# THE ASSOCIATION BETWEEN ORGANIZATIONAL PSYCHOSOCIAL FACTORS WITH MUSCULOSKELETAL DISORDERS AMONG NURSES AT TERTIARY UNIVERSITY HOSPITAL

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***Abstract***

**Introduction:** Musculoskeletal disorders (MSDs) were found to be high among nurses especially those working in the hospital. One of the risk factors of MSDs is psychosocial factors apart from physical and ergonomic factors. However, limited study was found specifically looking at this association among nurses working at tertiary university hospital especially in Malaysia. Hence, the objective of this study is to assess the association between organizational psychosocial risk factors with MSDs among nurses working at tertiary university hospital. **Methods:** A cross-sectional study was conducted with a total of 550 respondents among nurses in University Malaya Medical Centre working from all nursing working department. Samples were selected using Stratified Random Sampling based on nursing working location ratio. A multiple logistic regression was conducted to determine the association between organizational psychosocial factors with MSDs among study population. **Results:** Multiple logistic regression revealed that supervisor support was associated with MSDs (AOR 0.309, 95%CI 0.133-0.716) even after controlled with confounders such as age, number of children, income, history of musculoskeletal disease, employment grade, total employment duration, work schedule type and selected ergonomic factors. On the other hand, other psychosocial factors which include decision latitude, psychological job demand, co-worker support, and job insecurity were found not to be significant. **Conclusion:** The findings highlighted the relationships between organizational psychosocial factors and MSDs among nurses at tertiary university hospital specifically the role of supervisor support as a protective factor against MSDs among this working population. Hence, hospital top management should incorporate this element as one of the components in their program to reduce MSDs among nurses in the hospital.

***Keywords:*** Musculoskeletal Disorders, Psychosocial Factors, Nurses, University Hospital

## *Introduction*

Psychosocial factors were found to be one of the emerging occupational hazards at the workplace other than physical hazard among workers (1). Among nurses, psychosocial factors were found to be more prevalent due to their job nature that exposed them to high job demand which caused them to be in psychological stress. Frequently attributed psychosocial risk factors associated with MSDs among nurses were high work demand, low job control and social support (2-4). A study by Hoe et al. concluded that different type of MSDs which affects a person were associated with different risk factors (5). The study which was conducted among 1,111 nurses has found that different risk factors were associated with different location of MSDs, either with a single region between neck and shoulder pain or generalized neck and shoulder pain. This study has also found that generalized neck and shoulder pain were associated with several risk factors which include occupational and non-occupational risk factors. While, single region neck and shoulder pain were more associated with sociodemographic and psychosocial factors, respectively. It was concluded that there were different association of risk factors between single region and multi-site affected by MSDs. A study by Coggon in 2013 also found that there were different risk factors associated with the extensivity of MSDs region (6). It was found that a more extensive region affected by pain were associated with physical and psychosocial factors compared to a limited region affected by the pain. On top of that, several studies have also found that physical factors were

more associated with MSDs at the lower back, neck, and shoulder while different psychosocial risk factors were more associated with MSDs in different regions (7-9). However, it was concluded that low job control and low social support were found to be more associated with MSDs in the majority of the body site (10). In Malaysia, Amin et al. has illustrated that important psychosocial risk factors such as decision latitude, psychological job demand, supervisor support and co-worker support were associated with MSDs among hospital nurses (11). However, this study was only conducted among nurses working the public hospital and no previous study has been conducted among nurses in tertiary university hospital which could have different type of working environment, patient load and job demand. Hence, this present study was conducted to explore further relationship between organizational risk factors with MSDs among nurses working at the tertiary university hospital in Malaysia.

## Materials and Methods

### Study design

A cross-sectional study design was performed in this study.

### Study location

This study was conducted in University Malaya Medical Centre (UMMC) which is a second largest government funded medical centre and operates as a teaching hospital for Faculty of Medicine, Universiti Malaya serving at a tertiary level equipped with sub-specialty services.

