



Emotional Distress as a Predictor of Work-Related Musculoskeletal Disorders in Malaysian Nursing Professionals

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Abstract

Background: Emotional distress is becoming a great concern and is more common in both developed and developing countries. It is associated with several disease conditions.

Objective: To determine the prevalence of self-perceived emotional distress and its relation to work-related musculoskeletal disorders (WRMSDs) in nurses.

Methods: A self-administered questionnaire survey was carried out on 660 female nurses working in public hospitals in the Klang Valley, Malaysia. The validated Malay version of the standardized Nordic musculoskeletal questionnaire (M-SNMQ) was used to identify the annual prevalence of WRMSDs; perceived emotional distress was assessed using the validated Malay short version, depression, anxiety, and stress (M-DASS) instrument. In addition, socio-demographic and occupational profiles of the participants were considered. Factors associated with WRMSDs were identified using logistic regression analysis.

Results: A total of 376 nurses completed the survey (response rate 83.3%). 73.1% of the nursing staffs experienced WRMSDs in at least one anatomical site 12 months prior to the study. 75% of nurses expressed emotional distress. Of these, over half also reported anxiety and stress. Multiple logistic regression analysis showed that stress and anxiety significantly increased the risk of WRMSDs by approximately twofold.

Conclusion: There were significant associations between emotional distress and WRMSDs. Future longitudinal studies are therefore needed to investigate and identify the sources of emotional distress (non-occupational and occupational) to be used to establish preventive strategies to reduce the risk of WRMSDs.

Keywords: Stress, psychological; Musculoskeletal diseases; Occupational diseases; Nurses; Malaysia

Introduction

Rapid urbanization, higher life expectancy and lack of social support are among significant determinants of emotional distress in the population.¹

Therefore, emotional distress is becoming a great concern and is more common in both developed and developing countries. In 2003, it was estimated that over 450 million people suffered from mental or behavioral disorders with depres-

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sion and stress being the most prevalent with an annual prevalence of up to 20%.² The Third National Health and Morbidity Survey (NHMS) reported that 29.2% of Malaysian adults aged above 16 years experienced mental problem. At least one out of three workers sustained emotional distress.³ Hospitals are known for stressful environment. Therefore, the occurrence of emotional distress is expected among nursing personnel. A study among Australian nurses revealed that 11.4%, 15.2%, and 13.6% of them suffer from stress, anxiety, and depressive symptoms, respectively, with at least moderate severity.⁴ Previous local surveys among critical care nurses of tertiary health care facilities revealed that the majority of the nurses exhibited anxiety (81%), depression (40.5%), and stress (37.8%).⁵

Nurses are often the backbone and key contacts within the hospital organization. Their task is diversified and nurses need to juggle many jobs in different units. This includes providing direct care to patients, such as conducting assessment of patients, attending to their needs, administering daily medications, monitoring patients' conditions, and also being involved in administrative work. This creates a highly demanding work environment and leads to the occurrence of mental health problems. A local survey performed among nurses in private hospitals, reported that occupational factors, such as excessive workload due to role ambiguity, procedural injustice, and being harmed by the work-family conflicts were among significant contributing factors of poor mental health, especially stress, among nurses.⁶ In line with this finding, higher prevalence of stress was also reported among Japanese nurses attached to palliative care wards.⁷ This is expected because the nurses were fully accountable for taking care of critically ill patients, endured high demands from the patients and their relatives and also coped

with the use of sophisticated technological equipment compared to those in the general wards. Moreover, nurses working in rotating shifts are more prone to experience work-related stress than those who work the day shift only.⁸

Presence of mental health symptoms such as stress, depression, and anxiety is usually associated with poor health outcomes including immunosuppression, common cold, gastroenteritis, and musculoskeletal disorders.⁹ There are a number of epidemiological studies linking the occurrence of work-related musculoskeletal disorders (WRMSDs) with mental health. However, the findings are inconclusive. Bonzini, *et al*,¹⁰ in a longitudinal study among Italian nurses, suggest that although the stressed nurses were seen to develop musculoskeletal pain, no significant evidence in the study was available to show that stress significantly increases the risk of musculoskeletal pain. However, nurses with musculoskeletal pain were more likely to develop stress symptoms. Harcombe, *et al*,¹¹ in a cross-sectional survey among New Zealand workers, as part of the Cultural and Psychosocial Influences on Disability (CUPID) study, found significant evidence that those with better mental health were at lower risk of developing neck pain compared to workers with mental health symptoms. In the context of patient care, presence of mental health problems among nursing staffs is often associated with reduction in patient safety and quality of patient care.¹²

We therefore conducted this study to determine the relationship between emotional health and WRMSDs among nursing personnel.

