Work-Related Musculoskeletal Disorders among Nursing Students during Clinical Training

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Abstract Background: The Musculoskeletal Disorders (MSDs) have a considerable socio economic impact. First, they drive up costs for workers, companies, and society in general. This applies to both direct and indirect costs associated with occupational diseases and industrial accidents. Nursing students experienced the MSD with increased cases amongst nursing staff. Nursing students continue to face the problems of MSD due to the misuse of the good technique to protect them self during clinical training hours. The study aimed to assess work-related musculoskeletal disorders among nursing students during clinical training. A cross- sectional study design used to achieve this aim. Convenience sampling technique was used to include all consenting nursing students from fifth level to eighth level (3rd and 4th year) (n=253) student who were having clinical training. The study took place at the Faculty of Nursing, Princess Nourah Bint Abdulrahman University. The first part include demographic data questions. The second part is a self-reported pain using standardized Nordic questionnaire for the analysis of musculoskeletal symptoms that will assess different body parts namely upper limb, lower limb, and trunk sections of the body. The study illustrated that more than half of students reported pain (71.1%) and ankle or feet (43.9%) during the last 12 months. Consistent also with students who reported MSD in the last seven days, 48.2% of them reported lower back problem. There is significant relationship between number of clinical days (p = 0.05) and MSD, and no significant relationship between the MSDs and the number of the clinical hours per day (p =0.973), weight (p = 0.806). The main conclusion drawn from the current study is that the majority of nursing students are high risk for MSDs due to improper body mechanics or wrong posture.

***Keywords**: musculoskeletal disorders nursing students, clinical training*

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1. Introduction

The musculoskeletal problems defined by World health organization as conditions that can affect muscles, bones, and joints [1]. In a study done in Saudi Arabia, musculoskeletal problems are common among nursing students who provide patient care in clinical sitting. The development of work-related musculoskeletal disorder in this population may have a substantial impact on absences from work [2]. The physical requirements of nursing can cause some nurses to leave the profession [3,4].

According to a World Health Organization study, Saudi Arabia's Nursing Health System records an enhanced incidence of musculoskeletal disorder (MSD) [5]. Progressively, studies by WHO indicate that during service delivery, nurses exposed to physical exercises that in turn affect their skeletal makeup. That said, MSD is also high in the nursing-based institution such as the PNU: where students engage in practical sessions as a means to certify their class needs. The most common symptom related to musculoskeletal disorder is back discomfort and the causal agent being prolonged clinical training hours and high demands within the nursing sector [6].

Clinical preparation in nursing programs plays an important part in the development of abilities for nursing s [7]. The foundation of nursing education is clinical training. Clinical training quality is strongly linked to the quality of the setting of clinical teaching [8]. Work-related musculoskeletal disorders (WMSDs) are a significant occupational health concern for the nursing profession and have been studied more and more in latest years [9]. One of the most prevalent circumstances influencing the person regardless of gender, age or socio-economic background is musculoskeletal symptomatology. Nursing is one of the jobs where the effects of musculoskeletal symptoms are more apparent [10]. Different risk factors for MSD have been recorded, including extended working hours, requests for physical work and demographics [11]. Musculoskeletal issues in health care workers who have direct contact with patients are particularly prevalent. Reports from other communities have shown that the largest WMSDS levels in the medical industry are available to nurses, nursing aids and orderly people [12].

Evaluated work-related musculoskeletal disorders and associated risk factors among Ugandan nurses. The research discovered several important variables among nursing employees connected with MSD. This included drinking alcohol, pushing/pulling heavy loads, working in awkward postures, lacking mental exhaustion from the workstation for more than 6 months and feeling rested afterwards [13].

Backberg et al [14] reported that 67% of nursing learners recorded MSS over the previous 3 months and 64% over the previous 12 months. Daily life activities such as daily transportation, extended sitting and physical training were the most frequently impacted areas.

An elevated incidence of MSDs among nurses has been shown in countless studies, according to Chung et al., [15] the comparatively elevated incidence among cohort of nurses indicates nurses are working for MSDs in a comparatively high-risk setting. The peak of age-specific MSD incidence warrants further debate in 20-24 year-olds (85.61 percent). However, in order to get a detailed image of MSDs among nurses, this study is to assess Work-Related Musculoskeletal Disorders during Clinical Training of Nursing Students.

1.1. Aim of the Study

The study aimed to assess Work-Related Musculoskeletal Disorders among Nursing Students during Clinical Training.

