Correlation analysis between work-related musculoskeletal disorders and the nursing practice environment, quality of life, and social support in the nursing professionals

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Abstract

We aim to analyze the correlated influential factors between work-related musculoskeletal disorders (WMSDs) and nursing practice environment and quality of life and social support.

From January 2015 to October 2015, cluster sampling was performed on the nurses from 12 hospitals in the 6 areas in Xinjiang. The questionnaires including the modified Nordic Musculoskeletal Questionnaire, Practice Environment Scale (PES), the Mos 36-item Short Form Health Survey, and Social Support Rating Scale were used to investigate. Multivariate logistic regression analysis was used to explore the influential factors of WMSDs.

The total prevalence of WMSDs was 79.52% in the nurses ever since the working occupation, which was mainly involved waist (64.83%), neck (61.83%), and shoulder (52.36%). Multivariate logistic regression analysis indicated age ($\geq$26 years), working in the Department of Surgery, Department of Critical Care, Outpatient Department, and Department of Anesthesia, working duration of >40 hours per week were the risk factors of WMSDs in the nurses. The physiological function (PF), body pain, total healthy condition, adequate working force and financial support, and social support were the protective factors of WMSDs.

The prevalence of WMSDs in the nurses in Xinjiang Autonomous Region was high. PF, bodily pain, total healthy condition, having adequate staff and support resources to provide quality patient care, and social support were the protective factors of WMSDs in the nurses.

Abbreviations: PES = Practice Environment Scale, PF = physiological function, WMSDs = work-related musculoskeletal disorders.

Keywords: life quality, nurse, practice environment, social support, work-related musculoskeletal disorder

1. Introduction

Work-related musculoskeletal disorders (WMSDs) are considered as the most common cause of absenteeism among the nursing professionals.[1,2] Increasing evidence reveals WMSDs may occur in nurses, and the prevalence is apt to increase with the emergence of the high risk professionals.[3,4] According to a survey, the annual prevalence of WMSDs is up to 50% in the nurses.[5] This leads us to investigate the prevalence of WMSDs in the nursing professionals in the Xinjiang Autonomous Region.

WMSDs are the major cause for the absence of nurses in their professional positions, which severely affect their life quality and professional performance. According to the Bureau of Labor Statistics, WMSDs are listed as the top danger for the nurses. Several occupational factors including work load, work posture, and duration have been reported to affect the prevalence of WMSDs.[2,6] Besides, poor psychiatric status in nurses was associated with the onset of WMSDs.[7] To be exact, WMSDs may hamper the psychiatric status and the social activities of the nurses. Considering the importance of epidemiological knowledge related to WMSDs among the nursing professionals, it is necessary to summarize the symptoms in a broader context. In this study, we aim to investigate the correlation between WMSDs and the life quality, social support, and working environment of the nurses working in the Xinjiang Uygur Autonomous region.

2. Materials and methods

2.1. Subjects

From January 2015 to October 2015, cluster sampling was performed to the nurses in 12 hospitals localized in the south middle region, east region, and north region in the Urumqi city, Changji State, Bayingolin State, Kashgar area, Yili State, and Hami area. The nurses working in the Department of Internal Medicine, Department of Surgery, Department of Gynaecology

and Obstetrics, Department of Pediatrics, Department of Emergency, Department of Critical Care, and Operating Room and Supplying Room. The inclusion criteria were as follows: the licensed practical nurses with a working experience of more than 12 months in the permanent position; those with a nursing certificate; and those with at least 1-year working experiences. Those with the following aspects were excluded: those with WMSDs caused by congenital spine disorders, cancer, trauma, and gynecological disease; those with back pain due to surgery, tumor vessel lesions, irregular menstruation cycle, pregnancy, scoliosis, disc protrusion, spine malformation, ankylosing spondylitis, or those with malformation in extremities; those with a long-term medication of analgesics; or those with a history of psychiatric disorders or consciousness disorders. The study protocols were approved by the Ethical Committee of the Xinjiang Medical University.