Materials and Methods

Study Design and Participants

A cross-sectional study was performed at

For more information on risk factors for developing work-related musculoskeletal disorders during dairy farming see <http://www.theijoem.com/ijoem/index.php/ijoem/article/view/861>



four public hospitals in the Klang Valley, Malaysia. Selection of particular hospitals was based on convenience sampling and support from the respective hospital management. To avoid any gender bias, the study only recruited female nurses. The nurses volunteering to participate in this study were those aged between 23 and 50 years, working in shift for at least one year at the clinical site in the participating hospitals, and free from any musculoskeletal symptoms at the time of data collection. Nurses who were pregnant, breastfeeding mother, or at menopausal stage during data collection, were excluded from the study. The authors adopted a stratified sampling approach to calculate the number of nurses from each participating hospital followed by convenient sampling.

According to Malaysian Ministry of Health, nurses are categorized into three grades according to the nature of their work in hospital, work schedule, and level of patient care.¹³ This study recruited only grade 2 and grade 3 shift working nurses. Group 2 nurses are consisted of shift working nurses assigned to normal inpatient wards, such as medical and surgical wards, orthopaedic, obstetrics and gynecology wards. Group 3 nurses includes those working in intensive care units such as Intensive Care Unit (ICU), High Dependency Wards (HDW), Cardiac Critical Unit (CCU), Operation theatre (OT), and Neonatal Intensive Care Unit (NICU).

The participants remained anonymous and were identified with special identification codes that were made known only to the researchers. The completed questionnaires were returned within a week in a sealed envelope and deposited in a locked box located at the Chief Matron's office. The researchers then checked the completeness of the submitted questionnaires and tokens of appreciation were given to each participant.

TAKE-HOME MESSAGE

- Work-related musculoskeletal disorders (WRMSDs) are prevalent among nursing personnel. Three of four nurses in our study reported symptoms of WRMSDs in at least one body region in the past one year.
- Nurses are known to experience a high prevalence of emotional distress, including depression, anxiety and stress because of their high job demand.
- We found that nurses presenting with anxiety symptoms were more likely to suffer from WRMSDs, particularly in their neck and shoulders compared to those free from the symptoms.

Sample Size

The sample size was estimated using the single proportion formula.¹⁴ Assuming a prevalence of 78% for WRMSDs among nurses,¹⁵ and an acceptable error of estimation of 5% with a 95% confidence interval, the minimum sample size was calculated to be 264. Considering a presumed response rate of 80%, we came to the minimum sample size of 330.

The questionnaires were distributed to 660 nurses of which 550 sets were returned, translating to a response rate of 83.3%. A total of 112 nurses was excluded due to pregnancy (n=45), breastfeeding (n=45), and menopause (n=2); 20 nurses expressed they had lifetime non-occupational musculoskeletal disorders. Another 62 questionnaires were incomplete and thus excluded from the analyses, leaving 376 sets eligible for data analyses.

Research Materials

The survey was done using the validated Malay version of the self-administrated questionnaire (SAQ). The SAQ comprised of three sections:

Demographic and Job Information

The first section contains information on socio-demography (age, marital status,

educational level, and average household income) and job information (length of employment, years attached to the current unit and hospital, location of workstation, and time spent at work per week). The nurses were required to indicate if they were pregnant, at menopausal age, or breastfed a child. In addition, the nurses were to inform history of non-occupational MSDs in lifetime.

