ORIGINAL RESEARCH ARTICLE

Risk factors associated with MSDs among working women – Need of the hour!

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ABSTRACT

Background: Musculoskeletal disorders (MSDs) account between 42% and 58% of all work-related illnesses. These occur gradually and often go untreated due to their chronicity. These are multifactorial in origin having many risk factors which are amenable to change. So, this study was done to assess risk factors for the development of MSDs in different body regions among working women. **Objective:** To assess risk factors for the development of MSDs in different body regions among working women using Nordic scale. **Material and methods:** A cross sectional study was conducted among 196 working women in tertiary care hospital. A semi-structured questionnaire was used of which first part had demographic and work life details. Second part was Nordic scale. Data was analyzed using SPSS v20. **Results:** Most common MSDs among participants was low-back pain (58.2%) and least upper back (14.3%). Natures of job and comfort level at work were significantly associated with neck pain in last seven days and sleep disturbance was associated with neck pain in last twelve months. Sleep disturbance was found to be associated with low back pain in last seven days, whereas nature of job, working in static posture for long time was associated with back pain in last twelve months. Number of working hours per day (p<0.001) was associated with shoulder pain in last seven days and nature of job (p=0.004) as well as sleep disturbance (p<0.001) were associated with shoulder pain in last twelve months. Nature of job (p<0.001) was associated with knee pain in last seven days. Comfort level (p<0.001) and sleep disturbance (p<0.001) were associated with knee pain in last twelve months. **Conclusion:** Lower back pain was the most common musculoskeletal symptom among participants. Risk factors like nature of job, comfort level, sleep disturbance, working in static posture and number of working hours were associated with development of MSDs.

Key-words: Disorders, Musculoskeletal, Nordic scale, Risk Factors, Women, Working

INTRODUCTION

Musculoskeletal disorders (MSDs) are among the leading causes of occupational health problems, with consequences for workers, employers and society. These disorders are widespread in different countries with substantial costs and impact on the quality of life.[1]

The World Health Organization (WHO) has characterized multifactorial risk factors that contribute to Work-related MSDs (WMSDs) among workers all over the world and will be leading cause of disability by 2020.[2]

MSDs contribute to 42% to 58% of all work-related illnesses and are the most frequent cause of all health-related absence from work.[3]

MSDs are inflammatory and degenerative conditions that affect the muscles, tendons, ligaments, joints, peripheral nerves and supporting blood vessels with consequent ache, pain or discomfort.[4] MSDs are grouped under general terms such as repetitive strain injuries, cumulative trauma disorders and occupational overuse syndrome.

These disorders occur gradually, have a chronic course, and often go untreated. Typically, pain becomes progressively severe and loss of function occurs.[5] The risks of MSDs can increase with low job satisfaction, high job demands, job stress and lack of support from peers and supervisors as well.[6]

Working women are two to five times more likely than men to report these sorts of problems, may thus reflect the accumulation of difference in exposures at work and at home, bringing out the relationships between work-related factors, domestic load and underlying biological differences.[5] When women work with computers these factors get exaggerated as electronic data are mainly displayed on visual display terminals, improper body posture and prolonged sitting in front of these terminals can lead to many health hazards, including eye strain, muscle fatigue, and other musculoskeletal discomforts.[3]

Repetitious movements, awkward postures and high force levels are the three primary risk factors that have been

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associated with WMSDs.[2] The risk of disorders is also directly related to the number, speed and frequency of movements as well as the amount of force exerted with each movement and non-neutral body postures.[2,8] The WMSDs develop over a period of time and are not curable, however, suitable coping strategies can help in controlling the development of these disorders. With this background this study was undertaken to assess risk factors for the development of musculoskeletal disorders in different body regions among working women using Nordic scale.

MATERIAL AND METHODS

Study design and setting: A cross sectional study among working women in tertiary care hospital carried out for three months and ethical clearance was obtained from Institutional Ethical Committee.

Sampling method: The sample size calculated was 196, using the formula $4pq/L^2$, where p is the prevalence (33.8%),[5] q = 1- p (66.2%) and L the permissible error, taken as 20% of p.

Study Tool: It consisted of two parts. First part included information such as age, years of job experience, job type, marital status, number of working hours per day, self-perceived comfort level at work, working in static posture for long time, number of hours of usage of computer, type of activity and sleep disturbance. Second part was Nordic scale which is a tool to assess self-reported musculoskeletal symptoms in nine body regions such as neck, shoulder, elbows, wrists/hands, upper back, lower back, hips, knees and ankles/feet over last one week and last 12 months. Nordic scale has pictorial representation of nine body areas. The study participants were asked to mark the area in which they had pain. Height and weight of study participants was recorded and BMI was calculated.