2.2. Methods

All the nurses included in this study were required to fill in the questionnaire. On this basis, the information including gender, age, working duration, education, and working institutions were collected. The modified Nordic Musculoskeletal Questionnaire for musculoskeletal disorders with the efficiency testified according to the previous study[8] was used to evaluate the pain or discomfort in the 9 body regions, including back, shoulder, neck, elbow, waist, wrist, hip, knee, and ankle. WMSDs were defined as presence of long-term pain or discomfort in at least one body regions excluding WMSDs causing by other accident conditions including shoulder and neck pain caused by acute myocardial infarction, back pain induced by acute cholecystitis, trauma, and tumor.

2.3. Mos 36-item Short Form Health Survey

The Mos 36-item Short Form Health Survey consisted of 36 entries of 8 subscales involving physiological function (PF, 10 entries), role physical (RP, 4 entries), bodily pain (BP, 2 entries), general health (GH, 5 entries), vitality (VT, 4 entries), social functioning (SF, 2 entries), role emotional (RE, 3 entries), mental health (MH, 5 entries), and the total health transition (HT, 1 entry). The score was calculated according to the formula as previously described.[9] A higher score represented a better life quality. The retest reliability was ranged from 0.70 to 0.94, indicating the questionnaire was suitable to the Chinese population.

2.4. Practice Environment Scale (PES)

In the PES, 31 entries of 5 subscales were listed, including participatory role in the hospital and nursing department affairs (9 entries), nursing foundations for a high standard of patient care (10 entries), critical roles of the nurse manager (5 entries), having adequate staff and support resources to provide quality patient care (4 entries), and a positive working relationships between nurses and physicians (3 entries).[10] A higher score represented a higher satisfaction for the practice environment. The Cronbach α coefficient of the total scale was 0.91, and the coefficient of the subscale was ranged from 0.67 to 0.79. The retest reliability was 0.84, and the content validity was 0.94.

2.5. Social Support Rating Scale

A self-designed Social Support Rating Scale form was used in this study, including 10 entries and 3 subscales.[11] For the dimensions, 3 parts were involved including subjective support

(4 entries), objective support (3 entries), and support availability (3 entries). The total score was 66. A higher score represented more social support. The retest reliability was 0.92, and the Cronbach α coefficient was ranged from 0.89 to 0.94.

2.6. Statistical analysis

The data were entried by 2 working staff using the Epidata 3.0 software. SPSS17.0 software was used for the data analysis. The data were descriptively analyzed by calculating the frequencies, percentages, and means ± standard deviation. Logistic regression analysis was used to identify the risk factors for WMSDs. $P < .05$ was considered to be statistically significant.

3. Results

3.1. General information

In total, 2170 nurses (90.4%) accomplished the questionnaire, among which 1973 questionnaires (90.9%) were considered to be effective. A total of 41 male and 1932 female nurses were involved, aged from 16 to 55 years (mean 30.73 ± 6.58 years). The working duration ranged from 1 to 48 years (mean 9.01 ± 7.03 years). The body mass index was 14.69 to 53.99 kg/m^2 (mean 21.60 ± 3.11 kg/m^2). The most showed an educational degree of college (77.14%). For the working departments, 675 were from the Internal Medicine (34.21%), 628 from Department of Surgery (31.83%), 430 from the Department of Critical Care (21.80%), 88 from the Anesthesia Room (4.46%), 63 from Outpatient Department (3.19%), and 89 from other departments (4.51%). The working hours per week ranged from 20 to 50 hours (mean 46.10 ± 4.69 hours).

3.2. Incidences of WMSDs in different body regions

The total prevalence of WMSDs was 79.52% in the nurses ever since the working occupation, which was mainly involved waist (64.83%), neck (61.83%), and shoulder (52.36%). The prevalence of WMSDs in the recent year was 76.38%, which was mainly involved the waist (60.26%), neck (57.78%), and shoulder (47.39%, Table 1).

3.3. Life quality of the nurses

Statistical differences were noticed in the life quality of the nurses in terms of physiological and psychological health, total score, and Chinese version of nursing practice scale ($P < .001$). The life quality score was 60.04 ± 15.18. The maximal score was presented in the PF (76.05 ± 19.51), while the minimal score was presented in the GH (50.64 ± 17.45, Table 2).

3.4. Social support of the nurses

As revealed in the survey, the total social support score was 40.66 ± 6.70. The scores of the subjective support, objective, and support availability were 24.40 ± 3.99, 8.75 ± 3.27, and 7.51 ± 1.84, respectively.

