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HOANG DUC LUAN

SITUATION OF MUSCULOSKELETAL DISORDERS AMONG DISTRICT HOSPITAL NURSES IN HAIPHONG AND EFFECTIVENESS OF PREVENTIVE INTERVENTIONS

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SUMMARY OF THE THESIS

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SUPERVISORS:

1. **Assoc. Prof. PHAM MINH KHUE, MD, PhD**
2. **Assoc. Prof. NGUYEN MAI HONG, MD, PhD**

Reviewer 1:

Reviewer 2:

Reviewer 3:

The thesis was examined by Examination Board of Haiphong University of Medicine and Pharmacy

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INTRODUCTION

Musculoskeletal disorders (MSDs) are the most common occupational health problem among health professionals worldwide, especially among nurses. A recent meta-analysis by Soylar et al. showed that the prevalence of MSDs among nurses in the past 12 months ranged from 33.0% to 88.0% and there are many associated factors such as including physical, ergonomic (excessive repetition, awkward postures, heavy lifting...), psychosocial factor, sociological demographic characteristics as well as factors related to work organization.

In Vietnam, occupational diseases and their prevention are increasingly concerned. Many occupational disease prevention programs have been implemented in different work environments, including the medical milieu. Contrariwise, there was only one recent and unique study ever about MSDs among workers in the health sector in Vietnam in 2015 that showed a prevalence of MSDs over the past twelve months among nurses at Viettiep hospital, the largest provincial hospital in Haiphong in the northern coastal region of Vietnam, which was very high (81%), and many related factors may have affected these disorders. This suggests that the problem of MSDs among nurses in Vietnam can be very large. Our question of the suty is about the current situation of MSDs on nurses at other care levels, especially at the district level; how the impact of MSDs on the lives and work of those nurses; what is about the knowledge, attitudes and practices of nurses about MSDs, and what interventions under our country conditions can be effective to help prevent MSDs from nurses. From the above questions, we conducted this research with the following specific objectives:

1. Determine the prevalence and the impact of MSDs on the daily lives and work of nurses working in district hospitals in Hai Phong in 2017.

2. Describe the knowledge, attitudes, practices and some factors related to MSDs on nurses in the above facilities.

3. Evaluate the effectiveness of health education communication interventions to prevent MSDs from nurses at some district hospitals in Hai Phong.

THE NEW CONTRIBUTION OF THE THESIS

This is one of the first and comprehensive studies in Vietnam on the issue of MSDs across a group of occupations, from proportional surveys to assessments of factors related to MSDs in nurses and intervention method to evaluate some changes in the prevalence of MSDs and the knowledge, practice and attitude of nurses about MSDs. Moreover, our research is broad-based with high participation rates. The sample size of the study is highly representative for local nurses. The level and characteristics of the work of the nurses covered in the study varied due to the number of hospitals located in rural areas and also local hospitals in urban areas. This allows for an objective evaluation of the research results and reflects the current situation of MSDs as well as the effectiveness of interventions on nurses in Vietnam, so the results are reliable which may be the premise for future research on occupational MSDs in Vietnam.

THESIS STRUCTURE

The main part of the thesis has 135 pages, consisting of the following sections:

Introduction: 2 pages

Chapter 1- Overview: 36 pages

Chapter 2 - Materials and Methods: 21 pages

Chapter 3 - Results: 39 pages

Chapter 4 - Discussion: 34 pages

Conclusions and recommendations: 3 pages

The thesis has 159 references, including 34 Vietnameses and 125 English, 43 tables and 13 figures. There are totally 8 appendices of 57 pages.

Chapter 1 : OVERVIEW

1.1. The epidemiological characteristics of occupational MSDs and the impact of MSDs on the work and life of health workers

1.1.1. Outline about MSDs

MSDs refer to injuries in the motor system, including muscles, tendons, bones and joints and foreign joints such as cartilage, ligaments, nerves, blood vessels, synovial fluid... Commonly seen in the upper extremities (shoulders, elbows, wrists...) or the lower extremities (knees), in addition to the neck or back. MSDs cover all types of injuries, from transient minor injuries to both irreversible injuries and chronic disabilities. Occupational MSDs are a group of chronic illnesses that include MSDs mainly caused or aggravated by work processes, occupational activities or by the impact of working environment conditions. The risk factors for developing MSDs are:

- Biomechanical factors: overworked work, repetitive work, unfavorable working posture
- Work organization and psychosocial factors: work pressure, low satisfaction level, monotonous work, lack of social support
- Individual factors: age, gender, physical condition, medical history...
- Coordinated impact of environmental factors

1.1.2. Epidemiology of MSDs among nurses

MSDs are very common among health workers. According to worldwide evidence, health workers are at high risk of acquiring MSDs due to inappropriate physical activity with musculoskeletal posture. Numerous studies around the world have shown that a very high percentage of health workers develop symptoms of MSDs, ranging from 28% to 96%, and especially on nurses. In developing countries, occupational MSDs are still of little interest. A study conducted in Malaysia showed that the percentage of MSDs in health workers was 88% in the back, 77% in the neck and 60% in the shoulders. In Nigeria, a study showed a 78% MSDs among nurses, with lesions mainly in the back, neck and knees. In Vietnam, the most recent research at Viet Tiep Hospital in Hai Phong, shows that the prevalence of MSDs in hospital nurses is very high, accounting for 81%, the risk factors for this condition are women, co-sufferers of stress and old age.

