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A study on workstation exercises with ergonomic intervention in musculoskeletal disorders among nurses

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Abstract
Background: Musculoskeletal disorders (MSD) comprise significant occupational injuries and disability within the nursing profession, This study found a high prevalence of LBP, Shoulder, neck and Knee pain over a 12-month period among nurses working in hospital, and certain risk factors like working in same position for long time, bending, twisting, lifting and treating excessive number of patients were strongly associated with WMSDs.
Objective: To determine the effectiveness of workstation exercises with ergonomic intervention to reduce pain and disability among nurses.
Materials: 1. Inch tape, 2. Goniometer
Methodology: 50 individual nurses with musculoskeletal disorder will be selected based on inclusion and exclusion criteria. Detailed procedure will be explained in patient's words and informed consent will be obtained from all the participants. Subjects will be assessed for presence of musculoskeletal disorders affecting various body regions. The participants asked to fill the questionnaires form about musculoskeletal symptoms and intensity or severity of pain experienced. Pain will be measured in Numerical pain rating scale (NPRS) and disability Cornell musculoskeletal discomfort questionnaires. The post test value will be taken after two weeks.
Outcome Measures: 1. Numerical Pain Rating Scale, 2. Cornell Musculoskeletal Discomfort Questionnaire.
Results: From statistical analysis made with quantitative data revealed extremely statistically significant. The post test mean value for numerical pain rating scale (NPRS) is P is less than 0.0001.The post test value for Cornell musculoskeletal discomfort questionnaire scale (CDMQ) is P is less than 0.0001.Statistical analysis of post test, Numerical pain rating scale (NPRS) and Cornell musculoskeletal discomfort questionnaire revealed that there is extermely statistically significant
Conclusion: The study concluded that studies involving ergonomics will be of importance in identifying prevention strategies. Ergonomic training on proper lifting and transfer techniques, body awareness, and reduction in workload may be helpful for nurses.

Keywords: musculoskeletal disorders (MSD), LBP, WMSDs

Introduction

A work related musculoskeletal disorder is a musculoskeletal injury that results from a work related event. These include the disorder of the musculo-tendinous, osseous and nervous system that are caused, precipitated or aggravated by repeated exertions or movement of body. They are caused by continues use or pressure over an extended period of time. When a muscle, tendon, nerve or joint is stressed and traumatized on a repeated basis for days, month or year, those body tissues eventually become damaged and its leads to work related musculoskeletal disorders. Most common parts of the body that are affected are the back, neck, wrist, hands, ankle and foot. Example: Bursitis, tendonitis, tenosynovitis, trigger finger, low back pain, etc. Nurses are susceptible to it because of the nature of the work due to repetitive and labor intensity. The practice of nursing and it's increasingly fragmented and specialized nature creates musculoskeletal problem among nurses. The symptoms for musculoskeletal disorder are pain, numbness, muscle tightness, fatigue, sprain or strain. The study was developed to assess illness nursing workers with work related musculoskeletal disorder. Musculoskeletal disorders (MSD) comprise significant occupational injuries and disability within the nursing profession. Risk factors are known to include workplace activities such as manual handling, heavy lifting, strenuous tasks and work environment. There are many prevalence studies have investigated MSD among hospital nurses. Musculoskeletal disorders are commonly reported among nurses. This study explored whether these disorders can be reduced by the provision of workstation exercises with ergonomic intervention. It has been proposed as a conservative, noninvasive, and cost effective intervention to treat MSD as it functions to correct the cause of repetitive micro traumas due to hospital nurses by changing the position, lifting, and transferring. Lowering the physical exposure through workstation exercises with ergonomic intervention is the traditional strategy to reduce the workload in nurses.

Objective
To determine the effectiveness of workstation exercises with ergonomic intervention to reduce pain among nurses.

Methodology
Study design: Experimental Study
Study Setting: Saveetha Medical College & Hospital, Physiotherapy outpatient department,
Sampling method: Convenient sampling technique
Sample size: According to prevalence rate required sample size is 50 participants.

