslach et al., 2001). The Chinese version of the MBI-HSS (Huang, 2012) was used in this study. The MBI-HSS contains 22 items related to personal feelings and attitudes, which are categorized into three dimensions: emotional exhaustion (nine items), depersonalization (five items), and personal accomplishment (eight items). Emotional exhaustion defines the occupational burnout level of an individual according to their job and work overload, including exhaustion, weariness, and decrease in emotional energy. Depersonalization assesses the degree to which a respondent responds emotionally to those with whom they work. Personal accomplishment evaluates the degree to which the respondent feels a sense of accomplishment or success in their job. A 7-point Likert scale (0–6 points) is used to score these items, with a high score suggesting high levels of occupational burnout. The Cronbach's alphas of internal consistency reliability for the emotional exhaustion, depersonalization, and personal accomplishment dimensions were, respectively, .92, .93, and .93 in Huang (2012) and .87, .81, and .83 in this study.

Job-induced stress

Job-induced stress among hospital nurses was tested using the Nurse Stress Checklist, which is designed to measure stress in clinical working environments and includes nurses' physical and mental responses toward work and satisfaction after completion of work and individual professional ability (Benoliel, McCorkle, Georgiadou, Denton, & Spitzer, 1990). The Chinese version of the Nurse Stress Checklist (Tsai & Chen, 1996) was used in this study. This checklist contains 47 items in four categories: personal response (18 items), work concern (13 items), competency (11 items), and incompletion of personal arrangement (five items). A 9-point Likert scale (0–8 points) was used to score these items, with a high score suggesting high levels of stress. The Cronbach’s alphas of internal consistency reliability for the personal response, work concern, competency, and incompletion of personal arrangement categories were, respectively, .94, .91, .86, and .84 in Tsai and Chen (1996) and .95, .94, .92, and .87 in this study.

Nurse self-concept

Nurse self-concept was measured using the Nurses' Self-Concept Instrument, which is designed to test the subjective experiences of nurses, incorporating how they think and feel (beliefs reflected in questions encompassing both cognition and affect) about themselves in their nursing roles (Angel, Craven, & Denson, 2012). The Chinese version of the Nurses’ Self-Concept Instrument (Chang & Yeh, 2016) was used in this study. The instrument contains 14 items that are divided into four categories: knowledge (four items), leadership (four items), care (three items), and staff relations (three items). The response alternative is an 8-point, forced-choice, Likert scale that ranges from 1 = definitely false to 8 = definitely true. Each item is scored using positive numbers, with a higher score indicating stronger endorsement of each item. The psychometric properties have been tested to show its favorable reliability and...
validity. The Cronbach's alphas of internal consistency reliability for care, knowledge, staff relations, and leadership were, respectively, .81, .91, .65, and .84 in Chang and Yeh (2016) and .83, .86, .88, and .90 in this study.

**Nursing work environment**

Nursing work environment was measured using the Nursing Work Index-Revised (NWI-R), which is widely used to identify the presence of certain characteristics in the work environment that contribute to the professional practice of nurses (Aiken & Patrician, 2000). The Chinese version of the NWI-R (Chao, Yuan, Wang, & Hsieh, 2008) was used in this study. The 57-item instrument includes four categories: autonomy in work (five items), nurse–physician relationships (three items), control over the practice setting (seven items), and organizational support (10 items). A 4-point Likert scale (1–4 points) was used. Higher scores on the NWI-R reflect a higher presence of positive attributes that are conducive to the practice of professionals. Scores higher than 2.5 indicate favorable professional practice environments, and scores below 2.5 indicate unfavorable practice environments. The Cronbach’s alphas of internal consistency reliability for the autonomy, control over the practice setting, nurse–physician relationship aspect, and organizational support were, respectively, .76, .79, .85, and .71 in Chang and Yeh (2016) and .73, .79, .70, and .83 in this study.