1.1.3. The impacts of MSDs on the work and daily life of nurses

- Impact on work: reducing work productivity, including reducing the work quantity and quality, increasing absenteeism in the workplace

- Impact on daily life: reduced quality of life, manifested by its ability to perform daily activities and sleep quality.

1.2. Environment - working conditions and MSDs on nurses

The working environment of health workers in general and nurses in particular has many potential risk factors that greatly affect the prevalence and incidence of MSDs, including:

- Physical risk factors/postures: care work, transportation of patients, heavy objects, wrong posture ...

- Extended working time: long working time, duty, shift work lasts more than 12 hours, night work, holiday work...

- Unreasonable organization and workload, lack of social support, jobs requiring high responsibility...
- Toxic and noisy working environment...

1.3. Measures to prevent occupational MSDs on nurses and the effectiveness of preventive measures

- Ergonomic Interventions
- Community intervention: Health education and communication
- Interventions with physical exercises

Chapter 2. MATERIALS AND METHODOLOGY

2.1. Research objects, location and timing:

2.1.1. Research objects and location

Research subjects include nurses working at 15 district hospitals in 14 districts of Hai Phong city, including 7 district town hospitals: Le Chan, Hong Bang, Ngo Quyen, Hai An, Duong Kinh, Do Son, Kien An; and 8 district hospitals: Kien Thuy, Tien Lang, Vinh Bao, An Duong, Thuy Nguyen, Cat Ba, Cat Hai and An Lao

* Criteria for selection:

- Having a nursing degree
- Having worked at the hospital for at least 9 months (this time to ensure the assessment of employees affected by the working environment).
- Agree to participate in the research

* Exclusion criteria:

- Nurses work in hospitals for less than 9 months
- Refuse to participate in this study
- Are attending school or absent from work at the time of research

2.1.2. Study timing: from January 2017 to July 2019

2.2. Methodology

2.2.1. Study design

Cross-sectional descriptive study and Controlled community intervention.

2.2.2. Sample size

2.2.2.1. For cross-sectional phase: 1179 nurses working in 15 district hospitals in Haiphong city

2.2.2.2. For interventional phase: 292 nurses in 4 hospitals, of which the intervention group had 130 nurses (An Lao and Le Chan hospitals) and the control group had 162 nurses (Vinh Bao and Ngo Quyen hospitals).

2.2.3. Sampling technique

Sampling for descriptive study: randomized stratified sampling method by hospital: make list of qualified nurses participating in the study (working for at least 9 months) of all district hospitals in Hai Phong, a total of 1279 nurses. There are 1179 nurses agree to participate.

Sampling for intervention study: Randomly select 2 district town and district hospitals in the list of 15 hospitals to the intervention group. Then randomly select 2 out of the remaining 13 hospitals to the control group under the same conditions as the hospital intervention group.

2.3. Techniques and data collection tools

2.3.2. Variables and research indicators:

- Determining the prevalence of MSDs and assessing the impact of MSDs on work and life

  + prevalence of MSDs in general and by anatomical site, age, gender, medical history, work characteristics

  + The relationship between MSDs and quality of life, anxiety, absenteeism at work

- Assess knowledge, attitudes and practices about MSDs and some factors related to MSDs on nurses

+ The percentage of correct answering about knowledge - attitudes - practices of MSDs

+ The relationship between MSDs and the sociological characteristics of nurses

+ Relationship between MSDs and nurses' career characteristics

+ The relationship between MSDs and the score of knowledge - attitude - practice on nurses' MSDs

- Evaluate the effectiveness of interventions by health education communication and physical exercise

+ The percentage of MSDs in general and according to the anatomical position before and after the intervention

+ Percentage of people with good knowledge - attitudes - practices about MSDs before and after the intervention

+ Quality of life and anxiety level scores on nurses before and after the intervention

2.3.3. Techniques and data collection tools

2.3.3.2. Tool for assessing MSDs

The questionnaire to assess MSDs and the impact of MSDs include 1) The Nordic standardized questionnaire on MSDs: this questionnaire was developed by Kuorinka et al in 1987 and is widely used in many countries for research on the evaluation of MSDs. The questionnaire has two main parts, the first part gives an overview of musculoskeletal health issues at different places in the body in the last 12 months and in the last 7 days, the second part assesses the specific problem of MSDs in each position as well as the consequences it brings to work and the life of the respondent; 2) Psychological distress of Kessler questionnaire (K6), consisting of 6 questions, has been used in several studies in Vietnam; 3) The questionnaire evaluating absenteeism at work; 4) Q-LES-Q-SF (Quality of Life Enjoyment and Satisfaction Questionnaire-Short

Form) to evaluate quality of life, this questionnaire was developed by Endicott in 1993 and standardized into vietnamese by Tô Gia Kiên et al. in 2013.