Inclusion criteria
- Age group – 25 to 50 years.
- Females.
- nurses work more than 8 hour per day
- Prolonged standing in hospital
- Ward nurses

Exclusion criteria
- Pregnant women
- Persons with rheumatoid arthritis
- Ankylosing spondylitis
- Malignancy
- Vertebro basilar insufficiency
- Fractures or dislocation
- Recent undergone surgery
- Acute inflammatory condition
- Infections
- People with radiculopathy

Material Required
1. Inch tape
2. Goniometer

Procedure
50 individual nurses with musculoskeletal disorder will be selected based on inclusion and exclusion criteria. Detailed procedure will be explained in patient's words and informed consent will be obtained from all the participants. Subjects will be assessed for presence of musculoskeletal disorders affecting various body regions. The participants asked to fill the questionnaires form about musculoskeletal symptoms and intensity or severity of pain experienced Pain will be measured in Numerical pain rating scale (NPRS) and disability Cornell musculoskeletal discomfort questionnaires. The post test value will be taken after two weeks

Outcome measures
1. Numerical Pain Rating Scale (NPRS) for quantifying pain (Amelia Williamson *et al*., 2004)
2. Cornell Musculoskeletal Discomfort Questionnaire (Hedge *et al*., 1999)

Results
The collected data was tabulated and analyzed using descriptive & inferential statistics. To all parameters mean and standard deviation (SD) was used. Paired t-test was used to analyse significant changes between pre and post test measurements.

MSD affected body regions

Table 1

S. No	Body regions	Frequency	Percentage
1.	Neck	8	16%
2.	Shoulder	4	8%
3.	Elbow	3	6%
4.	Wrist & Hand	3	6%
5.	Low Back	10	20%
6.	Hip	5	10%
7.	Knee	6	12%
8.	Ankle	2	4%
9.	Foot	9	18%
	Total	50	100%

From statistical analysis made with quantitative data revealed extermely statistically significant. The post test value for numerical pain rating scale (NPRS) is P-value is less than 0.0001.The post test for Cornell musculoskeletal discomfort questionnaire scale (CDMQ) is P-value less than 0.0001.Statistical analysis of post test, Numerical pain rating scale (NPRS) and Cornell musculoskeletal discomfort questionnaire revealed that there is extremely statistically significant.

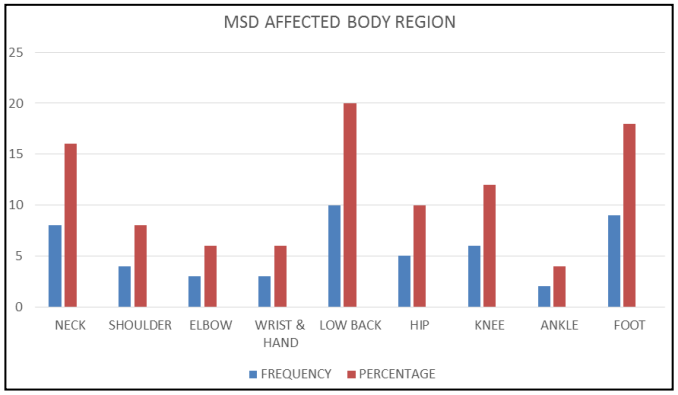

Fig 1

Table 2: NPRS

S. No	Body Regions	Pre intervention		Post intervention		t score	P value less than 0.0001
		Mean	SD	Mean	SD		
1.	Neck	8.3	0.74	1.37	0.51	22.0	0.0001
2.	Shoulder	8.5	0.57	1.25	0.50	19.1	0.0001
3.	Elbow	8.3	0.57	1.33	0.53	15.5	0.0001
4.	Wrist & Hand	8.6	0.57	1.66	0.57	14.9	0.0001
5.	Low Back	8.5	0.52	1.2	0.4	35.1	0.0001
6.	Hip	8.4	0.54	1.2	0.44	20.8	0.0001

7.	Knee	8.5	0.54	1.16	0.40	26.7	0.0001
8.	Ankle	8.5	0.70	1.11	0.33	13.5	0.0001
9.	Foot	8.5	0.52	1.5	0.70	24.0	0.0001

Table 3: CMDQ

S. No	body regions	Pre intervention		Post intervention		t score	P value less than 0.0001
		Mean	SD	Mean	SD		
1.	Neck	37.5	6.41	10.7	2.43	11.0	0.0001
2.	Shoulder	40.5	4.20	12.2	2.62	11.5	0.0001
3.	Elbow	41.6	5.77	13.0	2.64	8.1	0.0012
4.	Wrist & Hand	40.3	5.03	11.6	2.88	8.5	0.0010
5.	Low Back	37.5	6.67	10.4	2.31	12.	0.0001
6.	Hip	39.5	4.39	11.8	2.48	12.2	0.0001
7.	Knee	37.0	7.07	11.3	2.50	8.3	0.0001
8.	Ankle	40.5	6.36	12.5	2.53	5.7	0.0286
9.	Foot	38.3	6.5	10.4	2.45	12.0	0.0001

