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Incidence of work-related musculoskeletal disorders in staff nurses in tertiary care hospital

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Abstract
Background: Nursing work is one of the most jeopardizing work in Health Care Sector as they are exposed to numerous Occupational Risk factors contributing for illness and sick leaves, further leading to the occurrence of losses and burdens for Nurses.
Materials and Methods: The Study included both Male and Female Staff Nurses, Auxillary Nurses and Midwives willing to participate and aged between 25-50 years. Study excluded the subjects not willing to participate and undergone Recent surgeries, any Infectious conditions, neurological, cardiovascular conditions. The Study was conducted in Tertiary Care Hospital, Miraj. An Observational study was developed to identify the WRMSDs among nurses that worked in Tertiary Care Hospitals in Miraj. Nurses were given the Standardized Nordic Pain Questionnaire.
Findings: A sample(n=150), It was found that the incidence of WRMSDs was 94.7%. Upper/Lower Back pain (50%) was most commonly involved followed by neck pain (28%), Knee Pain (22.7%), shoulder pain (16.7%). Staff Nurses having having risk factors <30 years (100%) which was higher than staff nurses between 31-40 years (96.2%) followed by staff nurses between 41-50 years (80.6%).
Conclusion: The study concluded with the Age not being the criteria for WRMSDs in staff nurses in Tertiary Care Hospitals.

Keywords: nordic pain questionnaire, work related musculoskeletal disorders, tertiary care hospitals

1. Introduction
The term work related musculoskeletal disorders refers to musculoskeletal disorders that are made worse or long long lasting by work conditions [1]. A number of intrinsic and extrinsic factors like repetitive movement, awkward postures, and high force levels as the three primary risk factors that have been implicated in the aetiology of WMSDs [1] In Health Care Sector Nursing work is the most perilous Occupations [2]. Due to specificity of their work tasks and the long duration of the tasks in health institutions, Nurses are quite vulnerable to various occupational risk factors as they are the most affected health care professionals with regard to their health, comfort and safety [2]. The result of disequilibrium between the requirements and the tasks performed at work impose and individual functional abilities to respond to these requirements are the complex origin of WMSDs [3]. Nursing workers develop their activities in different places including hospital institutions, and continuously, demanding constant attention, physical effort which predisposes them to WMSDs [3].
Work related musculoskeletal disorders are one of the common occupational hazards among health care providers. Studies had shown the mean WMSD was 71.85% among professional Nurses [7]. Recent studies have interpreted the prevalence of WMSD among registered general nurses in Zimbabwe was 95.7% [7]. Studies have reported a prevalence of low back pain was most common WMSD 67%, followed by pain in Neck 47.4% and ankles and feet was 36% among Indian Nurses [5]. WMSD arising among Nurses contributes for illness and sick leaves, contributing to the occurrence of losses and burdens for Nurses [1]. Previous research found a high prevalence of low back pain, neck and knee pain among nurses in rural hospitals in Maharashtra [1]. Previous studies have given an overview of the health status of Military Nurses in Indian Army [5]. Also, previous studies have shown high prevalence of work-related musculoskeletal disorders in Primary Health Care Centre [2]. Hence as far as our knowledge no study was done on incidence of work-related musculoskeletal disorders in Nurses in Tertiary Hospital. Hence understanding the incidence of Work-related musculoskeletal disorders in tertiary hospital is important.

2. Material&Methodology
Ethical approval was obtained from the Institutional Ethical committee. A Cross-sectional study was conducted in Staff Nurses working in Tertiary Care Hospital in Miraj. Sample was achieved by simple random sampling method. Total population of 150 nurses working in tertiary care hospital in Miraj were selected. All the subjects were screened for inclusion criteria i.e. Both Male and Female staff nurses including auxiliary nurses and midwifes aged between 25 years - 50 years, that are willing to participate. Subjects excluded were those Nurses undergone Recent Surgeries, had any Infectious conditions, subjects with neurological conditions or cardiovascular and respiratory conditions. Subjects who are not willing to participate.
Written as well as verbal consent was taken from the subject. The doubts were cleared and benefits of the study were explained. The subject were explained the Nordic pain Questionnaire. Questionnaire were distributed among the nursing population eligible in inclusive criteria. Subjects were given option of returning the questionnaire immediately or Later. Those who completed later were given a maximum of Seven Days to return the questionnaire

[7].