1.2. Research Questions

What is the prevalence of musculoskeletal discomforts among the nursing Students?

2. Methods

2.1. Research Design

Cross-sectional study design used to assess Work-Related Musculoskeletal Disorders during Clinical Training of Nursing Students.

2.2. Setting

The study conducted at the Faculty of Nursing, Princess Nourah Bint Abdulrahman University. Riyadh, Saudi Arabia.

2.3. Subjects and Sampling

The study was include all consenting nursing students from fifth level to eighth level (3rd and 4th year) (n=253) student. The nursing students who were registered during this academic year from fifth level to eighth level (3rd and 4th year) who are having clinical training in the second term of the academic year 2016- 2017.

2.4. Tools of Data Collection

Tool (I): This part assesses the students' demographic characteristics

Tool (2): screening of MSDs that assess different body parts namely upper limb, lower limb, and trunk sections of

the body according to tools that are developed by (Attar , 2014 ad Moore, et al. 2011) [2,16].

3. Methods

3.1. Ethical Consideration

Research team was apply for the institutional review board (IRB) approval from the research unit in Princess Nourah Bint Abdulrahman University. Consent form was obtained from all students prior to the information collection stage. Researcher assure that all questionnaires were anonymous and considered as confidential data. The students informed that their participation is voluntary and they have the right to stop participation during anytime throughout the study.

3.2. Tools Development

After reviewing of national and international literatures, this review was a guide for developing two tools; first tool was questionnaire about demographic characteristics .The second tool was is adapted from a comparative cross-sectional study [2,16]. It consists of two parts .The first part include demographic data questions. The second part is often applied in screening of MSDs that assess different body parts namely upper limb, lower limb, and trunk sections of the body.

3.3. Validity and Reliability of Tools

A pilot study conducted on a group of 20 students who were registered at from5th level to eighth level (3rd and 4th year) who are having clinical training. Based on the finding of the pilot study, modifications were made to the tools. The reliability tested by statistical SPSS package to yield a Cronbach alpha of 0.94.

3.4. Data Analysis

The data was sorted, coded, and analyzed by using SPSS (Stand for statistical product and service solution), version 20. Descriptive data analysis performed to achieve the study aim.

4. Results

Table 1 shows that all respondents are female students as Princess Nourah Bint Abdulrahman University is a female university. The mean age was 21.9 years with SD of 1.74 years, 15.8% of them are married. The majority of students have no children (85.8%). For the students' weight, majority of the students have normal weight (56%), underweight (12.3%); over weight (27.7%) and Obese (4%).More than half of the students (56.5%) reported that they have two clinical days per week, 1 day (28.9%) and 3 days (14.6%). In regard to the clinical hours per day, Majority of the students (45.1%) have 7 hours clinical a day, 31.6% have 6 hours a day; 15.4% have 8 hours a day, and 7.9% have 9 hours a day.

Table 2: shows the frequencies and percentages of the students experiencing the Musculoskeletal disorders (MSD). More than half of the students reported that they have Neck (52.2%), shoulder (56.5%) and lower back (71.1%). The table also shows that there were considerable percentage of the students, who reported knee (41.5%), and ankle or feet (43.9%), during the last 12 months. The students who mentioned that they have visited physician for MSD were mainly because of Lower back (19.4%) and ankle or feet problems (12.6%). This consistent also with students who reported MSD in the last seven days, 48.2% of them reported lower back problem.

Table 3: shows linear relationship between the weight, number of clinical day per week and number of clinical hours a day and prevalence of MSDs. As table three shows, all the relationships except the weight were significant. Number of clinical day (.135*, p= .024) and number of clinical hours (-.303**, p= .000).

Table 4: shows the result of Chi-square test of the difference in variables (weight, number of clinical days, and number clinical hours per a day) and the prevalence of MSDs. The result show that there is no significant difference in the prevalence of MSDs among the students regardless of their weight categories (under-weight, normal weight, over weight and obese) (p = 0.806); and number of clinical hours per day (0.973), but there is significant relationship between number of clinical days (p = 0.05) and prevalence of MSD. The result indicates that prevalence of MSDs not affected by number of the clinical hours and weight but for the number of clinical days per week.

Table 1. Distribution of students according to their Socio-demographic characteristics (n=253).