**Statistical Analysis**

The predictors of demographic characteristics that were analyzed and controlled at the nurse level included age, gender, nursing work years, educational level, monthly salary, nursing clinical ladder level, and clinical nursing preceptor in six nursing units from seven hospitals. As these predictors may relate differently at the three different levels, the hierarchical model is an appropriate method of analysis. Multilevel regression analyses conducted using Hierarchical Linear Modeling (HLM) 6.0 software examined the predictors of occupational burnout at the nurse, unit, and hospital levels. Variations in analysis results were distinguished into between-group variation and within-group variation. Multilevel analysis was done when overall variation in the results was associated with intergroup variation, whereas overall variation in the results comes from within-group variation under conditions of large within-group heterogeneity. This study used the intragroup correlation coefficient (ICC) as a measure for the adoption of multilevel analysis. The formula for ICC is as follows: intergroup correlation coefficient = [intergroup variation / (intergroup variation + intragroup variation)]. If all of the observations are independent of one another, then the ICC approaches 0. At the other extreme, if all of the responses from the observations in all of the clusters are exactly correlated, then the ICC approaches 1 (Hox, 2002).

**Results**

Two thousand six hundred five nurses from 125 nursing wards at six nursing units in seven hospitals were enrolled as participants, with an overall response rate of 82.25%. Table 1 summarizes the demographic characteristics and work factors that potentially affect occupational burnout at Level I. The sample included 57 men and 2,548 women with an average age of 32.01 ± 7.89 years and an average of 9.55 ± 7.74 years of nursing work. Three fifths (59.9%) were single, 59.2% held a university level education or higher, and 38.4% and 26.2% worked in general wards and intensive care units, respectively. Mean scores were 26.51 ± 10.86 for emotional exhaustion, 10.63 ± 6.86 for depersonalization, 30.41 ± 9.07 for personal accomplishment, 5.37 ± 1.10 for emotional exhaustion, 10.63 ± 6.86 for depersonalization, 30.41 ± 9.07 for personal accomplishment, 5.37 ± 1.10 for job-induced stress, and 3.90 ± 1.07 for work environment.

**TABLE 1. Level I Variables for Nurses**

| Variable | n | % |
|----------|---|---|
| Age (years; M and SD) | 32.01 | 7.89 |
| Duration of nursing work (years; M and SD) | 9.55 | 7.74 |
| Gender | | |
| Male | 57 | 2.2 |
| Female | 2,548 | 97.8 |
| Marital status | | |
| Single | 1,561 | 59.9 |
| Not single | 1,044 | 40.1 |
| Educational level | | |
| University or above | 1,543 | 59.2 |
| Under university | 1,062 | 40.8 |
| Nursing unit | | |
| Outpatient department unit | 259 | 9.9 |
| General unit | 1,000 | 38.4 |
| Psychiatric unit | 192 | 7.4 |
| Intensive care unit | 684 | 26.2 |
| Special unit | 325 | 12.5 |
| Hemodialysis unit | 145 | 5.6 |
| Monthly salary (USD) | | |
| ≤ 1,335 | 856 | 32.9 |
| 1,336–1,670 | 964 | 37.0 |
| > 1,670 | 785 | 30.1 |
| Nursing ladder level | | |
| N | 655 | 25.2 |
| N1 | 597 | 22.9 |
| N2 | 1004 | 38.5 |
| N3–N4 | 349 | 13.4 |
| Clinical nursing preceptor | | |
| No | 1813 | 69.6 |
| Yes | 792 | 30.4 |

| | M | SD |
|------------------|---|---|
| Occupational burnout | | |
| Emotional exhaustion | 26.51 | 10.86 |
| Depersonalization | 10.63 | 6.86 |
| Personal accomplishment | 30.41 | 9.07 |
| Nurse self-concept | 5.37 | 1.10 |
| Job-induced stress | 3.90 | 1.07 |
| Work environment | 2.85 | 0.35 |
nurse self-concept, 3.90 ± 1.07 for job-induced stress, and 2.85 ± 0.35 for work environment.