Nordic Pain Questionnaire

These are Standardized questionnaires for analysis of musculoskeletal symptoms in an ergonomic or occupational health context are presented [8]. These are forced choice variants and may be either self-administered or used in interviews [8]. The questionnaire was divided into four sections. First section covered information on socio-demographic and work-related information [7]. Section A covered Information on work related musculoskeletal disorders which include 9 body regions including upper limb (shoulders, elbows, wrist/feets), Spine (Neck, Upper/Lower Back), Lower Limb (Hips/thighs, knees, ankles/feets). Section B covered consequences of injury. Section C covered risk factors that contributes to WMSDs. The questionnaire showed high scale /average content Validity Index (S-CVI/Ave=0.99) [7]. The questionnaire was evaluated for test-retest reliability and showed kappa coefficients (k) ranging from 0.36 to 1 [7].

3. Results & Discussion

Data was analyzed using SPSS version 20.0. Chi square test was done to check the association between age groups and risk factors of staff nurses. It was found that there was association between age groups and risk factors of staff nurses ($p \leq 0.01$).

Table 1: Gender Distribution of Staff Nurses

Gender	Frequency	Percentage
Females	115	76.7
Males	35	23.3
Total	150	100

Table 1: shows gender distribution of staff nurses. It was found that 115 (76.7%) staff nurses were females while 35(23.3%) of staff nurses were males.

Table 2: Age group wise Distribution of Staff Nurses

Age groups (in years)	Frequency	Percentage
≤30 years	66	44
31-40 years	53	35.3
41-50 years	31	20.7
Total	150	100

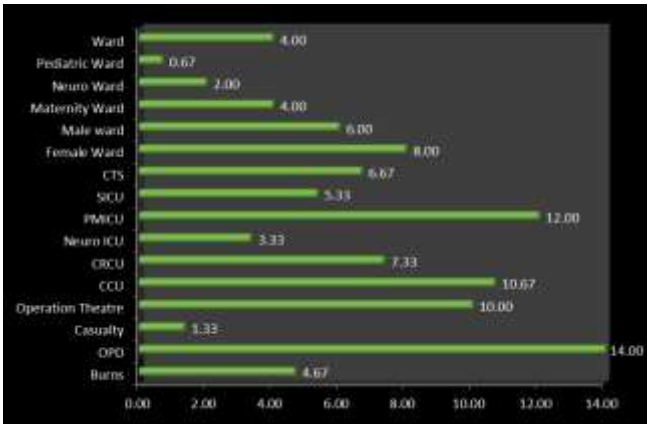

Fig 1: Horizontal Cylinder Bar Diagram Working Area Wise Distribution of Staff Nurses

Fig.1shows working area wise distribution of staff nurses.

Table 3: Sites of work-related Musculoskeletal Disorder of Staff Nurses

Site	Frequency	Percentage
Neck	42	28
Shoulder	25	16.7
Elbow	4	2.7
Wrist/Hand	6	4
Upper/Lower/Back	75	50
Hips/Thigh	15	10
Knees	34	22.7
Ankles/Feet	22	14.7

Table. 3 shows sites of work-related musculoskeletal disorder of Staff Nurses in Tertiary care hospitals by using standard Nordic pain questionnaire.

It was found that:75(50%) of staff nurses had upper/ lower/ back pain, 42(28%) of staff nurses had neck pain, 34(22.7%) of staff nurses had knee pain, 25(16.7%) of staff nurses had shoulder pain, 22(14.7%) of staff nurses had ankles/feet pain, 15(10%) of staff nurses had hips/thighs pain, 6(4%) of staff nurses had wrist pain, 4(2.7%) of staff nurses had elbow pain.

Table 4: Associated Job Risk Factors in Staff Nurses

Risk factors	Frequency	Percentage
Absent	8	5.3
Present	142	94.7
Total	150	100

It was found that incidence of work-related musculoskeletal disorders in staff nurses in tertiary care hospitals was 94.7%.

Table 5: Association between gender and risk factors of staff nurses

Gender	Risk factors		Total	Chi square statistic	p value
	Absent	Present			
Females	7 (6.1%)	108 (93.9%)	115 (100%)	0.55	0.46
Males	1 (2.9%)	34 (97.1%)	35 (100%)		
Total	8 (5.3%)	142 (94.7%)	150 (100%)		

Chi square test was done to check the association between gender and risk factors of staff nurses. It was found that there was no statistical association between gender and risk factors of staff nurses ($p > 0.05$).