3.5. Working environment of the nurses

The score of the dimension and entry was 3.05 ± 0.43 for the high-quality nursing service. The score for the capacity and leadership of the nursing supervisor as 3.03 ± 0.47, while that for the nurse and doctor cooperation was 3.02 ± 0.51. The score for

Table 1

Prevalence of WMSDs in different body regions in the nurses.

Region	Ever since the working occupation		In the recent 1 y	
	N	Prevalence, %	N	Prevalence, %
Neck	1220	61.83	1140	57.78
Shoulder	1033	52.36	935	47.39
Back	809	41.00	749	37.96
Elbow	340	17.23	343	17.38
Waist	1279	64.83	1189	60.26
Wrist	515	26.10	465	23.57
Hip	465	23.57	423	21.44
Knee	707	35.83	673	34.11
Ankle	668	33.86	625	31.68

the nurses' participatory roles in the hospital and nursing department affairs as 2.89 ± 0.46, and having adequate staff and support resources to provide quality patient care as 2.75 ± 0.56 (Table 3).

3.6. Factors related to the WMSDs in nurses

Multivariate logistic regression analysis was performed to identify the risk factors for the WMSDs using the WMSDs as the dependent variable and gender, age, working duration, education, working department, shift, BMI, working duration per week, life quality, working environment, life quality, and social support as the independent variables (Table 4). The results indicated age (≥ 26 years), working in the Department of Surgery, Department of Critical Care, Outpatient Department, Department of Anesthesia, and working duration of > 40 hours per week were the risk factors of WMSDs in the nurses. In contrast, the PF, body pain, total healthy condition, adequate working force and financial support, and social support were the protective factors of WMSDs (Table 5).

4. Discussions

WMSDs refer to an occupational disease that threats the public health worldwide. In European countries and the United States, WMSDs have been paid much more attention, but in some developing countries, it is only listed as a work-related disease despite it severely affects the mental and physiological health for each individual.[12] In this study, we reported the prevalence of WMSDs in the nurses working in the Urumqi was 79.52%, which

was higher than the previous report.[13] Compared with the prevalence of WMSDs in the China mainland, the prevalence was comparatively lower (79.52% vs 82.38%). This may be related to the healthy system, population traits, and the geographical environments. According to a survey by NIOSH, the nursing professionals showed a higher incidence of lumbar injury.[14] In line with this, our study showed the lumbar region was the mostly involved in the nurses with WMSDs. Meanwhile, the prevalence of WMSDs was higher in the neck and shoulder of the nurses, demonstrating a higher risk of WMSDs in the nursing professionals.

In this study, the life quality score of the nurses working in the hospitals in the Urumqi was 60.04 ± 15.18, which was lower than the Chinese version of nursing practice scale. This indicated that the life quality of the nurses was lower compared with the normal individuals, which may be related to the working characteristics of the nursing professionals such as labor intensive, high pressure, and an irregular working shifting, lower income, and social support. Meanwhile, our study showed the score of the PF was the highest, and the score of the GH was the lowest which may be related to lacking of social support and the lower income compared with the counterpart as well as inadequate mental health caring.

Social support consisted of subject and objective support, as well as support availability. Subjective support refers to the emotional support of a certain individual, which is closely related to the subjective sensation of an individual. Objective support refers to the substances or team relationship that is objectively existed.[15] The support availability refers to the utilization of the objective and subjective support.[16] In this study, the mean score for the social support of the nurses was 40.66 ± 6.70, which was

Table 2

Comparison between dimension score of the nurses and the normal individuals.

Dimension	Score	Normal individual	t	P
Physical function	76.05 ± 19.51	89.01 ± 15.73	-29.51	.000
Bodily pain	68.05 ± 17.21	80.40 ± 19.79	-31.88	.000
Social function	66.65 ± 19.25	84.60 ± 8.15	-41.42	.000
Mental emotional health	56.99 ± 16.79	75.23 ± 16.69	-48.25	.000
Vitality	55.05 ± 17.21	71.15 ± 18.09	-41.56	.000
Role-physical	53.73 ± 38.72	81.99 ± 31.65	-32.41	.000
Role-emotional	53.17 ± 39.09	77.04 ± 33.45	-27.13	.000
General health condition	50.64 ± 17.45	66.03 ± 20.87	-39.18	.000
Physiological health	62.12 ± 16.65	79.36 ± 17.00	-46.01	.000
Mental health	57.96 ± 16.89	77.00 ± 17.42	-50.05	.000
Total score	60.04 ± 15.18	78.18 ± 15.88	-53.08	.000

Table 3

Score of practice environment of the nurses.

