

## Research Article

# Work related musculoskeletal disorders among hospital nurses in rural Maharashtra, India: a multi centre survey

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## ABSTRACT

Nurses have one of the highest rates of MSD of any occupation. Although a number of studies were done to find out prevalence of Work related musculoskeletal disorders (WMSDs) among nurses across the world, there is limited information on its prevalence in Rural Maharashtra. This study investigated prevalence of WMSDs, job risk factors and the coping strategies towards reducing the risk of development of WMSDs among nurses from selected hospitals in rural Maharashtra, India. Validated questionnaires were distributed to 250 nurses working rural hospitals across Maharashtra but only 228 questionnaires were returned and 212 complete questionnaires were included for study. On Analysis we found that 89.1% nurses had experienced work-related musculoskeletal pain or discomfort at sometime in their occupational lives. WMSDs was highest in the low back (48.2%), followed by the shoulder (34.6%), neck (33.1) and knee (29 %). Other regions with less prevalence were Thoracic (10.5%), Feet and ankle (7.6%), Elbow (1.88%) and Hip (1.6 %). Priority was given to getting help to handle heavy patients ( 57.1 %), nursing procedure modification in order to avoid stress injury ( 50.2 %) coping strategies. Our study Concluded that high prevalence of LBP, Shoulder, neck and Knee pain over a 12-month period among nurses working in Rural hospitals in Maharashtra state , 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.

**Keywords:** Work related Musculoskeletal Disorders (WMSDs), Coping Strategies, Nurses

## INTRODUCTION

Musculoskeletal disorders (MSDs) are described as disorders of the muscles, nerves, tendons, ligaments, joints, cartilage, or spinal discs. The term "work-related musculoskeletal disorders" (WMSDs) refers to MSDs that are made worse or long lasting by work conditions. MSDs are some of the most important work-related problems currently reported.<sup>1</sup>

WMSDs are common among health care workers, with the nursing population that constitutes about 33% of the

hospital workforce particularly at high risk and accounting for 60% of the reported occupational injuries.<sup>2-4</sup> WMSDs are reported to significantly impact quality of life, cause loss of work time or absenteeism, increase work restriction, transfer to another job, or disability than any other group of diseases with a considerable economic toll on the individual, the organization and the society as a whole.<sup>5</sup>

A number of intrinsic and extrinsic factors have been implicated in the aetiology of WMSDs.<sup>6-10</sup> Silverstein et al reported repetitive movement, awkward postures, and high force levels as the three primary risk factors that

have been associated with WMSDs. Nurses routinely perform activities that require lifting heavy loads, lifting patients, working in awkward postures, and transferring patients out of bed and from the floor. These work tasks put nurses at high risk for acute and cumulative WMSDs. Nursing has suffered severe brain drain like most other health professions in Nigeria in the recent years. Many Nigerian nurses have immigrated to Europe, northern hemispheric countries and the oil rich middle-east in search of better life and condition of service. This has contributed to the problem of inadequate staffing, and this has been associated with WMSDs among nurses. Because nurses are already at risk for musculoskeletal disorders, a reduction in professional nursing staff and other changes in nursing care delivery are likely to lead to even higher rates of these disorders. Although several authors have reported the prevalence of WMSDs among nurses in the developed populations,<sup>8-10</sup> however, data on prevalence of WMSDs is limited in rural part of Maharashtra for reference. This study sought to determine the prevalence of WMSDs; the associated job risk factors and the coping strategies towards reducing the risk of development of WMSDs among nurses from selected hospitals in rural Maharashtra.

## METHODS

Project was approved by University Ethical Committee of Pravara Institute of Medical Sciences, Loni. After obtaining the written informed consent, A four section questionnaire, survey instrument was distributed to participants. Questionnaire consisted of: Section A that sought information on demographic profile such as age, height, weight, and gender. Section B was on occupational health in nursing practice and sought to elicit general information on years of practice, work status, work setting, practice specialty, patient population, and nursing activities. The symptom-survey segment of the occupational health in nursing practice section was a modification of the standardized Nordic questionnaire 11 and consisted of questions referring to nine body areas. These are 3 upper limb segments (Shoulders, elbows, wrists/hands/thumb), 3 lower limb segments (Hips/thighs, knees, ankles/feet), and 3 trunk segments (Neck, upper back and lower back). Its section C contained items on perceptions on job risk factors that may contribute to development of work-related musculoskeletal disorders while section D gleaned data on coping strategies towards reducing the risk of development of work-related musculoskeletal disorders among nurses.