Table 6: Association between age groups and risk factors of staff nurses

Age groups	Risk factors		Total	Chi square statistic	p value
	Absent	Present			
≤30 years	0 (0%)	66 (100%)	66 (100%)	16.045	≤0.01
31-40 years	2 (3.8%)	51 (96.2%)	53 (100%)		
41-50 years	6 (19.4%)	25 (80.6%)	31 (100%)		
Total	8 (5.3%)	142 (94.7%)	150 (100%)		

Chi square test was done to check the association between age groups and risk factors of staff nurses. It was found that there was association between age groups and risk factors of staff nurses ($p \leq 0.01$).

No. of staff nurses having risk factors present ≤30 years of age (100%) were higher than staff nurses between 31-40 years of age (96.2%) which was followed by staff nurses between 41-50 years of age (80.6%).

So, we can say that, age is not the criteria for work related musculoskeletal disorders in staff nurses in tertiary care

hospitals, at early age, staff nurses are facing more work-related musculoskeletal disorders.

Table 7: Factors associated with WMSDs among nurses (N = 150)

Work related tasks	Response	Risk factors				Total	Chi square statistic	p value
		Present		Absent				
		F	%	F	%			
Repeatedly performing nursing tasks	Yes	141	95.92	6	4.08	147	22.81	<0.01
	No	1	33.33	2	66.67	3		
	Total	142	94.67	8	5.33	150		
Treating a large number of patients each day	Yes	133	98.52	2	1.48	135	39.67	<0.01
	No	9	60.00	6	40.00	15		
	Total	142	94.67	8	5.33	150		
Not enough rest during day	Yes	139	97.89	3	2.11	142	56.69	<0.01
	No	3	37.50	5	62.50	8		
	Total	142	94.67	8	5.33	150		
Performing manual nursing technique	Yes	137	97.86	3	2.14	140	42.34	<0.01
	No	5	50.00	5	50.00	10		
	Total	142	94.67	8	5.33	150		
Working in awkward positions	Yes	141	97.24	4	2.76	145	57.12	<0.01
	No	1	20.00	4	80.00	5		
	Total	142	94.67	8	5.33	150		
Working in same position for long time	Yes	139	95.21	7	4.79	146	3.15	0.08
	No	3	75.00	1	25.00	4		
	Total	142	94.67	8	5.33	150		
Bending or twisting your back in awkward way	Yes	138	96.50	5	3.50	143	20.48	<0.01
	No	4	57.14	3	42.86	7		
	Total	142	94.67	8	5.33	150		
Reaching or working away from your body	Yes	133	97.79	3	2.21	136	30.69	<0.01
	No	8	61.54	5	38.46	13		
	Total	141	94.63	8	5.37	149		
Unanticipated sudden movements or fall by patients	Yes	136	97.14	4	2.86	140	25.5	<0.01
	No	6	60.00	4	40.00	10		
	Total	142	94.67	8	5.33	150		
Assisting patients during gait activities	Yes	134	97.81	3	2.19	137	30.94	<0.01
	No	8	61.54	5	38.46	13		
	Total	142	94.67	8	5.33	150		
Lifting or transferring dependent patients	Yes	139	94.56	8	5.44	147	0.17	0.68
	No	3	100.00	0	0.00	3		
	Total	142	94.67	8	5.33	150		
Carrying or lifting or moving heavy materials	Yes	139	95.86	6	4.14	145	12.31	<0.01
	No	3	60.00	2	40.00	5		
	Total	142	94.67	8	5.33	150		
Working at or near your physical limit	Yes	118	93.65	8	6.35	126	1.61	0.21
	No	24	100.00	0	0.00	24		
	Total	142	94.67	8	5.33	150		
Overtime, irregular shift length of workday	Yes	130	97.74	3	2.26	133	22.02	<0.01
	No	12	70.59	5	29.41	17		
	Total	142	94.67	8	5.33	150		
Inadequate training in injury prevention	Yes	115	97.46	3	2.54	118	8.53	<0.01
	No	27	84.38	5	15.63	32		
	Total	142	94.67	8	5.33	150		
Lack of assistive devices and equipment	Yes	95	96.94	3	3.06	98	2.89	0.08
	No	47	90.38	5	9.62	52		
	Total	142	94.67	8	5.33	150		
Malfunction of equipment	Yes	98	98.00	2	2.00	100	6.6	0.01
	No	44	88.00	6	12.00	50		
	Total	142	94.67	8	5.33	150		