2.3.3.3. Tools and criteria for assessing knowledge - attitude - practice (KAP) of nurses on MSDs

Evaluation tools: Nurses' knowledge, attitudes and practices are investigated using a set of interview questions. The questionnaire was developed by the research team based on a reference of the KAP assessment panel for prevention of musculoskeletal disorders in nurses of the United States Department of Occupational Health and Safety (OHSA), MSDs prevention document of United States Department of Labor and World Health Organization guidelines on prevention of MSDs in the workplace.

KAP evaluation criteria: nurses with correct knowledge or attitudes or practices in an aspect or a question are calculated by having the correct answer to the question of a choice, or answering at least one correct answer with multiple choice questions. The percentage of nurses with correct knowledge, or attitudes, or practices is calculated by the total number of nurses who correctly answer all questions about knowledge, or attitudes, or practices divided by the total number of nurses participating in the response.

2.3.3.4. Gather information for intervention research

The intervention consists of three components: Communication on MSDs, Communication on Ergonomics, and training on strengthening exercise for nurses..

a. Communication intervention on MSDs

Provide posters with illustrations in the departments; disseminating information through group communication sessions of 30-40 people, at intervention hospitals.

b. Communication on ergonomics

Organize group training sessions on ergonomics at the ward and department of the hospital. Ergonomics training material is translated from "Guidelines for ergonomics in preventing MSDs on nurses" of the US Department of Occupational Safety and Health (OSHA). The document has been translated and extracted sections to suit the working conditions of nurses in Vietnam.

c. Training methods to improve physical exercise

The instruction of strength training exercises with training videos, videos for all nurses participating in the study so that they can exercise at home or in the department depending on the free time, the videos are submitted and screenings once a week for nurses in each department or ward. The communication and training sessions were conducted by lecturers of the Department of Public Health, Hai Phong University of Medicine and Pharmacy and the group of Occupational Health experts of Brest Medical University, France. Each intervention will have 1 communication session on MSDs, 2 communication sessions on ergonomics, 1 training guide exercises, these contents will be repeated in 6 months of intervention. The posters are posted in the departments for a period of 1 year. Post-intervention evaluation performed at 1 year after intervention.

2.4. Data analysis:

The data were entered by Epidata 3.1 and analysed by SPSS 19.0.

2.5. Ethical approval

The study complies with the outline approved by the Council for approval of the PhD candidate of Hai Phong University of Medicine and Pharmacy. The study gets the consent of local health authorities and hospital leaders. Nurses agree to volunteer to participate. Research does not directly harm the interests and health of the research subjects. Research steps and data were analyzed honestly and objectively by researchers.

Chapter 3: STUDY RESULTS

3.1. Prevalence of MSDs and its impact on daily and work life of nurses at Hai Phong district hospital

The study conducted a survey of 1179 nurses at 15 district hospitals in Hai Phong, accounting for 92.18% of the 1279 nurses. The average age of participants was 32.57, at least 19 years old and the oldest was 60 years old, women accounted for 81.26%, men accounted for 18.74%.