### Study population

The study population comprises of nurses in UMMC from varies department like inpatient ward, clinic, operation theatre, clinical care, emergency department and administrative office. Nurses who were working at the same department or work location for at least 1-year duration were included in the study while those with history of trauma, psychological disease and pregnant were excluded.

### Sampling method

The sampling method used was Stratified Random Sampling based on working area ratio among nurses in each department. Participants were selected based on the ratio of total number of nurses in respective department to total number of nurses. Subsequently, simple random sampling of participant from each department was conducted.

### Measurement instruments

All data were collected by the main researcher. Data were collected using questionnaire prepared in Malay and English languages. The questionnaires adopted in this study were Nordic Musculoskeletal Questionnaire (NMQ) and Job Content Questionnaire (JCQ) which have been validated and translated for Malaysian population.

### Statistical analysis

Data analyses were performed using SPSS version 22.0. Descriptive statistics for categorical data were presented using frequency and percentage. Univariate analyses were performed accordingly. Chi Square analysis was performed for categorical exposure with categorical outcome data with 95% confidence interval (CI) and statistically significant level at p-value less than 0.05 were set. Subsequently, Multiple Logistic Regression were performed to adjust for confounders such as age, number of children, income, history of musculoskeletal disease, employment grade, total employment duration, work schedule type and selected ergonomic factors.

## Results

### Socio-demographic characteristics among study participants

The socio-demographic and occupational characteristic of the study population are shown in Table 1. The participants were nurses of University Malaya Medical Centre (UMMC) that are sampled from various departments in UMMC. There were 550 (94.34%) respondents who have agreed to participate in the study and have completely answered the questionnaire. The mean age of participants was 33.70 (SD 9.0; range 22-59 years). Majority of the participants were below 40 years old (77.1%), Malay (94.2%), Muslim (94.4%), diploma holders (97.8%), married (65.4%) and have no background history of musculoskeletal disease (91.6%). Pertaining to the occupational characteristics of the participants, majority of them were stationed in the clinical area (94.9%) which predominantly at inpatient wards (40.1%) while only 5.1% were working in the administrative office. Majority of the participants were also working in shift hours type schedule (68.9%).

### Annual prevalence of MSDs among study participants

The annual prevalence of musculoskeletal disorders (MSDs) among study participants are shown in Figure 1. The annual prevalence of MSDs among the study participants was 86.4%. The most common body region that was found to be affected by MSDs was lower back area (68.2%) while elbow was the least common area to be affected by MSDs in this study population with 13.1%.

### Organizational psychosocial factors at work among study participants

Table 2 illustrated the organizational psychosocial factors at work among study population based on Job Contain Questionnaire (JCQ). The participants were found to have almost equal percentages in decision latitude, psychological job demand and job insecurity in which 59.6% of them perceived to have high decision latitude, 55.5% perceived to have low job demand while 55.1% perceived to have low job insecurity. However, majority of them (81.8%) perceived to have non high job strain. On