The prevalence was associated with repeatedly performing nursing tasks, treating a large number of patients each day, not enough rest during day, performing manual nursing technique, working in awkward positions, bending or twisting your back in awkward way

reaching or working away from your body, unanticipated sudden movements or fall by patients, assisting patients during gait activities, carrying or lifting or moving heavy materials overtime, irregular shift length of workday, inadequate training in injury prevention ($p<0.01$) and malfunction of equipment ($p=0.01$) (Table 7).

This study represents the first attempt to report on the Incidence of work-related musculoskeletal disorders among Tertiary Care Nurses in Miraj. Nevertheless, numerous studies have been conducted on work related musculoskeletal disorders among Nurses worldwide [1-5]. Results denote high Incidence of WMSDs among the staff

nurses working in tertiary care hospital (94.7%). The possible explanation for high prevalence in Tertiary Care Hospital in Miraj is unclear. However, similar studies link the high prevalence among nurses to the physical nature of the job [6]. Musculoskeletal system diseases ranked second among nursing workers disorders, who referred higher frequencies for back (71.5%), neck (68%), shoulder (62.3%) and leg pain (54.6%) [3].

This study had majority of female nurses also relatively young nurses. This is more likely due to after-work responsibilities like parenting, undertaking domestic loads, insufficient rest time and lack of exercise [9]. The fact of majority being females shows the gender distribution in given target population. This finding is consistent with other findings [1, 2, 5, 7, 9].

This study showed that the staff nurses experience more work-related musculoskeletal disorders in early stages (<30years), this may be due to the working area they are working in. As Nurses below thirty years of age were mostly posted in ICU's, OT. Hence, resulting into performing more Manual tasks, working in awkward postures, standing for longer period of time.

This study also focusses on the high prevalence of WMSDs nurses' symptoms on lower and upper back (50%), experienced during 12 months of beginning of Data collection. These results are almost similar with the other different studies in range of all WMSDs that affect nurses [1, 2, 5, 7]. Disorders of lower back are the most common, although other body regions are also affected. It may be because of bending/twisting the back in awkward ways, standing long periods when treating large number of patients, inadequate breaks and lifting /transferring dependent patients [6].

According to Deepak B. Anap work related musculoskeletal disorder was highest in the Low back (48.2%) followed by the shoulder (34.6%) and neck (33.1%) in nurses in rural Maharashtra. These findings are in accordance with our findings though the order of sites affected were not similar. LBP is one of the most common and important WMSDs among nursing professionals, accounting for a point prevalence of approximately 17%, an annual prevalence of 40-50% and a lifetime prevalence of 35-80% [1].

Second commonly reported WMSDs was at Neck (28%). The disorder in the Neck, shoulder are reportedly associated with physical, psychosocial demands and precarious physical conditioning [3].

Working in awkward postures, not enough rest during day, performing manual nursing technique were the highest associated job risk factors contributing for WMSDs. Manual handling is a particularly important issue in nursing, because staff must meet the demands of patients at any time [1]. Furthermore, many patient -related manual handling activities need to be undertaken in less than ideal spaces and in suboptimal time frames [1]. Such situations often incur great biomechanical strain, which may eventually lead to development of MSD [1].

4. Conclusion

This study found a high prevalence of Low Back Pain followed by Neck, Knee, shoulders, ankles/feet, and hips/thighs. The least prevalence of WMSDs was wrist and elbow pain. It was also concluded that age is not the criteria for work related musculoskeletal disorders in staff nurses in tertiary care hospitals, at early age, staff nurses are facing more work related musculoskeletal disorders. The study suggests of involving ergonomic training and undertaking programs based on prevention strategies and coping strategies.

Limitation being that this study only investigated Age, WMSD and associated job risk factors neglecting other factors like work experience which can possibly influence development of condition. Though given time for the returning of questionnaire was seven days, many participants failed to return in given time resulting into delayed Data Collection.

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