Data collection: Data was collected by taking written informed consent from the study participants on voluntary basis after using the pre-designed, pre-tested questionnaire and confidentiality of data collected was assured. Those women who were above 60 years of age, not willing to give consent and previously diagnosed of having MSDs were excluded. Data collection was scheduled with prior intimation as per their convenient timing and the questionnaire was distributed after explaining the pictorial diagram and any other queries related to the study.

Statistical analysis: Data was entered using Epidata v3.1 and analyzed using SPSS v20. Descriptive statistics like frequencies, percentages, mean and standard deviation were calculated. Chi square test was applied to determine the association between two categorical variables. P value less than 0.05 was considered statistically significant.

RESULTS

Total of 196 working women participated in the study. Mean age of participants was 33.64±7.01 years and mean BMI was 23.37±4.13 kg/m².

Table 1: Profile of working women (n=196)

Characteristics	Number	Percentage
Age in years		
20-25	20	10.2
26-30	59	30.1
31-35	42	21.4
36-40	38	19.4
41-45	31	15.8
46-50	6	3.1
Marital status		
Unmarried	30	15.3
Married	166	84.7
Job experience in years		
1-3	55	28.1
4-6	55	28.1
7-10	62	31.6
>10	24	12.2
Nature of job		
Sitting	95	48.5
Standing	2	1
Both	99	50.5
Number of working hours/day		
5-6 hrs	3	1.5
6-8 hrs	159	81.1
>8 hrs	34	17.3
Type of worker		
Sedentary	44	22.4
Moderate	152	77.6
Static posture at work		
Yes	129	65.8
No	67	34.2
Usage of computer in hours per day		
2-4	28	14.3
5-7	73	37.2
>8	95	48.5
Sleep disturbances		
Yes	61	31.1
No	135	68.9

Table 1 shows that 84.7% of the participants were married and as much as 30.1% of them were in the age group of 26 to 30 years. 31.6% had job experience of 7-10 years, 81.1% were working for 6-8 hours/day, 77.6% were doing moderate activity and 65.8% were working in static posture for longer time. 48.5% were using computer for more than 8 hour/day and 31.1% had complaints of sleep disturbance.

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Table 2: Association of risk factors with neck pain

Variable	Present				Last 12 months				P+L*
	Pain	No pain	χ2	p	Pain	No pain	χ2	p	
Nature of Job									
Sitting	35(36.8)	60(63.2)	15.394	<0.001	30(31.6)	65(68.4)	16.108	<0.001	0.459
Both	13(13.1)	86(86.9)			13(13.1)	86(86.9)			
Comfort Level									
Comfort	48(27.6)	126(72.4)	8.037	0.005	45(25.9)	129(74.1)	7.385	0.007	<0.001
Un-comfort	2(9.09)	20(90.91)			2(9.09)	20(90.91)			
Sleep disturbed									
Yes	20(32.8)	41(67.2)	3.297	0.069	28(45.9)	33(54.1)	26.354	<0.001	<0.001
No	28(20.7)	107(79.3)			17(12.6)	118(87.4)			

P+L – Pain in last seven days + last twelve months

Table 3: Association of risk factors with low back pain

Variable	Present				Last 12 months				P+L*
	Pain	No pain	χ2	p	Pain	No pain	χ2	p	
Nature of Job									
Sitting	24(25.3)	71(74.7)	1.667	0.434	50(52.6)	45(47.4)	21.863	<0.001	0.003
Both	31(31.3)	68(68.7)			21(21.2)	78(78.8)			
Static Posture									
Yes	36(27.9)	93(72.1)	0.004	0.947	64(49.6)	65(50.4)	29.278	<0.001	<0.001
No	19(28.4)	48(71.6)			07(10.4)	60(89.6)			
Sleep disturbance									
Yes	23(37.7)	38(62.3)	4.08	0.043	18(29.5)	43(70.5)	1.729	0.189	0.438
No	32(23.7)	103(76.3)			53(39.3)	82(60.7)			

P+L – Pain in last seven days + last twelve month

Table 4: Association of risk factors with shoulder pain

Variable	Present				Last 12 months				P+L*
	Pain	No pain	χ2	p	Pain	No pain	χ2	p	
Nature of Job									
Sitting	29(30.5)	66(69.5)	2.053	0.358	21(22.1)	74(77.9)	10.83	0.004	0.003
Both	23(23.2)	76(76.8)			06(6.1)	93(93.9)			
Working hours									
05-06	1(33.3)	2(66.7)			1(33.3)	2(66.7)			
06-07	34(21.4)	125(78.6)	15.411	<0.001	26(16.4)	133(83.6)	4.728	0.094	0.077
>8	18(52.9)	16(47.1)			1(2.9)	33(97.1)			
Sleep disturbance									
Yes	13(21.3)	48(78.7)	1.238	0.266	20(32.8)	41(67.2)	26.949	<0.001	0.003
No	39(28.9)	96(71.1)			07(5.2)	128(94.8)			