According to the results of the HLM analyses, no statistical significance was identified on the three-level model. The hospital level was ultimately removed from the HLM analyses because of the high collinearity among variables. Thus, a two-level model was then used in the analysis in the random intercept, random coefficient, and two-level models. However, the cross-level model did not converge because of multicollinearity between predictors.

Table 2 shows the results of emotional exhaustion for occupational burnout. Participants with a university or higher level of education, who earned a salary of more than US$1,670 per month, or who were N2 or N3–N4 had significance in the random intercept model and random coefficient model. Note that nurse self-concept and job-induced stress had significance based on the random intercept, random coefficient, and two-level models. However, nurse self-concept was negatively associated with emotional exhaustion.

Table 3 shows the results of the depersonalization aspect of occupational burnout. Nurses with a university or higher level of education or who earned a salary of more than US$1,670 per month had significance in the random intercept model and random coefficient model. However, nurse self-concept was negatively associated with depersonalization. As shown in Tables 2–4, the two-level model was identified as the optimal model for analysis. At the unit level, no significance was found in any aspect of occupational burnout. At the nurse level, the ICC for emotional exhaustion was 2.86 (0.042/(0.042 + 1.424) = 2.86%; *p < .001*), indicating 5.33% reliability in the unit mean difference. ICC for depersonalization was 3.48 (1.648/(1.648 + 45.692) = 3.48%; *p < .001*), indicating 4.42% reliability. ICC for personal accomplishment was 1.21 (1.006/(1.006 + 81.788) = 1.21%; *p < .001*), indicating 3.87% reliability. Because ICC was greater than 0, all of the observations were associated with each other.

Table 2.
Results of Hierarchical Models of Emotional Exhaustion

| Fixed Effect                        | Random Intercept | | | Random Coefficient | | | Two-Level | | |
|---|---|---|---|---|---|---|---|---|---|
|   | β  | SE  |   | β  | SE  |   | β  | SE  |   |
| Intercept | 2.829*** | 0.088 | | 1.610 | 0.247 | | -11.594 | 5.575 |   |
| Level I |   |   |   |   |   |   |   |   |   |
| Gender | 0.090 | 0.131 | | 0.087 | 0.137 | | |   |
| Age | -0.006 | 0.007 | | -0.005 | 0.007 | | |   |
| Years of nursing work | 0.018* | 0.007 | | 0.018* | 0.007 | | |   |
| Marital status (single vs. not) | -0.084 | 0.045 | | -0.081 | 0.045 | | |   |
| Educational level (university and above vs. under) | 0.111** | 0.041 | | 0.109** | 0.041 | | |   |
| Monthly salary (US$; ≤ 1,335 vs. 1,336–1,670) | 0.070 | 0.048 | | 0.067 | 0.048 | | |   |
| Monthly salary (US$; ≤ 1,335 vs. > 1,670) | 0.129** | 0.056 | | 0.125** | 0.056 | | |   |
| Nurse ladder level (N vs. N1) | 0.095 | 0.056 | | 0.100 | 0.056 | | |   |
| Nurse ladder level (N vs. N2) | 0.185** | 0.059 | | 0.185** | 0.059 | | |   |
| Nurse ladder level (N vs. N3–N4) | 0.084* | 0.081 | | 0.086 | 0.081 | | |   |
| Nursing preceptor (no vs. yes) | -0.034 | 0.050 | | -0.035 | 0.050 | | |   |
| Nurse self-concept | -0.250*** | 0.019 | | -0.250*** | 0.019 | | |   |
| Job-induced stress | 0.608*** | 0.018 | | 0.607*** | 0.018 | | |   |
| Level II |   |   |   |   |   |   |   |   |   |
| Nurse self-concept |   |   |   |   |   |   |   | 2.736 | 1.036 |
| Job-induced stress |   |   |   |   |   |   |   | 0.056 | 0.210 |
| Work environment |   |   |   |   |   |   |   | 0.975 | 0.634 |
| Random effect |   |   |   |   |   |   |   |   |   |
| Intergroup variation | 0.042 | 0.015 | | 0.006 | 0.015 | | |   |
| Intragroup variation | 1.424 | 0.919 | | 0.919 | 0.919 | | |   |
| Deviance | 7240.160 | 7234.970 | |   |   |   |   |   |

*p < .05. **p < .01. ***p < .001.
Three aspects of occupational burnout showed greater variation among nursing units than among individual nurses.