Dimension and the entry	Results	Mean score
Participatory role in the hospital affairs	26.00±4.16	2.89±0.46
I have the chance to get advancement	2.86±0.67	
I have the chance to involve in the policy decisions	2.66±0.77	
The head of the nursing personnel is easy to get along with	3.14±0.65	
The leader responsible for the nursing shares the similar rights with the other leaders of the hospitals	2.93±0.62	
I have the chance to receive training	2.81±0.72	
Nursing administrators consult with staff on daily problems and procedures	2.85±0.67	
Nurses have the rights to participate in the management of the hospital affairs	2.81±0.69	
Nurses have the chance to be a member of the nursing committee and the hospital leadership	2.84±0.69	
The head nurse often communicate with the nurses about the basis of the working affairs	3.10±0.58	
Nursing foundations for a high standard of patient care	30.53±4.31	3.05±0.43
Hospitals give nurses the chances to a better future and training	3.00±0.66	
The administration office of the hospital give the patients high quality nursing	3.08±0.57	
With definite nursing philosophy during the nursing	3.02±0.55	
I have the chance to work with someone with strong capacity in the clinical nursing	3.08±0.55	
The hospitals have complete quality control systems for the nursing	3.06±0.58	
The nurses have the chance to receive training at the initial stage of the working	3.15±0.57	
The nursing in the hospitals has a special nursing mode.	3.02±0.61	
I can finish the nursing records in time	3.07±0.62	
Positive measures (eg, distribution of hospital beds to each nurse) contribute to the continuous nursing	3.05±0.61	
Frequent nursing diagnosis in the daily nursing activities	3.00±0.59	
The capacity and leadership of the nursing supervisor	15.13±2.33	3.03±0.47
Supporting from the leaders to the nurses' work	3.12±0.59	
In cases of any wrong doings of the nurses, appropriate training or explanation not blame was given	2.92±0.69	
Head nurse is an excellent supervisor and leader	3.22±0.62	
I am given encourage after a certain work	2.95±0.62	
Support by the head nurse to the nurses' decisions	2.92±0.65	
Having adequate staff and support resources to provide quality patient care	11.01±2.26	2.75±0.56
I have enough time for the nursing care in presence of adequate facility support	2.70±0.72	
I have spare time to communicate with the other nurses for the nursing	2.80±0.69	
There are enough nurses to provide high quality nursing in the hospital	2.89±0.74	
There are adequate staff to complete the working affairs in the hospitals	2.62±0.79	
Cooperation between physicians and nurses	9.06±1.54	3.02±0.51
The physicians and nurses are well cooperative in the daily working	3.01±0.65	
The physicians and the nurses have the capacity for team-work	3.00±0.61	
The physicians and nurses are well cooperative and collaborative work	3.05±0.59	

considered as a moderate degree according to the previous description.[15] This may be related to the fact that the nurses working in the first line are young with less experience in the social working. On this basis, the stress reaction was comparatively lower, which was not adequate to ask for social support. Meanwhile, most of the nurses obtained less communication with the family, which finally resulted in lacking of social support.

Practice environment of the nurses refers to the sum of each element that affect the nursing system in a direct or indirect manner.[17] According to the PES of the nursing work index, a score of >2.5 represented satisfaction of the practice environment of the nurses. In this study, the nurses filled in the questionnaire reported a score of >2.5, indicating that the nurses were satisfactory to the nursing environment and the dimensions.[18] Among the 5 subscales, the minimal score was presented in the subscale of having adequate staff and support resources to provide quality patient care, which implied that the nurses were not satisfactory with the number of staff and the facility. In China, the number of nurses working in the hospitals was decreased, which was mainly associated with the poor satisfac-

Table 4

The risk factors of WMSDs in the nurses.