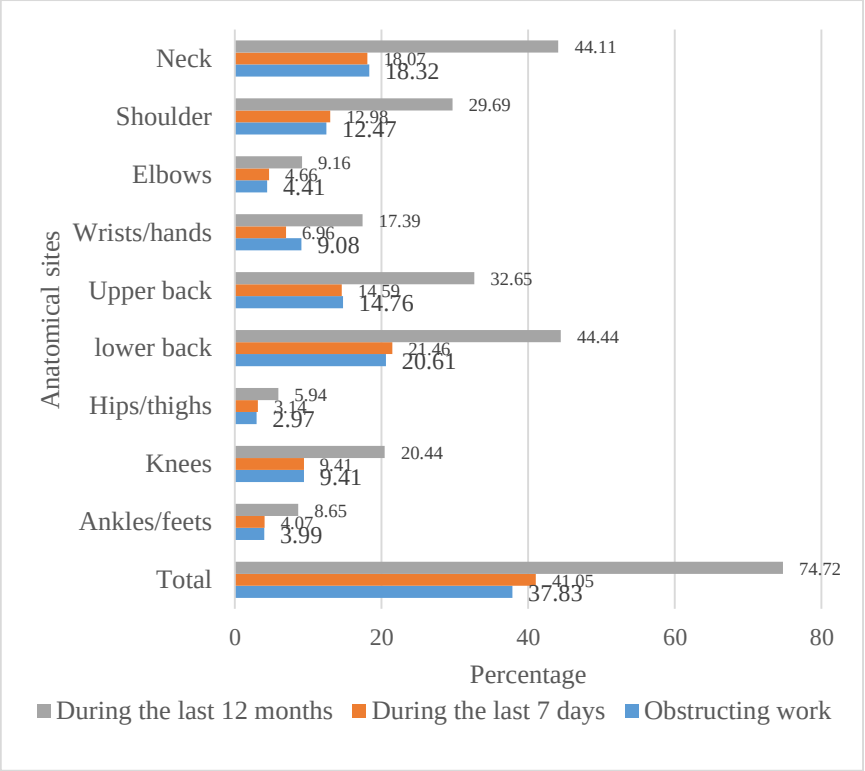

Figure 3.4. Prevalence of MSDs on nurses in district hospitals in Haiphong

Comments: The prevalence of MSDs during the last 12 months of nurses is 74.72%. Mainly the position of the waist (44.44%) and the

neck (44.11%). Over the past 7 days, the percentage of MSDs on nurses was 41.05%.

The symptom of MSDs lasted mainly from 1 to 7 days in the past 12 months, the neck was 31.3%, the lumbar region was 25.4%. The prevalence of MSDs occur every day is very low, the highest is the waist and back area, respectively 3.6% and 2.5%.

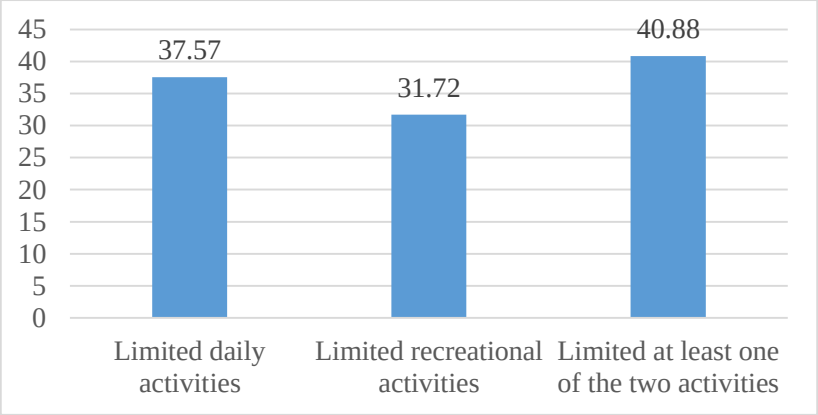

Figure 3.5. Consequences of MSDs on daily activities and recreation in the last 12 months

Comment: The consequence of MSDs reduced daily activities is 37.57% and reduced entertainment activities accounted for 31.72%.

Table 0.8-3.9. Characteristics of quality of life and level of anxiety among nurses in the last 12 months according to MSDs status

Variables	**MSDs**		**p**
	Yes (n=881)	**No (n=298)**	
	M ± SD	**M ± SD**	
Quality of life	49,80 ± 6,429	53,33 ± 7,146	< 0,05
Psychological distress	4,91 ± 3,743	3,44 ± 3,312	< 0,05

Comments: The average score of quality of life of the nursing group with MSDs was lower than the group without this condition with p <0.05. The opposite of average score of psychological distress.

Table 0.10. Characteristics of absence at work in the last 12 months according to MSDs status

Absenteeism	MSDs		OR (95%CI)	p
	Yes n (%)	No n (%)		
Yes	461 (80,45)	112 (19,55)	1,82 (1,39 – 2,38)	<0,001
No	420 (69,31)	186 (30,69)	1	

Comment: The group of nurses who were absent from the workplace in the past 12 months had the MSDs rate 1.823 times higher than the group of nurses who were not absent at the workplace (p <0.001).

3.2. Knowledge, attitude, practice and some factors related to MSDs among nurses in Hai Phong district hospital

3.2.1. Knowledge, attitude, practice of nurses about MSDs

Table 0.11. The rate of correct answers to knowledge about MSDs symptoms

Knowledge on MSDs	N = 1179	%
Never heard of or know about MSDs	134	11,37
Ever heard or know about MSDS	1045	88,63
- *Correctly mention all 3 symptoms*	705	67,46
- *Other (Numbness, limiting movement)*	49	4,69

Comment: 1045 nurses have heard of MSDS. Of which, 67.46% answered all 3 symptoms correctly.

Table 0.12. The rate of correct answers to risk factors of MSDs

Factors	N = 1045	%
Correct answers all factors	232	22,20
Don’t know	37	3,54

Comments: The percentage of correct answer of all risk factors causing MSDs is 22.20%. The proportion of unknown factors accounted for 3.54%.