**Discussion**

This study hypothesized a hierarchical model of occupational burnout that is associated with job-induced stress, nurse self-concept, and work environment among nurses working in six units of seven hospitals. Occupational burnout refers to emotional exhaustion, depersonalization, and a reduced sense of personal accomplishment. This study confirmed that these three categories were highly associated with the characteristics of individual nurses. These characteristics included years of nursing work, educational level, salary, and nursing clinical ladder level. Having an educational level of university or above and a ladder level of N2 were important predictors of occupational-burnout-related emotional exhaustion and depersonalization in this study, with number of years of nursing work also affecting this exhaustion. These findings are similar to other studies (Gallavan & Newman, 2013; Khamisa et al., 2016; Shih et al., 2013; Wu et al., 2014).

Nurse self-concept was the most important predictor of emotional exhaustion, depersonalization, and personal accomplishment in this study. Nurse self-concept related negatively to emotional exhaustion and depersonalization but positively to personal accomplishment, indicating that nurses with a high self-concept of nursing are less susceptible to job burnout. Positive self-concept and job satisfaction among nurses may be helpful in reducing the degree of burnout in experienced nurses, as self-concept has been shown to mediate the relationship between job satisfaction and burnout (Nwafor, Immanel, & Obi-Nwosu, 2015). Nursing self-concept is relevant to how nurses think and feel about themselves. Moreover, self-concept is typically relatively stable between an individual’s academic career and during his or her early professional career as a nurse (Arthur & Randle, 2007). Although self-concept is cultivated in nursing education, clinical continuing education should also pay attention to this issue. Very few studies have explored the professional self-concepts of nurses. This study provides evidence on nursing self-concepts from nurse populations across six nursing units at seven hospitals.

In addition to self-concept, job-induced stress was identified as an important predictor of the emotional exhaustion and depersonalization dimensions of occupational burnout, with those exhibiting higher job-induced stress having higher levels of occupational burnout. This finding is similar to other studies, supporting that job-induced stress contributes to burnout in nurses (Khamisa et al., 2016; Shih et al., 2013; Wu et al., 2014). The Institute of Labor, Occupational Safety and Health, Ministry of Labor (2013) has identified the occupational

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**TABLE 3. Results of Hierarchical Models of Depersonalization**

| Fixed Effect | Random Intercept | Random Coefficient | Two-Level |
|--------------|------------------|--------------------|-----------|
|              | $\beta$          | $SE$               | $\beta$   | $SE$       | $\beta$ | $SE$ |
| Intercept    | 10.006***        | 0.549              | 9.516     | 1.538      | -24.985 | 78.245 |
| Level I      |                  |                    |           |            |         |      |
| Gender       | -0.306           | 0.804              | -0.323    | 0.804      |         |      |
| Age          | -0.041           | 0.041              | -0.040    | 0.041      |         |      |
| Years of nursing work | -0.010 | 0.043              | -0.012    | 0.044      |         |      |
| Marital status (single vs. not) | -0.265 | 0.277              | -0.265    | 0.278      |         |      |
| Educational level (university or above vs. under) | 0.583* | 0.252              | 0.582*    | 0.252      |         |      |
| Monthly salary (US$; ≤ 1,335 vs. 1,336–1,670) | 0.582 | 0.297              | 0.589*    | 0.298      |         |      |
| Monthly salary (US$; ≤ 1,335 vs. > 1,670) | 0.772* | 0.345              | 0.764*    | 0.346      |         |      |
| Nurse ladder level (N vs. N1) | 1.213** | 0.345              | 1.218**   | 0.345      |         |      |
| Nurse ladder level (N vs. N2) | 1.721*** | 0.361              | 1.733***  | 0.361      |         |      |
| Nurse ladder level (N vs. N3-N4) | 0.698 | 0.500              | 0.721    | 0.501      |         |      |
| Nursing preceptor (no vs. yes) | -0.423 | 0.307              | -0.424    | 0.308      |         |      |
| Nurse self-concept | -1.587*** | 0.115              | -1.588*** | 0.115      |         |      |
| Job-induced stress | 2.439*** | 0.112              | 2.442***  | 0.112      |         |      |
| Level II     |                  |                    |           |            |         |      |
| Nurse self-concept |         |                    | 1.008     | 8.781      |         |      |
| Job-induced stress |         |                    | -1.114    | 2.901      |         |      |
| Work environment |         |                    | 11.781    | 15.520     |         |      |
| Random effect |                  |                    |           |            |         |      |
| Intergroup variation | 1.648 | 0.942              | 1.872     |           |         |      |
| Intragroup variation | 45.692 | 34.779             | 34.779    |           |         |      |
| Deviance     | 16655.442        | 16640.572          |           |           |         |      |