Factor	Valuation
Sex	0=M, 1=F
Age, y	0=≤25; 1=26–30; 2=31–35; 3=36–40; 4=≥41
Working duration, y	0=≤5; 1=6–10; 2=11–15; 3=16–20; 4=≥21
Education	0=lower education; 1=bachelor degree or more
Department	0=Internal Medicine; 1=Department of Surgery; 2=Department of Critical Care; 3=Outpatient Department; 4=Department of Anesthesia; 5=Others
BMI, kg/m²	0=<18.5; 1=18.5–23.9; 2=24.0–27.9; 3=≥28.0
Working duration per week, h	0=≤40; 1=>40
Shift	0=No; 1=Yes
Life quality	Based on the exact life quality in the nursing care
Practice environment	Based on the exact practice environment in the nursing care
Social support	Based on the exact social support in the nursing care

BMI=body mass index, WMSD=work-related musculoskeletal disorder.

Table 5

Logistic regression analysis of the WMSDs.

Parameter	B value	SE	Wald	P value	OR (95%CI) value
Constant	1.733	0.755	5.269	.022	. . .
Age	0.169	0.082	4.242	.039	1.184 (1.008–1.390)
Department*					
Department of Surgery	0.297	0.146	4.153	.042	1.345 (1.011–1.789)
Department of Critical Care	0.804	0.177	20.644	.000	2.235 (1.580–3.162)
Department of Outpatient	0.990	0.400	6.119	.013	2.692 (1.228–5.990)
Department of Anesthesia	0.737	0.367	4.038	.044	2.090 (1.018–4.288)
Working duration per week	0.446	0.139	10.311	.001	1.563 (1.190–2.052)
Physical functioning	−0.008	0.003	4.800	.000	0.992 (0.984–0.998)
Bodily pain	−0.017	0.004	15.436	.000	0.983 (0.975–0.992)
General health	−0.018	0.004	18.668	.000	0.982 (0.974–0.990)
Objective support	−0.050	0.020	6.317	.012	0.950 (0.942–0.990)
Having adequate staff and support resources to provide quality patient care	−0.092	0.042	4.876	.027	0.912 (0.840–0.990)

CI = confidence interval, OR = odds ratio, SE = standard error, WMSD = work-related musculoskeletal disorder.
* Compared with the Department of Internal Medicine.

tion about the work. Besides, the work load was severe due to lacking of adequate facility in the practice environment. According to our study, the score of the participatory roles in the hospital and nursing department affairs was only inferior to having adequate staff and support resources to provide quality patient care. Actually, in the clinical practice, the nurses seldom participate in the management of hospital affairs, which were mainly associated with the following aspects: the nurses are busy caring for the patients and seldom pay attention to the hospital affairs; the nurses are usually neglected by the leaders due to lacking of management capabilities and professional trainings. All these lead to the professional development of the nurses, and decreased working activity.

Several factors have been reported to be associated with the WMSDs including biomechanical factors, social psychic factors, and individual factors.[19] In this study, age (≥26 years), working in the Department of Surgery, Department of Critical Care, Outpatient Department, Department of Anesthesia, and working duration of > 40 hours per week were the risk factors of WMSDs in the nurses. In contrast, the PF, body pain, total healthy condition, adequate working force and financial support, and social support were the protective factors of WMSDs. Meanwhile, the PF, BP, GH, having adequate staff and support resources to provide quality patient care, and social support were the protective factors of WMSDs. These indicated that improvement of the life quality of the nurses, elevation of social support, and improvement of the practice environment could decrease the risk of WMSDs in nurses. On this basis, we proposed the following aspects to decrease the prevalence of WMSD in nurses: rational arrangement for the work load and medical facility; to improve the working positivity of the nurses by inventive action; and to improve the social support of the nurses.

There are limitations in this study. The study is retrospective analysis, and its accuracy needed to be verified by perspective studies. In future, further studies with even large sample sizes are needed.

In conclusion, we investigated the prevalence of WMSDs, life quality, social support, and practice environment through a cross-sectional study. Our data indicated that PF, BP, GH, having adequate staff and support resources to provide quality patient care, and social support were the protective factors of WMSDs in the nurses working in the Xinjiang Autonomous Region.

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