Items	No	%
Age		
18 -20	46	18.2
20 -22	205	81.0
22-24	2	.8
Marital status		
single	211	83.4
married	40	15.8
divorce	2	.8
Parity		
nulliparous	217	85.8
single parity	36	14.2
Academic year		
3rd year	94	37.2
4th year	159	62.8
Weight		
Under weight	31	12.3
Normal weight	142	56
Over weight	70	27.7
Obese	10	4.0
clinical days per week		
1 day	73	28.9
2 days	143	56.5
3 days	37	14.6

Table 2. Types of musculoskeletal disorders among students (n=253)

MSDs	Trouble in the Last 12 months		Trouble in the last 7 days		Preventing from carrying out normal activities		Visiting physician in the last 12 months	
	No.	%	No.	%	No.	%	No.	%
Neck	132	52.2	84	33.2	36	14.2%	38	15%
Shoulder	143	56.5	84	33.2	40	15.8%	0	0%
Upper back	87	34.4	55	21.7	35	13.8%	35	13.8%
Elbow	28	11.1	18	7.1	16	6.30%	18	7.1%
Hand& wrist	87	34.4	47	18.6	37	14.6%	16	6.3%
Lower back	180	71.1	122	48.2	84	33.2%	49	19.4%
Hips and thighs	85	33.6	47	18.6	35	13.8%	40	15.8%
Knee	105	41.5	60	23.7	38	15%	20	7.9%
Ankle or feet	111	43.9	63	24.9	54	21.3%	32	12.6%

Table 3. Correlation between Weight, number of clinical days per week and number of clinical hours per day and prevalence of musculoskeletal disorders MSDs)

Variables	Pearson Correlation	P value
Weight & MSDs prevalence	.014	.826
Number of clinical days per week & MSDs	-.135*	.024
Number of clinical hours a day & MSDs	-.303**	.000

* Correlation is significant at the 0.05 level (2-tailed).
** Correlation is significant at the 0.01 level (2- tailed).

Table 4. Number of Clinical Days and prevalence of musculoskeletal disorders (MSDs)

Variables	With MSDs	Without MSDs	Pearson Chi square	P value
Number of Clinical Days per week				
1 day	6	67	5.94	0.05
2 days	17	125		
3 days	8	28		
Number of Clinical hours per a day				
6 hours	11	69	0.230	0.973
7 hours	14	100		
8 hours	5	34		
9 hours	2	18		

5. Discussion

This study reports Work-Related Musculoskeletal Disorders during Clinical Training of Nursing Students. In this study, the results indicated that the most common MSDs experienced by the student nurses include neck pain, back pain, and feet/ankle pain. According to a study in Karachi, [17] the most prevalent site of the musculoskeletal pain was neck followed by lower back and legs. This result is consistent with the reported findings of a systematic review on work related musculoskeletal disorders (WMSD) among nurses [18]. This outcome was comparatively comparable to other nursing surveys where in a large number of the articles such as 74.7% in Vietnam [19] 79.5% in Turkey [20], 76% in India [21], 70% in Poland [22], 78% in Nigeria [12] ,79.5% in China[23] and (70.1%) in Ghanaian [24] they reviewed in their study that vertebral column (lower back, neck, upper back, hips) were the most vulnerable anatomical site of WMSD, followed by shoulders, neck, knee, ankles/feet, wrist, thighs and elbow. Observed from this study is somewhat different compared with findings in previous studies among Korean nursing students, which mentioned that prevalence pattern was mostly in the shoulder (46.0%), lower back (39.1%), neck (35.6%), feet (25.2%) and leg (23.8%) [25]. In the same review, they have postulated that the WMSD can be attributed to extrinsic factors that include the physical demands of the nurses' job related activities like bending and twisting, transferring patients from bed to wheel chair, to the toilet or to a stretcher. These activities require the nurses to alter their body positions. It noted that many nurses do not practice proper lifting techniques when transferring patients. In addition to another review about impact of musculoskeletal symptoms on general physical activity during nursing education [14] found that the most common ways in which MSS affected the students were limitation in activity and discomfort connected with activity. These are not surprising findings but notable being as the high percentage of experienced limitation in activity impacts on the students' everyday life, such as study result and performance in clinical placement.