*p < .05. **p < .01. ***p < .001.
stressors for nurses as compactness of job content, work interfering with personal time and life, stresses from the medical team, stresses from occupational hazards, stresses from nurse–patient–family relationships, stresses from assault, and stresses from powerlessness and patient deaths. Thus, the occupational burnout of nurses may be effectively minimized by reducing their perceived stress.

In addition, nursing clinical ladder level N2 was identified as an important predictor for depersonalization in this study. The clinical ladder system in Taiwan aims to improve the quality of patient care based on learning experience and on increasing the rewards and recognitions given to nurses in clinical practice. This study found that nurses at higher nursing clinical ladder levels and with more clinical situational experience had a less reduced sense of personal accomplishment than their novice-level peers. One study found that perceptions of a clinical ladder system correlated positively with job satisfaction and negatively with intention to leave (Chae, Ko, Kim, & Yoon, 2015), although other studies concluded the opposite (Chae et al., 2015; Hariyati, Igarashi, Fujinam, Susilaningsih, & Prayenti, 2017). The conflicting results may relate to the differing perceptions of nurses toward the clinical ladder system. Nurses in Taiwan with higher ladder levels are expected to take on more clinical responsibilities and to practice and guide new recruits, which may increase their perceived pressures and lead to a lower sense of personal accomplishment.

This study found that longer nursing work years, a university or higher educational level, a monthly salary greater than 1,670 U.S. dollars, and a nursing clinical ladder level of N2–N4 were each associated with higher emotional exhaustion and occupational burnout. Moreover, a university or higher educational level, a monthly salary greater than 1,670 U.S. dollars, and a nursing clinical ladder level of N1–N2 were each associated with higher depersonalization burnout. Furthermore, nurses at higher ladder levels had a lower sense of personal accomplishment than their novice-level peers. Clinical nurses with more working experience, education, and income and a higher ladder level are often given more job responsibilities (Gallavan & Newman, 2013; Khamisa et al., 2016; Oyefeso et al., 2008; Shih et al., 2013; Wu et al., 2014). Thus, taking on heavier responsibilities and stress in more important roles may cause more frequent instances of more severe levels of burnout.

This study did not find evidence that the work environment is a predictor of nursing occupational burnout. This differs from Gasparino and Guirardello (2015), which indicated that unfavorable nursing care environments may cause development of burnout syndrome. In addition, this study did not support the idea that occupational burnout varies among different nursing units. Thus, the nursing unit may not be