**Table 1:** Sociodemographics characteristics of study participants

| Sociodemographic characteristics | Total n (%) | MSD | | |
|---|---|---|---|---|
| | | n (%) | $\chi^2$ | P-value |
| **Age groups** | | | | |
| 20 to 29 years old | 233 (42.4) | 208 (89.3) | 4.815 | 0.186 |
| 30 to 39 years old | 191 (34.7) | 165 (86.4) | | |
| 40 to 49 years old | 83 (15.1) | 67 (80.7) | | |
| 50 years old and more | 43 (7.8) | 35 (81.4) | | |
| **Education** | | | | |
| Diploma | 538 (97.8) | 465 (86.4) | 0.096 | 0.757 |
| Degree/Master's Degree/ PHD | 12 (2.2) | 10 (83.3) | | |
| **Marital status** | | | | |
| Single | 184 (33.5) | 164 (89.1) | 1.811 | 0.404 |
| Married | 360 (65.4) | 306 (85.0) | | |
| Widower/Divorced | 6 (1.1) | 5 (83.3) | | |
| **Past medical history of musculoskeletal disease** | | | | |
| Yes | 46 (8.4) | 431 (85.5) | 3.678 | 0.050 |
| No | 504 (91.6) | 44 (95.7) | | |
| **Department type** | | | | |
| Medical based | 312 (56.7) | 271 (86.9) | 0.494 | 0.781 |
| Surgical based | 210 (38.2) | 181 (86.2) | | |
| Administration | 28 (5.1) | 23 (82.1) | | |
| **Work location** | | | | |
| Inpatient | 220 (40.1) | 189 (85.9) | 1.773 | 0.880 |
| Critical care | 102 (18.5) | 91 (89.2) | | |
| Ambulatory/Clinic | 94 (17.1) | 80 (85.1) | | |
| Operation theatre | 75 (13.6) | 64 (85.3) | | |
| Emergency department | 31 (5.6) | 28 (90.3) | | |
| Office | 28 (5.1) | 23 (82.1) | | |
| **Employment grade** | | | | |
| U29 and less (Ordinary grade nurse) | 357 (64.9) | 315 (88.2) | 3.026 | 0.082 |
| U32 and more (Senior grade nurse) | 193 (35.1) | 160 (82.9) | | |
| **Work schedule type** | | | | |
| Office hours | 171 (31.1) | 140 (81.9) | 4.252 | 0.039 |
| Shift hours | 379 (68.9) | 335 (88.4) | | |

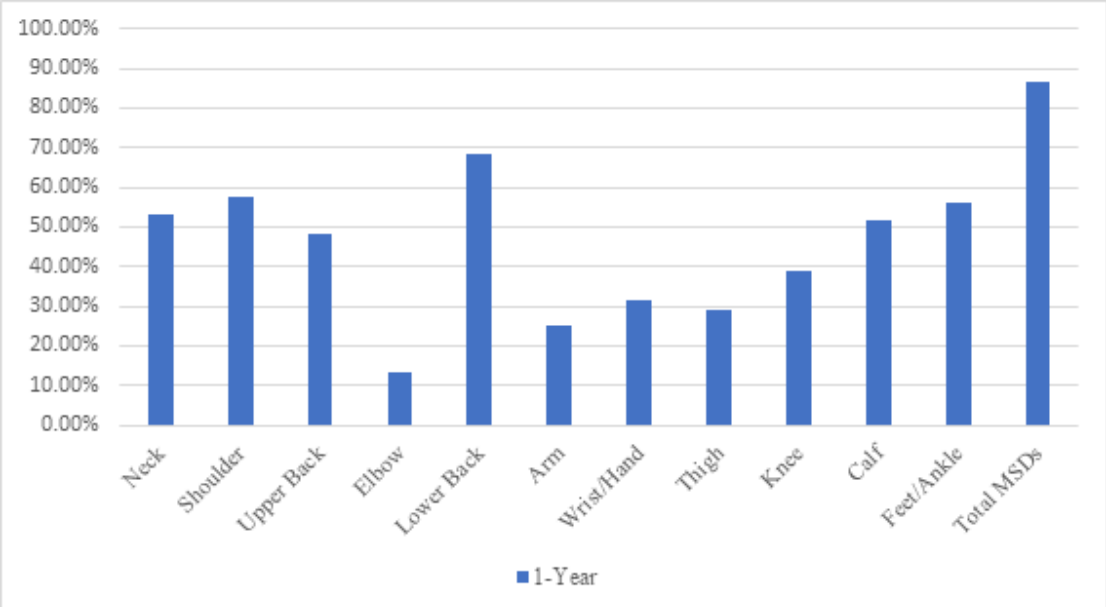


**Figure 1:** Annual prevalence of musculoskeletal disorders (msds) among study participants

top of that majority of the participants were also perceived to have good support system at the workplace with high supervisor support (74.5%) and high co-worker support (93.6%).