Table 0.13. Correct response percentage on MSDs preventions

Preventions	N = 1045	%
Reduce stress	555	53,11
Physical exercise	926	88,61
Reasonable working time distribution	617	59,04
Correct posture handling	771	73,78
Don't know	32	3,06

Comments: 88.61% said that physical training is a preventive measure for MSDs. Follow by the correct posture manipulation, reasonable distribution of working time and reduce stress.

Table 0.14-3.15. Knowledge of the consequences of MSDS and Ergonomics

Consequences	N = 1045	%
To work	852	81,53
To individual life	905	86,60
To family	678	64,88
All	642	61,44
Don't know	46	4,40
Heard about Ergonomics	129	10,94

Comment: The majority believe that MSDs have consequences on personal life (86.60%) and on work (81.53%). 10.94% nurses have heard about Ergonomics.

Table 0.17-3.19. Attitudes to prevent MSDs of nurses

Attitudes	Always intend to do it right n (%)	Somtimes n (%)	No n (%)
When working with medical devices (chair, stretcher, bed…)	1107 (93,89)	59 (5,0)	13 (1,1)
When operating on the patient (lifting, supporting,…)	1106 (93,81)	59 (5,0)	14 (1,19)
Physical exercises	918 (77,86)	245 (20,78)	16 (1,36)
Relaxation, entertainment reduce stress	919 (77,95)	253 (21,46)	7 (0,59)
Actively prevent musculoskeletal injuries	1005 (85,24)	149 (12,64)	25 (2,12)
Relieves the symptoms of musculoskeletal pain	1052 (89,23)	110 (9,33)	17 (1,44)
Treatment from musculoskeletal injuries	795 (67,43)	271 (22,99)	113 (9,58)

Comments: Most nurses always take the initiative in preventing musculoskeletal injuries, especially when working with medical instruments and manipulating patients (> 90% always intend to do right).

Table 0.20-3.22. Practice prevention of MSDs by nurses

Practices	Always n (%)	Somtimes n (%)	No n (%)
Proper handling with some medical instruments (chairs, bed, tretchers)	1024 (86,85)	123 (10,43)	32 (2,71)
Handle properly when taking care of patients	1106 (86,17)	127 (10,77)	36 (3,05)
Rest after shift work	717 (88,41)	79 (9,74)	15 (1,85)
Exercise/sports	619 (52,5)	490 (41,56)	70 (5,94)
Relaxation, entertainment reduce stress	726 (61,58)	429 (36,39)	24 (2,04)

Rest, reduce activity when symptoms appear	679 (70,88)	232 (24,22)	47 (4,91)
Perform exercises to pain reducing	472 (49,27)	346 (36,12)	140 (14,61))
See a doctor for treatment	402 (41,96)	242 (25,26)	314 (32,78)

Comment: Most nurses have right practice with the content of MSDs prevention. However, less than 50% regularly perform pain reduction exercises as well as see a doctor for treatment.

3.2.2. Factors related to MSDS during the past 12 months among district hospital nurses in Hai Phong

Table 0.30. The final multivariate model of some factors related to MSDs on nurses

Independent variables		**MSDs n (%)**	**OR[a] OR [95%CI]**	***p*[b]**
Sex	Male	136 (61,5)	-	**<0,001**
	Female	745 (77,8)	2,1 [1,5 – 2,9]	
History of musculoskeletal diseases	No	756 (72,2)	-	**<0,001**
	Yes	125 (94,7)	7,1 [3,2 – 15,5]	
Correct attitudes about MSDs	Yes	404 (71,76)	-	**0,039**
	No	477 (77,44)	1,4 [1,02 – 1,8]	

[a]Multiple logistic regression; [b]Likelihood-ratio test

Comments: The final model results of logistic regression analysis showed three factors related to MSDs in nurses: gender, history of musculoskeletal disease, and right attitude about MSDs ($p < 0.05$).

3.3. The effectiveness of interventions

3.3.1. Effectiveness of intervention on prevalences of MSDs

Table 0.32. Prevalence of MSDs before and after the intervention among district hospitals nurses in Hai Phong

MSDs	Control group (N = 162)		p[1]	Interventional group (N = 130)		p[2]
	After n (%)	Before n (%)		After n (%)	Before n (%)	
During the past 12 months	114 (70,4)	110 (67,9)	0,310	98 (75,4)	69 (53,1)	0,01
Obstructing work during the past 12 months	66 (40,7)	61 (37,7)	0,245	51 (39,2)	36 (27,7)	0,045
During the last 7 days	58 (35,8)	59 (36,4)	0,823	45 (34,6)	39 (30,0)	0,034

Comment: After intervention, the percentage of MSDs and work obstructions due to MSDs decreased significantly in the intervention group, in the control group, there was no significant change.