P+L – Pain in last seven days + last twelve months

Table 5: Association of risk factors with knee pain

Variable	Present				Last 12 months				P+L*
	Pain	No pain	χ2	p	Pain	No pain	χ2	p	
Nature of Job									
Sitting	30(31.6)	65(68.4)	15.084	<0.001	2(2.1)	93(97.8)	39.589	<0.001	0.008
Both	9(9.1)	90(90.9)			10(10.1)	89(89.9)			
Comfort Level									
Comfort	35(20.1)	139(79.9)	0.046	0.831	02(1.1)	172(98.9)	66.702	<0.001	<0.001
Un-comfort	04(18.2)	18(81.8)			10(45.5)	12(54.5)			
Sleep disturbed									
Yes	11(18.0)	50(82.0)	0.193	0.66	10(16.4)	51(83.6)	16.255	<0.001	0.071
No	28920.7)	107(79.3)			02(1.5)	133(98.5)			

P+L – Pain in last seven days + last twelve months

Table 2 shows association of risk factors with neck pain. It was found that nature of job ($\chi2$=15.394, p=<0.001, df=1) and comfort level at work ($\chi2$=8.037, p=0.005, df=1) were significantly associated with neck pain in last seven days whereas along with these factors sleep disturbance ($\chi2$=26.354, p=<0.001, df=1) was associated with neck pain in last twelve months. Also, comfort level (p=<0.001) and sleep disturbance (p=<0.001) was significantly associated with neck pain when pain in the last seven days and twelve months was considered together.

Sleep disturbance was found to be associated with low back pain ($\chi2$=4.080, p=0.043, df=1) in last seven days but when pain was considered for last twelve months, nature of job ($\chi2$=21.863, p=<0.001, df=1) and working in static posture long time ($\chi2$=29.278, p=<0.001, df=1) were significantly associated with low back pain (table 3). When low back pain was taken together for last seven days and twelve months, it was seen that nature of job (p=<0.003) and static posture (p=<0.001) were found to be significantly associated with it.

Table 4 shows association of risk factors with shoulder pain. Number of working hours per day ($\chi2$=15.411, p=<0.001, df=2) was associated with shoulder pain in last seven days. But nature of job ($\chi2$=10.830, p=0.004, df=2) and sleep disturbance ($\chi2$=26.949, p=<0.001, df=1) were significantly associated with development of shoulder pain in last twelve months. However, nature of job (p=0.003) and sleep disturbance (p=0.003) were associated with present and twelve months shoulder pain.

Nature of job ($\chi2$=15.084, p=<0.001, df=1) was also significantly associated with knee pain in last seven days. All three factors namely nature of job ($\chi2$=39.589, p=<0.001, df=1), comfort level ($\chi2$=66.702, p=<0.001, df=1) and sleep disturbance ($\chi2$=16.255, p=<0.001, df=1) were associated with knee pain in last twelve months (table 5). But when the knee pain was considered together for seven days and twelve months, it was associated with nature of job (p=0.008) and comfort level (p=<0.001)

Overall, most common MSDs among participants was low-back pain (58.2%), followed by neck pain (42.9%), shoulder (38.8%), knees (26.0%), wrist (20.4%), hips and thighs (19.4%), elbows(18.9%), ankles (18.4%), and least pain was noted in upper back (14.3%).

DISCUSSION

Present study was intended to assess risk factors for the development of musculoskeletal disorders among working women. Most common MSD found among participants was low-back pain (58.2%), followed by neck pain (42.9%), shoulder (38.8%), knees (26.0%), wrist (20.4%), hips and thighs (19.4%), elbows (18.9%), ankles (18.4%), and least pain was noted in upper back (14.3%).

Lower back pain (58.2%) and Upper back (14.3%) pain were most common and least common MSDs in our study. This finding was similar to a study in Tamil Nadu[3] in which lower back symptoms were most common (51.8%) and ankle/knee related MSDs were least common (18.3%). This was in contrast to a multi-centric study done in India[9] where low back pain was found only in 25.3% of office going women. This finding was also similar to a study done in South West Nigeria[10] and Vellore[11], where low backache was the most common MSD among nurses, as much as 44.1% and 31.3% respectively

In our study shoulder pain was found in 38.8% of study participants, which was in variance with a study done in Malaysia[12], in which shoulder pain was seen among 25.4% women doing plantation work and also study done in Hyderabad[4], among female construction workers where only 12.6% had shoulder pain. Occurrence of shoulder pain in our study may be more due to office table work and usage of computer which have a greater impact on shoulder pain.