Symptoms of WRMSDs

In the second section of SAQ, the nurses were to identify the symptoms of WRMSDs over the past 12 months using a validated Malay version of the Standardized Nordic Musculoskeletal Questionnaire (M-SNMQ) that was based on the original version.¹⁶ In an earlier reliability study, 21 items of M-SNMQ showed strong level of agreement ($\kappa \geq 0.75$).¹⁷ An anatomical diagram of nine body regions (neck, shoulder, upper and lower back, hands/wrists, arms, knee, thighs, and feet) was appended to facilitate the identification of the anatomical location of the WRMSDs symptoms. The participants were requested to indicate “yes” or “no” to any encountered symptom¹⁶ of WRMSDs (pain, numbness, tingling, aching, stiffness, and burning) in the preceding 12 months. Then, the body regions were grouped into four anatomical regions—region 1 (neck and shoulders), region 2 (wrists, arms, and hands), region 3 (upper and lower back), and region 4 (thighs, knees, ankles, and feet)—for data analyses.

Symptoms of Emotional Distress (Depression, Anxiety and Stress) (M-DASS)

In the third section, the presence of emotional distress symptoms was assessed using a self-reported Malay-translated short version of the 20-item Depression Anxiety Stress Scale (M-DASS20).¹⁸

M-DASS20 consists of three subscales that measure the symptoms of depression

(6 items), anxiety (7 items), and stress (7 items) over the last seven days. A study suggested that M-DASS20 is a valid and reliable instrument to assess the symptoms of emotional distress among the nursing population.¹⁹ Each item comprises of a statement and four ordinal responses that ranged from ‘0’ (did not apply to me at all) to ‘3’ (applied to me very much, or most of the time). Scores from each set of subscales were summed to yield a single subscale score and were interpreted according to a predetermined criterion based on cut-off percentiles as either “normal” (score 0–78), “mild” (score 79–87), “moderate” (score 88–95), “severe” (score 96–98), and “extremely severe” (score 99–100). Higher scores indicated greater severity of depression, anxiety and or stress. The emotional status (stress, anxiety, and depression) of the nurses was dichotomized into either “normal” or “emotional distress.”¹⁸ Emotional distress refers to nurses who presented at least one symptoms of depression, anxiety, or stress.

Ethics

The study was granted ethics approval from Institutional Review Boards of the Ministry of Health (MREC) (NMRR-12-234-11176) and Monash University (MUHREC) (CF12/506-2012000809).

Statistical Analysis

Data were analysed with IBM SPSS® ver 22.0. Questionnaires were checked for completeness. Data distribution was examined for normality using the one-sample Kolmogorov-Smirnov test. Means and standard deviations were reported for continuous variables with normal distribution. Frequencies and percentages were presented for categorical data. Presence of WRMSDs symptoms was taken to be a dependent variable. Self-perceived depression, stress, anxiety, demographic, and occupational variables were considered

independent variables in the logistic regression analysis. Those variables that had a p value <0.05 in univariate analysis were entered into multivariate regression model. The results were expressed as crude and adjusted odds ratios (OR) and their corresponding 95% confidence interval (CI). A p value <0.05 was considered statistically significant.

Results

Sociodemographic Profile

The majority of the participants were Malays, aged between 23 and 50 years, married, and had a mean age of 30.6 (SD 5.3) years. Most of the participants had service for >5 years, with a mean service of 7.4 (SD: 4.9) years. Of these, at least half of the nurses worked in the current unit for <5 years with a mean of 4.3 (SD 3.0) years. The mean number of weekly working hours at the hospital was 45.0 (SD 5.4) hours with the majority working not more than 48 hours/week (Table 1).

Annual Prevalence of WRMSDs

A total of 275 (73.1%) of the nursing staffs experienced WRMSDs symptoms in at least one anatomical site one year prior to the study. WRMSDs symptoms were most frequently reported in the neck region (48.9%) followed by the feet (47.2%), upper back (40.7%), shoulders (36.9%), and lower back (35.3%). Less than 20% of the nurses reported WRMSDs in the thighs or arms (6.6%). Additionally, the results showed that approximately half of the nurses suffered from WRMSDs in region 1 (neck and shoulders; 55.6%), region 4 (thighs, knees, ankles, and feet; 51.9%), region 3 (upper and lower back; 47.9%). Less than 30% had WRMSDs symptoms in region 2 (wrists, arms and hands).

Table 1: Sociodemographic characteristics of the studied nurses (n=376). Figures are either mean (SD) or n (%).