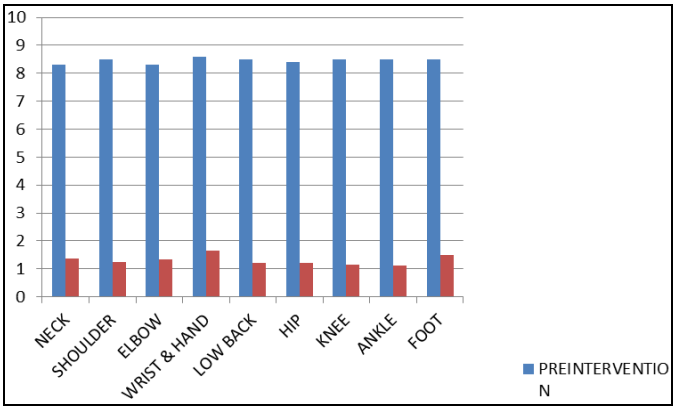

Fig 1: NPRS

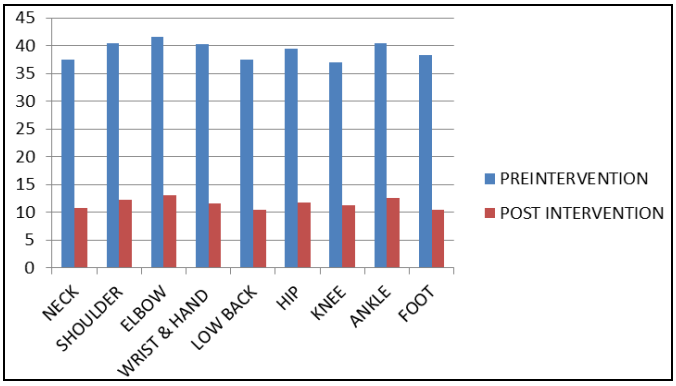

Fig 2: CMDQ

Discussion

This study was a questionnaire-based self-reported survey and ergonomic intervention pre and post score analysis, reflecting the attitude and perception of nurses regarding pain and discomfort. Therefore, the prevalence of WMSDs among nurses working in Saveetha hospital in different department with those exposed to the same level of hazards may be very different due to their different attitudes and perception. Majority 20% of nurses affected low back pain, 18% of nurses affected plantar fasciitis affected in the foot region, 16% of nurses affected neck pain, 12% of nurses affected knee disorders, 10% of nurses affected hip disorders. In shoulder region 8% of nurses were affected, 6% of nurses affected elbow, wrist and hand disorders, 4% of nurses affected ankle disorders. Inferential analysis states that the results shows pain and discomfort were pre and post intervention. In pre intervention phase there is no significant difference between the MSDs and the different category of nurses.In the post intervention phase NPRS score was analyzed, p value is less than 0.0001 conventional criteria there is extremely statistically significant. Following t score neck (22.0), shoulder (19.1), elbow (15.5), wrist and hand (14.9), low back (35.1), hip (20.8), knee (26.7), ankle (13.5) and foot (24.0).CMDQ score was analyzed, p value is less than 0.0001 conventional criteria there is extremely statistically significant. Following t score neck (11.0), shoulder (11.5), elbow (8.1), wristand hand (8.5), low back (12), hip (12.2), knee (8.3), ankle (5.7), and foot (12.0).

Limitations

1. Small sample size
2. Ergonomic modified set up workstation exercises
3. Muscle power should be assessed with Electromyography analysis

Recommendations

A study with large sample size is recommended. Nurses should be given education about work-related musculoskeletal disorders and causes of these disorders. WMSDs and musculoskeletal disorders since their consequence in response to work demands may be similar. This study was delimited to nurses in active service only, those who left the workforce due to retirement or WMSDs or any other reason were not included in the current analysis.

Conclusion

This study found a high prevalence of LBP, Shoulder, neck and Knee pain over a 12-month period among nurses working in Saveetha hospital, and certain risk factors like working in same position for long time, bending, twisting, lifting and treating excessive number of patients were strongly associated with WMSDs. Lack of lifting knowledge and availability of lifting devices was one of the reason for injuries in nurses working in hospital. Further prospective studies are required to confirm these findings. The study suggests that studies involving ergonomics will be of importance in identifying

prevention strategies. Prevention strategies, such as nursing training on proper lifting and transfer techniques, body awareness, and reduction in workload may be helpful.

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