3.3.2. Effective intervention on knowledge, attitudes and practices

Table 3.34-3.39. Change in knowledge - attitudes - practices about MSDs of nurses

KAP	Control group N = 162		p[1]	Interventional group N = 130		p[2]
	After n (%)	Before n (%)		After n (%)	Before n (%)	
Correct answers 3 main symptoms	92 (56,8)	91 (56,2)	0,837	91 (70,0)	108 (83,1)	0,004
Correct answers the cause	43 (26,5)	41 (25,3)	0,805	40 (30,8)	71 (54,6)	<0,001
Answers the consequences correctly	85 (52,5)	102 (63,0)	0,035	88 (67,7)	107 (82,3)	0,005

Correctly mention preventive measures	68 (42,0)	64 (39,5)	0,296	61 (47,0)	87 (66,9)	<0,001
The general attitude is right	59 (36,4)	63 (38,9)	0,112	61 (46,9)	73 (56,2)	0,005
The general practice is right	43 (26,5)	46 (28,4)	0,200	28 (21,5)	39 (30,0)	0,014

Comment: There was a significant improvement in the intervention group in knowledge of practical attitudes about MSDs.

3.3.3. Interventional effectiveness to the nurses' quality of life, anxiety and daily work

Table 3.40-3.41. Change in quality of life and psychological distress score

Average score	**Control group N = 162**		**p[1]**	**Interventional group N = 130**		**p[2]**
	After M ± SD	**Before M ± SD**		**After M ± SD**	**Before M ± SD**	
Quality of life	51,70 ± 6,493	52,83 ± 6,209	0,042	50,08 ± 7,074	52,33 ± 7,239	0,013
Psychol-ogical distress	3,74 ± 3,103	3,84 ± 3,123	0,071	4,23 ± 3,278	3,85 ± 3,180	0,048

Comments: The intervention group had a significant change in the quality of life score and anxiety level with p <0.05 compared to the control group.

Table 3.42-3.43. Changes in the percentage of daily activities and recreation limit due to MSDs at each anatomical site before and after the intervention by the intervention nurses

Anatomical sites	**Daily activities**		**p**	**Recreational activities**		**p**
	After n (%)	**Before n (%)**		**After n (%)**	**Before n (%)**	
Neck	17 (34,7)	10 (29,4)	0,028	16 (32,7)	8 (23,5)	0,021

Shoulder	12 (36,4)	6 (26,1)	0,040	10 (30,3)	4 (17,4)	0,015
Elbows	7 (53,8)	2 (28,6)	0,007	5 (38,5)	2 (28,6)	0,007
Wrists/hands	11 (52,4)	4 (28,6)	0,006	7 (33,3)	3 (21,4)	0,032
Upper back	12 (30,8)	7 (25,0)	0,019	13 (33,3)	7 (25,0)	0,009
lower back	21 (39,6)	12 (27,9)	0,003	24 (45,3)	13 (30,2)	0,005
Hips/thighs	2 (25,0)	1 (20,0)	0,354	3 (37,5)	1 (20,0)	0,04
Knees	3 (27,3)	2 (22,2)	0,141	3 (27,3)	2 (22,2)	0,811
Ankles/feets	2 (25,0)	1 (25,0)	0,585	3 (37,5)	1 (25,0)	<0,001

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Comment: In the intervention group, there is a significant reduction in almost all percentages from pre-intervention to post-intervention.

Chapter 4: DISCUSSION

4.1. Prevalence of MSDs and its impact on daily life and work of nurses in Hai Phong district hospital

4.1.1. Prevalence of MSDs

Nearly three quarter of nurses (74.72%) had MSDs at least one body site within the past 12 months, and 41.5% over the past 7 days. The most common sites of MSDs are the lower back (44.44%) and the neck (44.11%), the third is the upper back with over 30%. The results are similar for the percentage of MSDs in the last 7 days. During the work of the nurses, they have to support the patient and bend over so much and continuously, making the pressure on the waist region increase even more. This may be the cause of the high prevalence in the low back region of such nurses. Pain in the neck is the second highest rate after the lumbar region. The neck region is a wide range of motion with movements of bending, rotating, tilting ... so it is also easy to get hurt if not moving properly. In addition to the

burden of the job and the nature of the job, the prevalence of these positions is quite high. Our research results are quite similar to some of other authors in the world.

Regarding the duration of episodes of MSDs in the past 12 months, most of the symptoms of MSDs at all anatomical sites were mainly from 1 to 7 days, followed by from 8 to 30 days in length, the percentage of MSDs that occur frequently every day in nurses is very low, only from 0.7% to 2.5%. In addition, 37.57% reported that the disorders they encountered reduced the daily activities (including work activities) and 31.72% reported the reduction in recreational activities due to MSDs status.