Variable	Statistic
Age (yrs)	30.6 (5.3)
Years of employment as a nurse (yrs)	7.4 (4.9)
≤5	161 (42.8%)
>5	215 (57.2%)
Years of working at current hospital (yrs)	5.3 (3.7)
≤5	259 (68.9%)
>5	117 (31.1%)
Working hours/week (hrs)	45.0 (5.4)
≤48	323 (85.9%)
>48	53 (14.1%)
Level of education	
Tertiary (certificate/diploma/degree)	330 (87.8%)
Non-tertiary (lower and upper secondary)	46 (12.2%)
Marital status	
Married	288 (76.6%)
Single/widower/divorcee	88 (23.4%)

Prevalence of Self-perceived Emotional Distress

Three quarters of studied nurses mentioned they experienced at least one emotional symptom. Of these, 269 (71.5%) reported self-perceived anxiety, 203 (54.0%) reported stress, and 132 (35.1%) expressed depression.

Self-perceived Emotional Distress as Predictors of WRMSDs

In univariate analyses, self-perceived anxiety and stress had significant effects on the WRMSDs symptoms. Anxious nurses had significantly elevated odds of WRMSDs across the four body regions as compared to nurses without anxiety, with the highest OR reported for region 1 (neck and shoulders; OR 2.40, 95% CI 1.52 to 3.79). Simi-

Table 2: Relationship between self-perceived symptoms of emotional distress (depression, anxiety and stress) and WRMSDs symptoms across four body regions among 376 female nursing personnel studied

DASS Subscale	Model*	Region 1 (n=209) [†]	Region 2 (n=99) [†]	Region 3 (n=133) [†]	Region 4 (n=195) [†]
Depression	I	1.10 (0.72 to 1.69)	1.37 (0.85 to 2.20)	1.08 (0.71 to 1.65)	1.33 (0.87 to 2.03)
	II	1.14 (0.74 to 1.76)	1.33 (0.82 to 2.14)	1.05 (0.68 to 1.62)	1.32 (0.86 to 2.02)
Anxiety	I	2.40 (1.52 to 3.79)	1.31 (1.18 to 2.23)	1.64 (1.04 to 2.59)	2.04 (1.29 to 3.22)
	II	2.34 (1.48 to 3.71)	1.66 (1.04 to 2.65)	1.59 (1.01 to 2.53)	2.05 (1.29 to 3.25)
Stress	I	1.10 (1.05 to 1.18)	2.26 (1.39 to 3.67)	1.88 (1.25 to 2.84)	2.16 (1.43 to 3.26)
	II	1.89 (1.25 to 2.86)	2.36 (1.44 to 3.86)	1.81 (1.19 to 2.75)	2.12 (1.40 to 3.21)

*Model I: Crude OR (95% CI);

Model II: OR (95% CI) adjusted for age, type of ward, marital status, BMI, and working hours

[†]Number of nurses reporting WRMSDs in that body region

larly, self-perceived stress had significantly elevated odds of WRMSDs symptoms in all body regions with the highest OR reported for region 2 (wrists, arms and hand; OR 2.26, 95% CI 1.39 to 3.67). Logistic regression analyses were undertaken to investigate the relationship between self-perceived depression, anxiety and stress, and the presence of WRMSDs symptoms in four body regions (Table 2). After adjustment for covariates, self-perceived anxiety and stress were found to be independent predictors of WRMSDs symptoms across the four body regions with adjusted ORs ranging from 1.59 to 2.36.

Discussion

In the context of WRMSDs, three of four nurses in our study reported symptoms of WRMSDs in at least one body region in the past one year. Nevertheless, the prevalence found in this study was slightly lower than those reported among nurses surveyed using the SNMQ in other studies conducted in Iran,^{20,21} Japan,²² Estonia,²³ and Brazil,²⁴ which varied between 81% and 95%. This might possibly reflect the level of awareness of the studied nurses. The nurses may have found that the pres-

ence of WRMSDs symptoms were common due to their nature of job.²⁵ The most frequently reported body regions associated with WRMSDs symptoms were the neck (48.9%), feet/ankles (47.2%), upper back (40.7%), shoulders (37%), and lower back (35.3%). A study conducted on Australian nurses²⁶ revealed that WRMSDs symptoms were commonly reported in the lower back (71%), neck (67.4%) and feet/ankles (55.3%).