**Table 2:** Univariate analysis of the organizational psychosocial risk factors of musculoskeletal disorders (MSDs) among study participants

| Psychosocial risk factor | Total n (%) | MSD | | |
|---|---|---|---|---|
| | | n (%) | χ2 | P-value |
| **Decision latitude** | | | | |
| Low | 222(40.4%) | 193(86.9%) | 0.104 | 0.747 |
| High | 328(59.6%) | 282(86.0%) | | |
| **Psychological job demand** | | | | |
| Low | 305(55.5%) | 257(84.3%) | 2.567 | 0.109 |
| High | 245(44.5%) | 218(89.0%) | | |
| **Supervisor support** | | | | |
| Low | 140(25.5%) | 133(95.0%) | 11.894 | 0.001* |
| High | 410(74.5%) | 342(83.4%) | | |
| **Co-worker support** | | | | |
| Low | 35(6.4%) | 32(91.4%) | 0.814 | 0.367 |
| High | 515(93.6%) | 443(86.0%) | | |
| **Job insecurity** | | | | |
| Low | 303(55.1%) | 259(85.5%) | 0.449 | 0.503 |
| High | 247(44.9%) | 216(87.4%) | | |
| **Job strain** | | | | |
| Non-High | 450(81.8%) | 389(86.4%) | 0.014 | 0.907 |
| High | 100(18.2%) | 86(86.0%) | | |

### *Association between psychosocial factors with MSDs among study participants*

Univariate analysis of organizational psychosocial factors at workplace with MSDs within 1-year as in table 3 illustrated that only supervisor support was significantly associated with MSDs among study population in 1 year with (P=0.006). On the other hand, all other component of organizational psychosocial factors e.g., decision latitude, psychological job demand, co-worker support and job insecurity were found not to be statistically significant in association with MSDs within 1-year with (P=0.747), (P=0.111), (P=0.373), (P=0.503) respectively. Subsequently, multiple logistic regression was performed to control for confounders such as age, number of children, income, history of musculoskeletal disease, employment grade, total employment duration, work schedule type and selected ergonomic (Table 3). In the multivariate analysis, the association between supervisor's support was still found to be significant with Adjusted OR 0.309 (95%CI 0.133-0.716). Hence, this study illustrated the importance of supervisor support as a protective factor against MSDs among tertiary hospital nurses.

## *Discussion*

This is the first study that has been conducted which aimed to explore the relationships between organizational psychosocial factors with musculoskeletal disorders among nurses working at a tertiary university hospital in Malaysia. It was found that the annual prevalence of MSDs among this study population was 86.4%. It was almost similar with what have been recorded by previous studies that were conducted among nurses with prevalence range between 48% to 95% worldwide and 78% to 94.6% among Asian nurses (12-20). However, the prevalence of MSDs in this study was found to be slightly higher compared to what was found by Amin et al. among public hospital nurses in Malaysia which was 73.2% (21). This could be due to the difference between population of interest between both studies where in this study were taken from all type of working location in UMMC which include operation theatre and emergency department in comparison with Amin et al. which involve only inpatient ward nurses. Nevertheless, the annual prevalence that was found in this study was almost similar with what have been found from research that were conducted among hospital nurses in other Asian country previously e.g., China, Japan and Vietnam and Saudi Arabia (16, 20, 22-25). On top of that, among the entire body region, lower back was found to contribute the highest percentage of MSDs while elbow was found to be the least common in this study. These findings were similar with what have been found from previous studies where lower back was the commonest area to be affected by MSDs among nursing population (15, 17, 26, 27).

On the other hand, organizational psychosocial factors at work were assessed using Job-Content Questionnaire (JCQ) in this study. In the questionnaire, we assessed six main components of organizational psychosocial factors at work based on demand-control-support model (JDSC) such as decision latitude, psychological job demand, job strain, supervisor support, co-worker support and job insecurity (28). According to Karasek, decision latitude was calculated from job discretion and decision-making authority scores (28). Meanwhile, job strain was calculated based on decision latitude and job demand. Job strain can be further categorized into high job strain, low job strain, active job, and passive job. However, in view of the needs to recognize only high job strain as work psychosocial risk exposure, the other three categories were combined under non-high strain category for further analysis. Participants that were exposed to low decision latitude, low supervisor support, low co-worker support, low job security and high job demand were categorized as exposed to work psychological risk factors.