4.1.2. Impacts of MSDs to quality of life and to work

The research results have shown that the average score of anxiety level is 4.53 ± 3.69 points, while the average quality of life of nurses is 50.69 ± 6.79 out of 70 in maximum score (Table 3.8-3.9). According to the conversion table of quality of life scale to percentage scale, we have a satisfaction level of quality of life of about 72.4%, which is quite good. This research result is higher than that of Kieu Ngoc Quy et al (2015) conducted a cross-sectional study on about 300 nurses at Viet Tiep hospital in Hai Phong, giving the number of 47.9 ± 7.9 for quality of life.

The research results also showed that a significant proportion of nurses appear to have reduced daily activities (37.57%) as well as leisure activities (31.72%) due to the impact of the MSDs situation (Figure 3.5). However, these effects in our study stopped at a not so serious level, as evidenced by the time spent reducing daily activities and leisure activities as MSDS mainly lasted from 1 to 7 days during the last 12 months at all anatomical sites. The decrease in activity

over 30 days was negligible, the highest was in the low back region with 5.3% of nurses affected by the time over 30 days (table 3.7).

4.2. Knowledge, attitude, practice and some factors related to MSDs

4.2.1. Knowledge, attitude and practice of nurses about MSDs

The results show that most nurses have good knowledge and attitudes towards MSDs, but from theory to practice there are many limitations in the application of such knowledge and attitudes into the right practice. However, there are still some aspects that are still quite limited, such as less than 11% nurses have ever heard about the concept of ergonomics or only about 50% have done regular exercise... Improving this issue not only improves the knowledge and practice of the nurses themselves, but also depends on the mechanisms and policies applied in the careers' specific characteristics. Changing the way of management, operation and regulation of nursing workloads in the context of high patient load is a very difficult problem, requiring a gradual and comprehensive change.

4.2.2. Some related factors of MSDs

When surveying the factors related to the status of MSDs, we conducted a univariate analysis of each factor. Then the multivariate model with statistically significant univariate factors to avoid possible confounding. The results of the multivariate model showed three factors related to MSDs status: gender, history of musculoskeletal disease and right attitude about MSDs. Although it has been shown in the literature that MSDs are an abnormal condition caused and contributed by a variety of factors such as mechanical, physical, mental, environmental and organizational, and individual factors..., each of the studies produces slightly different factors and results. However, this result is quite consistent with many

previous studies and evidence about factors related to MSDs in nurses.

4.3. The effectiveness of MSDs preventive interventions

In this intervention study, four hospitals were selected, of which 2 hospitals were selected for the intervention, the remaining 2 were control hospitals with similar conditions as the 2 intervention hospitals, one district town hospital and 1 district hospital. The study interviewed 130 people for the intervention group and 162 people for the control group.

4.3.1. Effectiveness of intervention on prevalence of MSDS

The results showed that the percentage of MSDs in the intervention group had a statistically significant decrease compared to before the intervention, while in the control group, no significant difference was noted. This shows the effectiveness of preventive measures over a period of 1 year. Specifically, this percentage decreased from 75.4% to 53.1% ($p = 0.01$) in the intervention group, and the percentage of MSDs also decreased from 70.4% to 67.9% in the control group. However, this decrease is not statistically significant with $p = 0.31$ (Table 3.32). The effect manifests itself in both the prevalence as well as each anatomical position of the body.

4.3.2. Assess the changes in knowledge, attitudes and practices

Results showed that there was a statistically significant change in all aspects of KAP on MSDs in the intervention group with $p < 0.05$ (table 3.34-3.39). While the change in the control group is not significant and is not statistically significant. These results show that communication and training interventions are remarkably effective in this target group. This will be the premise for future research on MSDs, especially on nurses.

4.3.3. The effect of intervention on quality of life, anxiety and daily work

The results of the intervention phase on the improvement of quality of life as well as the level of anxiety in life indicate statistically reasonable, only changes before and after the intervention (improvement in both quality of life and psychological distress) in the intervention group was statistically significant. For the control group, this improvement is lower than the intervention group. The results are similar to the change in the limit of daily activities and leisure activities, most of which have been improved, but there are still some sites where the improvement is not statistically significant, typically in the hip-thighs, knees and ankles (table 3.42-3.43). It is possible that the methods of communication education and the application of exercises for a period of not long enough (12 months) may significantly reduce the prevalence of MSDs, but it is still not strong enough to be significantly improved the QoL, the level of anxiety as well as the nurse's daily activities and entertainment.

4.4. Limitations of the study

The assessment of MSDs is self-reported by nurses through questionnaires and is not confirmed by a clinical diagnosis, so the results are epidemiological and comparative but not diagnostic clinically determined prevalence. The results may also be affected by recall bias, or the study subjects dishonestly answered the questions asked. In addition, the study design is partly a cross-sectional descriptive study, which cannot provide accurate information about the sequence of occurrence and the development of the symptoms of MSDs described. The evaluation of the effects of MSDs on the psychological distress, absences and the quality of life of nurses also collected from cross-sectional descriptive phase, which have not yet analyzed the causal relationship between the factors. In terms of intervention components, there may be confounding factors affecting

intervention results such as reforming the health system on a national scale to achieve patient satisfaction, so the difference of the intervention results between before and after intervention are not really clear.