Nurses are known to experience a high prevalence of emotional distress, including depression, anxiety and stress because of their high job demand.²⁷ Three quarters of the studied nurses reported at least one symptom of emotional distress. This supported the hypothesis that nursing professionals were at greater risk of emotional distress compare to other professions.^{28,29} Of these, over half of the studied nurses suffered from anxiety and stress symptoms as compared to only 35% of the nurses reporting depressive symptoms. This might possibly be due to the nurse to patient ratio in Malaysia, which was much lower (1:333) than the recommended value of 1:200 made by the World Health Organization (WHO).³⁰ The lower nurse to patient ratio has increased the workload

of the studied nurses causing mental and physical exhaustion and consequent emotional distress.³¹ The prevalence of stress was twice that reported in an earlier local study on nurses.³² Furthermore, in comparison to a recent study conducted on Egyptian nurses of critical care units,¹² our results showed a higher prevalence for anxiety (69.0%) and stress (51.6%), but a lower prevalence of depressive symptoms (50.8%). The deterioration of the nurse's emotional health might also closely be related to the difficulties they experienced in meeting the patients' and their relatives' demands and also inadequate job training.³³

Several researchers have so far discussed the adverse effects of poor emotional health that have been positively associated with the presence of WRMSDs among nurses.^{21,34} The results of our study also supported the existing findings suggesting that stressed nurses are more likely to suffer from WRMSDs in various occupational settings. This was in line with the results of a cross-sectional study conducted on a group of Iranian nurses showing that stressful nurses were prone to report WRMSDs at the neck, wrists, upper back, and ankles/feet with an OR up to 3.²¹ Earlier, Warming, *et al*,³⁵ confirmed that stress can double the risk of low back pain (LBP). A cross sectional study on female nursing students also documented significant association between stress and occurrence of low back pain.³⁶

These findings might be associated with the presence of stress-induced muscle strain, causing muscle fatigue, which could possibly lead to even injury.³⁷ There are many sources of stress for nurses in the hospital environment including the workstation,⁷ dealing with death and dying patients,³⁸ lack of social support from the supervisor and colleagues,³³ and shift rotation⁸. On the other hand, we found different findings from those of previous stud-

ies on nurses in Australia and Greece. The study from Australia³⁹ revealed that stress was not significantly related to WRMSDs in the wrists or hands. A cross-sectional study conducted on 420 nurses working in six hospitals in Greece also reported no significant relationship between stress and developing low back pain.⁴⁰

Little is known on the association between anxiety and WRMSDs in nursing population. We found that nurses presenting with anxiety symptoms were more likely to suffer from WRMSDs, particularly in their neck and shoulders compared to those free from the symptoms. Blozik, *et al*,⁹ in a cross-sectional survey in Germany, reported consistent evidence that anxiety was significantly associated with neck pain (OR 1.87, 95% CI 1.48 to 2.25). An anxious person tends to over-react in various situations, particularly when avoiding potentially threatening environment. This leads to non-adaptive responses, which can intensify pain resulting in fear that can further increase functional disability of the musculoskeletal system.⁴¹

Although there is evidence in favor of association between depression and WRMSDs in various occupational settings, our study documented contrasting findings. A recent systematic review documented strong evidence for the association between knee pain and depression.⁴² Kim, *et al*,⁴⁴ reported that depressed firefighters have an OR of WRMSDs twice than those without depression. This was also confirmed by Blozik, *et al*,⁹ in a cross-sectional study, where depression was found to double the risk of neck pain.

Our study had certain limitations. The data were obtained from a cross-sectional design; the results should therefore be interpreted with caution as it is a difficult task to determine the causality, *ie*, whether the presence of emotional distress contributed to the risk of WRMSDs. Furthermore, because the data were self-reported the

nurses' responses might be biased as a result of social desirability to provide socially preferable answers than their real experience. As in our case, there was a possibility that the given answer did not reflect the real situation experienced by the nurses due to cultural perceptions.

Despite its limitations, our study revealed a high prevalence of WRMSDs and emotional distress among studied nurses. Our study also showed that after adjusting for covariates, stress and anxiety appeared to be the independent determinants of WRMSDs. Longitudinal studies are needed to identify possible causal relationship between emotional distress and WRMSDs in order to implement effective preventive strategies to reduce the risk of WRMSDs.

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Conflicts of Interest: None declared.

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