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**TABLE 4.**

**Results of Hierarchical Models of Personal Accomplishment**

| Fixed Effect | Random Intercept | Random Coefficient | Two-Level |
|--------------|------------------|---------------------|-----------|
|              | β                | SE                  | β         | SE         | β         | SE       |
| Intercept    | 30.504***        | 0.461               | 9.553     | 1.974      | -12.242   | 62.056   |
| Level I      |                  |                     |           |            |           |          |
| Gender       | -1.788           | 1.060               | -1.850    | 1.060      |           |          |
| Age          | 0.032            | 0.054               | 0.029     | 0.054      |           |          |
| Years of nursing work | 0.044 | 0.057 | 0.042 | 0.057 |           |          |
| Marital status (single vs. not) | 0.081 | 0.365 | 0.079 | 0.366 |           |          |
| Educational level (university or above vs. under) | -0.586 | 0.333 | -0.577 | 0.333 |           |          |
| Monthly salary (US$; ≤ 1,335 vs. 1,336–1,670) | -0.103 | 0.389 | -0.049 | 0.391 |           |          |
| Monthly salary (US$; ≤ 1,335 vs. > 1,670) | 0.261 | 0.450 | 0.334 | 0.454 |           |          |
| Nurse ladder level (N vs. N1) | -1.168* | 0.454 | -1.166* | 0.455 |           |          |
| Nurse ladder level (N vs. N2) | -1.356** | 0.475 | -1.310** | 0.476 |           |          |
| Nurse ladder level (N vs. N3–N4) | -1.812** | 0.657 | -1.739** | 0.661 |           |          |
| Nursing preceptor (no vs. yes) | 0.715 | 0.404 | 0.718 | 0.406 |           |          |
| Nurse self-concept | 4.126*** | 0.152 | 4.120*** | 0.152 |           |          |
| Job-induced stress | 0.015 | 0.147 | 0.030 | 0.148 |           |          |
| Level II     |                  |                     |           |            |           |          |
| Nurse self-concept |           | 5.999 | 12.001 |           |           |          |
| Job-induced stress |       | -1.184 | 2.324 |           |           |          |
| Work environment |           | 1.753 | 7.003 |           |           |          |
| Random effect |                  |                     |           |            |           |          |
| Intergroup variation | 1.006 | 0.453 | 1.021 |           |           |          |
| Intragroup variation | 81.788 | 60.518 | 60.517 |           |           |          |
| Deviance     | 18085.621        | 18072.056           |           |            |           |          |

*p < .05. **p < .01. ***p < .001.
an important predictor of occupational burnout in nurses. This differs from Bogaert et al. (2010), which indicated that nurse perceptions about the environment of their nursing units potentially influence their job experiences and may be associated with occupation burnout. This may be because the three aspects of occupation burnout exhibited greater variation at the nursing unit level than at the individual nurse level. Better clarifying the relationship between units and occupational burnout will be important to further distinguishing the differences at the unit level.

Limitations
This study is affected by several limitations. First, the cross-sectional design of this study provided data at one time point only. Therefore, longitudinal follow-up of the relationships between occupational burnout and job-induced stress, self-concept, and the work environment was not conducted. Second, although this study included seven hospitals from all of Taiwan’s main geographic regions, many regions were not covered. Differences in medical culture may affect the responses of nurses toward their practice environment. Third, the hospital-level burnout model was found to have no statistical significance in this study, which may reflect the small number of hospitals that were included.

Conclusions/Implications for Practice
The findings of this study confirm that individual nurse characteristics predict the emotional exhaustion, depersonalization, and personal accomplishment dimensions of occupational burnout. Individual factors such as number of years working in nursing, educational level, income, nursing clinical ladder level, job-induced stress, and nurse self-concept were all identified as important predictors of occupational burnout. This study did not support that occupational burnout varied among nursing units, as occupational burnout variation between nursing units was greater than that between individual nurses. The findings suggest, in particular, that improving self-concept may effectively decrease perceived burnout in nurses, which may then improve overall patient care. In clinical practice, nurses holding a positive self-concept regarding nursing reduce their occupational burnout, which may help them provide a higher quality of care. A two-level hierarchical model appropriately fits the data, with no significance identified for any of the dimensions of occupational burnout at the unit level. A larger number of hospitals in the sample may be required to achieve the hypothesized hierarchical model.

Authors Contributions
Study conception and design: All authors
Data collection: RWL
Data analysis and interpretation: RWL, MLY, KCL
Drafting of the article: RWL, MLY
Critical revision of the article: RWL, MLY

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