In this study, it was found that majority of the participant perceived to have high decision latitude, low psychological job demand, low job insecurity and high supervisors, co-worker support and non-high job strain. These results

**Table 3:** Multivariate analysis of the organizational psychosocial risk factors of musculoskeletal disorders (MSDs) among study participants

| | Unadjusted | | Adjusted[a] | |
|---|---|---|---|---|
| | **Crude or (95% CI)** | **P-value** | **Adjusted or (95% CI)** | **P-value** |
| **Decision latitude** | | | | |
| Low | 1.000 | | 1.000 | |
| High | 0.921 (0.559-1.518) | 0.747 | 1.057 (0.621-1.800) | 0.837 |
| **Psychological job demand** | | | | |
| Low | 1.000 | | 1.000 | |
| High | 1.508 (0.910-2.498) | 0.111 | 1.285 (0.748-2.207) | 0.364 |
| **Supervisor support** | | | | |
| Low | 1.000 | | 1.000 | |
| High | 0.265(0.119-0.591) | 0.001 | 0.309 (0.133-0.716) | 0.006* |
| **Co-worker support** | | | | |
| Low | 1.000 | | 1.000 | |
| High | 0.577 (0.172-1.933) | 0.373 | 0.742 (0.205-2.679) | 0.648 |
| **Job insecurity** | | | | |
| Low | 1.000 | | 1.000 | |
| High | 1.184 (0.722-1.940) | 0.503 | 0.878 (0.513-1.504) | 0.636 |

[a]Adjusted for age, number of children, income, history of musculoskeletal disease, employment grade, total employment duration, work schedule type and selected ergonomic factors

were comparable to results by Amin et al. in 2014 that was conducted among public hospital nurses in Malaysia where similar findings was found among public hospital nurses in Malaysia (11). For high decision latitude, it was determined by a total of job skill discretion and decision-making authority. Referring to median value of decision latitude score, more than half (59.6%) of the participants were found to have high decision latitude. The mean score for decision latitude in this study was 66.99 which slightly higher than mean score for decision latitude that has been recorded by Amin et al. in 2014 among public hospital nurses in Malaysia (64.64). In UMMC, majority of the nurses tend to stay longer in service at the hospital, this could be explained by higher percentages of nurses with experience working 5 years and more in the hospital compared to study by Amin et al., hence they were more experienced and were able to make decision pertaining to their work scope compared to young nurses. It was also found that less than 40% of participant in study by Amin et al. (11) were working 5 years and more compared to our study in which about 74.5% of study participant have worked more than 5 years in UMMC. Apart from that, majority of our nurses tend to work longer in UMMC, hence they are used to the hospital environment and working system which make them to be able to make their own decision but still within their limit as a nurse. For low psychological job demand, it was found more than half (55.5%) of the participants perceived to have low job demand. The mean score for psychological job demand in this study was 34.40 which a lot higher that what has been recorded in public hospital nurses in Malaysia (18.34) by Amin et al. (11). These results were expected since our study was conducted among nurses in university hospital, a leading tertiary center in Malaysia and a referral center for sub-specialty cases which mainly more complicated and needs more care by the nurses and indirectly increase the job demand.

Job strain was calculated from decision latitude and psychological job demand. Using the quadrant approach, nurses that record score more than median value for psychological job demand and less than median value for decision latitude were classified as being exposed to high strain (28, 29). From this study it was found that majority of the participants (81.8%) claimed to have non high job strain and only 18.2% were found to be exposed to high strain among the study population. This was explained with the finding that more than half of the participants were also found to have low job demand and high decision latitude in our study. The finding was similar with study by Amin et al. in 2014 among public hospital where it was found that only 17.3% of the participants were found to be exposed to high job strain (11).