Results of another cross-sectional assessment study conducted in India on musculoskeletal disorders among health care professionals concurred with our findings [26]. They found in their study that a high proportion of health care professionals reported WMSDs at one or the other body region, lower back being the most commonly affected area. The prevalence of WMSDs was attributed to working in the same position for long periods, working in awkward or cramped positions and handling an excessive number of patients or samples in one day. In Saudi Arabia, a cross-sectional study accompanied by a nested case-control study was implemented including nurses in Taif City's operating rooms, revealing that nearly half of the female respondents (n=61, 48.41 percent) complained about low back pain [27]. Based on the findings of the comparative cross-sectional study in a total of 200 registered nurses shows that the lower back pain (LBP) was the most commonly reported WMSD, with a frequency of 65.7%. Symptoms of the wrist 10%, mid-back 5%, and elbow 3% were the least common. Prolonged working hours and being underweight were significantly associated with the development of these symptoms. In Saudi Arabia, the Working in the surgical department was a greater risk factor for low back pain compared with working in other departments [2].

Another finding of our study showed that the prevalence of MSDs is not dependent on the weight of the student nurse; this is consistent with the study done in Karachi that noted of no co-relation of BMI with prevalence of pain and showed positive association with the number of clinical days per week, and the number of clinical hours [22]. This finding is contrary to one of the findings of the systematic review on MSDs among nurses (23) where obesity reported to be the primary intrinsic predisposing risk factor of lower back injury among nurse. It was reported that the genoid somato type of obese nurses correlated to the prevalence of lower back injuries. The excess body fat around the waist and hip causes anterior pelvic tilt that produces an abnormal force couple relationship between the hip extensors and flexors. Hip flexors became tight while the hip extensors are elongated and weaker. Findings in another study [28] showed that overweight, obese professionals have a greater chance of developing MSDs.

Literatures have not correlated the prevalence of WMSDs to clinical hours and clinical days directly. However, most of the literatures have shown that there is an exposure –response relationship correlating the prevalence of WMSDs to the intensity, frequency, or duration of an exposure. An example of this relationship is long duration of forceful, and repetitive work using the wrist is associated with hand or wrist tendinitis [26]. This exposure-response correlation obtained from the outcomes of another research, which indicated that working in the same situation for lengthy periods of time and managing an excessive number of patients at one day founded to be the most frequently reported occupational risk factor that led to the growth of WMSDs. [24].

Based on the findings of the [26,28] where prevalence of WMSDs are associated with the intensity, duration, and frequency of exposure to the risk factors that include the type of activities and body mechanics, the weak correlation between clinical days, clinical hours, and weight to the prevalence of WMSDs among the nursing students, it can be attributed to the fact that they are students. Being students, they have limited frequency, duration, and intensity of exposure to the activities of nurse-patient interactions that require lifting, transferring, and movement of patients, and other physically strenuous activities.

Results of [13] were found that hospitals to be the most common work setting among the respondents as 90.7% of the population works in the clinical set- ting (81.3% in the federal hospital, 15.3% in the state hospital and 3.4% in the private owned hospital), 2.5% in the academia and 6.8% in the public health sector. 57.6% of the respondents were staff nurses, 11.6% were senior nursing officers, 10.8% were principal nursing officers, 10.2% were chief nursing officers, 4.9% were chief public health officers, 2.4% were matrons while 2.5% were assistant directors of nursing services. Of the respondents, 84.4% reported that they had experienced work-related musculoskeletal pain or dis- comfort at some time in their occupational lives.

In another study revealed that the clustering pattern of MSDs particularly in the neck (28.0%), upper back (27.4%), lower back (23.6%), wrists/hand (22.9%) and hip/thigh (21.0%) observed from this study is somewhat different when compared with findings in our study among nursing students [26]. The capacity of nursing learners to provide patient care of high quality depends in part on their capacity to maintain their own health and well-being [29]. This research has several limitation. The method of information collection through interviews of occurrences over the previous 12 months can trigger recall bias in answering the question, particularly the recall of symptoms of MSDs and the population of the study is female gender only.

6. Conclusion

Nursing students are high risk for MSDs due to improper body mechanics or wrong posture. The longer hours of clinical duty expose them to more frequencies of improper body mechanic practice during delivery of nursing care or performance of procedures.

7. Recommendations

Nursing students should be educated about the incidence of MSDs acquired during clinical work due to improper body mechanics or incorrect posture. Their increase awareness regarding this risk for MSDs will make them realize the value of following proper body mechanics during their performance and delivery of care to their patients. Clinical instructors should be more observant and strict with the students' body mechanics to enforce them to maintain good posture all the time. Emphasize on body mechanics in the classroom and skills lab and be strictly encouraged or enforced during clinical duty. Exercise should be encouraged to strengthen the muscles and improve stamina of nursing students.

Acknowledgements

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