As much as 42.9% of study participants in our study had neck pain which was more compared to a multi-centric study done in India[13] among IT employees, where neck pain was found to be 30%. It was also more, when compared to study conducted in Gujarat, where neck pain was found among 34.5% of nurses[14]. The difference in this finding could be due to nature of job, comfort level of work and disturbed sleep at night found to be significant factors in our study.

In our study nature of job was significantly associated with neck and knee pain in the last seven days also with low-back pain and shoulder pain in the last twelve months. It was found to be an important risk factor for development of MSDs in any body part as sitting while working has impact on lower back, doing table work predisposes to shoulder pain due to prolonged shrugging. Self-perceived comfort level was associated with knee pain in last seven days along with neck and knee pain in last twelve months. This is due to uncomfortable posture during work or may even be psychological discomfort as a part of low job satisfaction.

The major strength of study is most of the aspects of work, which may lead to MSDs were included such as nature of job, comfort level, number of working hours, usage of computers, static posture and sleep disturbance. The study was limited to women working in a tertiary care hospital, hence results cannot be generalized. Further community based studies can be carried out on large sample size.

Conclusion:

Lower back pain was the most common musculoskeletal symptom encountered among study participants. Nature of job, comfort level, sleep disturbance, working in static posture for long time and number of working hours were found to be the risk factors for development of musculoskeletal disorders either in last seven days or

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twelve months. Therefore Nordic scale is a useful tool to screen working women for MSDs so that detection is done at the earliest, so that preventive measures can be instituted early to prevent disabilities.

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REFERENCES

1. Loghmani A, Golshiri P, Zamani A, Kheirmand M, Jafari M. Musculoskeletal Symptoms and Job Satisfaction among Office-workers: A Cross- sectional study from Iran. Acta Med Acad 2013;42(1):46-54.

2. Gangopadhyay S, Ghosh T, Das T, Ghoshal G, Das B. Effect of Working Posture on Occurrence of Musculoskeletal Disorders among the Sand Core Making Workers of West Bengal. Cent Eur J Public Health 2010;18(1):38-42.

3. Sulaiman SK, Kamalanathan P, Ibrahim AA, Nuhu JM. Musculoskeletal Disorders and Associated Disabilities among Bank Workers. Int J Res Med Sci 2015;3(5):1153-8.

4. Telaprolu N, Lal B, Chekuri S. Work Related Musculoskeletal Disorders Among Unskilled Indian Women Construction Workers. Natl J Community Med 2013;4(4):658-91.

5. Strazdins L, Bammer G. Women, Work and Musculoskeletal health. Soc Sci Med 2004;58: 997-1005.

6. Bodhare T, Valsangkar S, Bele S. An Epidemiological Study of Work-related Musculoskeletal Disorders among Construction Workers in Karimnagar, Andhra Pradesh. Indian J Community Med 2011;36:304-7.

7. Kalpana devi, Kiran U V. Work Related Musculoskeletal Disorders among Workers in Unorganized Sector. Int J Technical Res Applications 2015;3(3):225-9.

8. Varte LR, Rawat S, Singh I, Majumdar D. Duration of use of Computer as Risk Factor for Developing Back Pain among Indian Office Going Women. Asian J Med Sci 2012;3(1):6-12.

9. Henry LJ, Esfehani AJ, Ramli A, Ishak I, Justine M, Mohan V. Patterns of Work-Related Musculoskeletal Disorders Among Workers in Palm Plantation Occupation. Asia Pac J Public Health 2015;27(2):1785-92.

10. Tinubu BMS, Mbada CE, Oyeyemi AL, Fabunmi AA. Work-Related Musculoskeletal Disorders among Nurses in Ibadan, South-west Nigeria: a cross-sectional survey. BMC Musculoskeletal Disorders 2010;11-2.

11. Inbaraj LR, Haebar OJ, Saj F, Dawson S, Paul P, Paul Prabhakar AK, et al. Prevalence of Musculoskeletal Disorders among Brick kiln Workers in rural Southern India. Indian J Occup Environ Med 2013;17(2):71-5.

12. Vijay SA. Work-Related Musculoskeletal Health Disorders among the Information Technology Professionals in India: A Prevalence Study. Int J Mgmt Res Bus Strat 2013; 2(2):118-28.

13. Janwantanakul P, Pensri P, Jiamjarasrangsri V, Sinsongsook T. Prevalence of self-Reported Musculoskeletal Symptoms among Office Workers. Occu Med 2008;58:436-8.

14. Apexa S. Raithatha and Daxa G. Mishra. Musculoskeletal Disorders and Perceived Work Demands among Female Nurses at a Tertiary Care Hospital in India. Int J Chronic Dis 2016;1-6.