Social support can be further divided into supervisor support and co-worker support. In our study, majority of the participants perceived to have high supervisor and co-worker supports which led to high social support among them. The mean score for social support in our study was 24.65 which slightly higher than mean score that has been recorded among public hospital nurses (23.88) by Amin et al. (11). In this study, after controlled for confounders, supervisor support was the only psychosocial factors that associated with MSDs. We have found that supervisor support serves as a protective factor against MSDs in this study population. In UMMC, there were a good

commitment and initiative shown by the top management in maintaining the highest standard of occupational safety and health of their employees including mental health. This includes taking care of the staff's welfare and ensures a good support system for their employees which include direct assessment and communication with the supervisors who representing the management of the hospital. One of the initiatives in providing support for staff is the establishment of counselling unit which provides 24 hours counselling services for any staff that need it. Apart from that, the establishment of Occupational Safety, Health, and Environment (OSHE) unit was also very important in identifying and monitoring all kind of hazards at the workplace which includes mental health and play the role as the middle person between hospital managers and employees.

Finally, majority of the participants were found to have low job insecurity. This can be explained by the type of institution as statutory organizational which able to offer permanent type of appointment to most of their employee. Among our study population, 88.0% of them were appointed in permanent post. The mean score for job insecurity in our study was 5.67 and this was much lower than what has been found by Amin et al. in 2014 among public hospital nurses with mean score of 6.33.

Psychosocial factors at the workplace which includes decision latitude, psychological job demand, job strain, supervisor support, co-worker support and job insecurity were analyzed using univariate analysis and followed by multivariate analysis. However, in this study supervisor support was the only work psychological factors that was found to be significantly associated with MSDs in 1-year. Nurses who had lower supervisor support tend to have higher odds in suffering from MSDs in 1-year compared to nurses with higher supervisor support. This was similar with study that was conducted by Amin et al. where social supports which include supervisor support were also found to be associated with MSDs among nurses (11). On top of that, this result was also similar what has been found by Sembajwe et al. in 2013 where poor supervisors support was associated with higher possibility of experiencing MSDs among healthcare workers including nurses (30). Other than that, a study that was conducted by Weigl et al. also found that supervisor support provides a buffering effect on burnout-depression linkage and serves as a crucial element in reducing work stress among nurses which is known to be one of a risk factors of MSDs and eventually affect the work performance among this population (31). Based on the findings from current study which also supported with similar findings from previous studies, social support especially supervisor support is found to be a very important element which associated with development MSDs among nursing population. Hence, hospital managers need to ensure more initiative to be organized to ensure better support to the nurses especially from supervisors which can be incorporated as part of program to reduce MSDs among this working population. MSDs among nurses is an important issue to be solved because the nurses serve as the backbone of a hospital and their safety and health which very closely associated with their work performance could indirectly give impact to the safety and healthcare delivery to the public (13, 32, 33).

There were some limitations which can be found from this study. Firstly, in view of the cross-sectional study design used, no causality can be conclude using the data from this study. Apart from that, information gathered in this study was based on self-reported questionnaires which could expose to biases and might be challenging to make any reliable assumption based on the data that was generated. Further study is needed to explore more on these MSDs with using more robust method by comparing the self-reported questionnaires with clinical assessment by a qualified physician to reduce biases and increase the validity of the results.

## *Conclusion*

This study highlighted the relationships between organizational psychosocial factors and MSDs among nurses at tertiary university hospital specifically the role of supervisor support as the protective factors against MSDs among this working population. Hence, this finding shall be taken as a reference for hospital policy makers so that this factor can be incorporated into program to reduce MSDs among university hospital nurses.

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## *Competing interests*

The authors declared no conflict of interest that may affect the integrity of the study.

## *Ethical Clearance*

Ethical approval was applied from UMMC Medical Ethic Committee (MREC ID NO: 2019610-7507).

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