CONCLUSION

5.1. Percentage of MSDs and its impact on daily life and work of nurses in Hai Phong district hospitals

Among 1179 nurses, 74.72% had symptoms of MSDs in the past 12 months, the two most common sites were the lower back (44.44%) and the neck (44.11%), 37, 8% found MSDs to limit their work, only 41.05% had MSDs over the past 7 days.

The mean score for anxiety level is 4.53 ± 3.69 points, for quality of life is 50.69 ± 6.79 (72.4%). Nurses with MSDs had lower quality of life (49.8 points compared to 53.33 points) and had more anxiety problems in life (4.91 points compared with 3.44 points) compared to the non-MSDs group. The prevalence of absenteeism in the workplace in the group with MSDs is higher than in the non-MSDs group (80.45% compared to 69.31%). The decrease in daily activities and entertainment activities due to the influence of MSDs was 37.57% and 31.72%, respectively.

5.2. Knowledge, attitude, practice and some factors related to MSDs in nurses

There were 88.63% which have ever heard of MSDs. Nurses' knowledge and attitudes about MSDs are quite good, but practice with the right practices to prevent MSDs is still limited.

Some factors related to MSDs: gender (female - OR=2.1; p <0.001), previous history of musculoskeletal disease (OR=7.1; p <0.001) and attitude innapropiate about MSDs (OR=1.4; p = 0.039).

5.3. Effective some preventive interventions for MSDs on district hospital nurses

Research has shown the effectiveness of a number of interventions to prevent MSDs (propaganda, education, training, physical exercises) on nurses: a significant reduction in the overall prevalence of MSDs (from 75.4% to 53.1%) and in each position, significantly improved knowledge, attitude and practice on MSDs in the intervention group; significant improvement in quality of life (average increase from 50.08 to 52.33), anxiety level (average reduction from 4.23 to 3.85) as well as some decrease daily activities and recreational activities of nurses..

RECOMMENDATION

1. Education on MSDs to nurses through regular meetings, seminars, and use of leaflets, posters... in the department of ward for widespread dissemination.

2. For nurses, it is necessary to: carry out the correct operations in professional activities according to the instructions (using medical equipment, support equipment for transporting and taking care of patients such as stretchers, bed, trolley...), alternating working time and rest and relaxation, especially after the duty, combine short exercise according to instructions alternating working time, harmonizing family and work life, avoiding bringing home work pressure and family conflicts into work... Particular female nurses, thoses with a history of musculoskeletal disease before and with many anxiety and stress issues in life.

3. All absenteeism of nurses, especially work related, excused or unexcused absences, and the reason of absences, illnesses related... need to be specifically reported and investigated.

4. There is a need for other future studies that incorporate many other interventions and on a more representative sample size to more accurately assess the relevant factors as well as the effectiveness of MSDs preventive interventions on nurses.

LIST OF WORKS RELATED TO THE THESIS HAS BEEN PUBLISHED

1. Hoang Duc Luan, Nguyen Thanh Hai, Nguyen Thuy Ngan, Pham Thanh Hai, Pham Minh Khue**, "**Prevalence of musculoskeletal disorders and its impact on quality of life among district hospitals nurses in Haiphong, Vietnam**".** *Vietnam Journal of Preventive Medicine*, Vol 29, nº9 – 2019, pp. 35, Article in Vietnamese.

2. **Hoang Duc Luan,** Nguyen Thanh Hai, Pham Thu Xanh, Hoang Thi Giang, Phạm Van Thuc, Nguyen Mai Hong, Pham Minh Khue, "Musculoskeletal disorders: prevalence and associated factors among district hospital nurses in Haiphong, Vietnam". *BioMed Research International*, volume 2018, article ID 3162564, published 26 August 2018

3. Nguyen Thanh Hai, **Hoang Duc Luan**, Hoang Thi Giang, Pham Minh Khue, Julie Bodin, Jean Dominique Dewitte, and Yves Roquelaure. "Prevalence and Characteristics of Multisite Musculoskeletal Symptoms among District Hospital Nurses in Haiphong, Vietnam". *BioMed Research International*, Volume 2020, Article ID 3254605, Accepted 13 March 2020, page 1-11

4. **Hoang Duc Luan**, Nguyen Thanh Hai, Hoang Thi Giang, Pham Minh Khue, "Effectiveness of interventions to prevent musculoskeletal disorders among district hospital nurses in Hai Phong in 2019". Vietnam Medical Journal, $N^0$2, March 2020, page 262-276