A total of 250 questionnaires were distributed to the different hospitals of which 228 questionnaires were returned (91.2%). Out of 228 however, 212 questionnaires only (92.98%) were used in the data analyses and 16 questionnaires were excluded because of incomplete data.

**Table 1: Description of nurses involved in the study.**

|                        |               |
|------------------------|---------------|
| Age (Yr)               |               |
| Mean                   | 31.4          |
| Range                  | 25-49         |
| Weight (Kg)            |               |
| Mean                   | 63.4          |
| Range                  | 52.4-68.1     |
| Height (cm)            |               |
| Mean                   | 168.4         |
| Range                  | 162.1 – 170.5 |
| BMI (m)                |               |
| Mean                   | 24.06         |
| Range                  | 23.18 – 25.14 |
| Job Experience (Years) |               |
| Mean                   | 11.5          |
| Range                  | 2-26          |
| Daily Working Hours    |               |
| Mean                   | 8.1           |
| Range                  | 6-10          |

## RESULTS

The mean age, height weight and body mass index of the respondents were 31.4 years, 168.4, 63.4 Kg and 24.06 Kg/m<sup>2</sup> respectively.

Of the respondents, 89.1% reported that they had experienced work-related musculoskeletal pain or discomfort at sometime in their occupational lives. The respondents reported a 12-month prevalence rate of WMSDs at any body region to be 81%.

As shown in the figure 1, prevalence rates of WMSDs was highest in the low back (48.2%), followed by the shoulder (34.6%), neck (33.1%) and knee (29%). Other regions with less prevalence were thoracic (10.5%), feet and ankle (7.6%), elbow (1.88%) and hip (1.6%).

Subjects suffering from WMSD have described that working in the same positions for long periods (47.6%), lifting or transferring dependent patients (52.4%), treating an excessive number of patients in one day (41.0%) and carrying, lifting or moving heavy material or equipments (42.4%) were the most perceived Job risk factors precipitating WMSDs during their hospital duties.

Among the coping strategies respondents followed commonly were, getting help to handle heavy patients (57.1%), nursing procedure modification in order to avoid stress injury (50.2%), modification of patients or self position (41.2%). Less common strategies followed were stop treatment if it causes or aggravates discomfort (28.1%) and select technique that will not aggravate or provoke the discomfort (23.2%).

### Prevalence of work related musculoskeletal disorders in different body regions

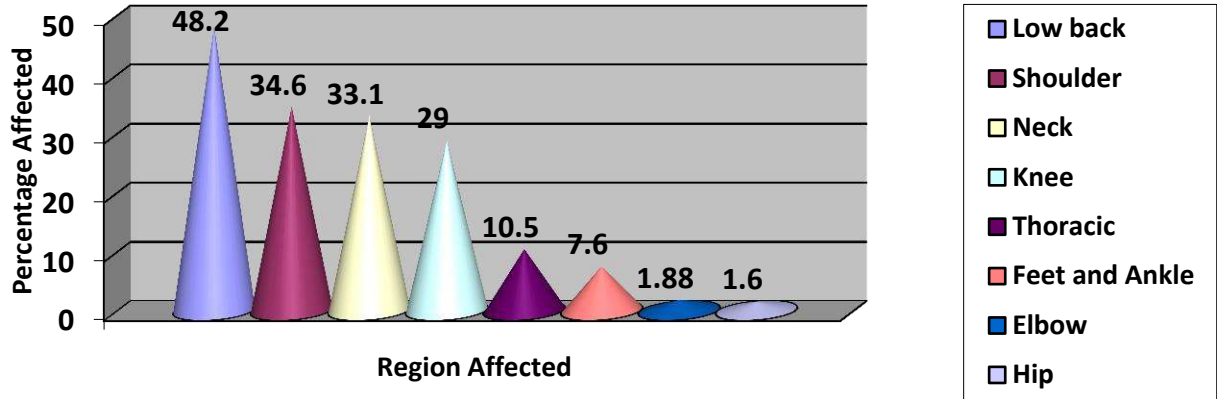
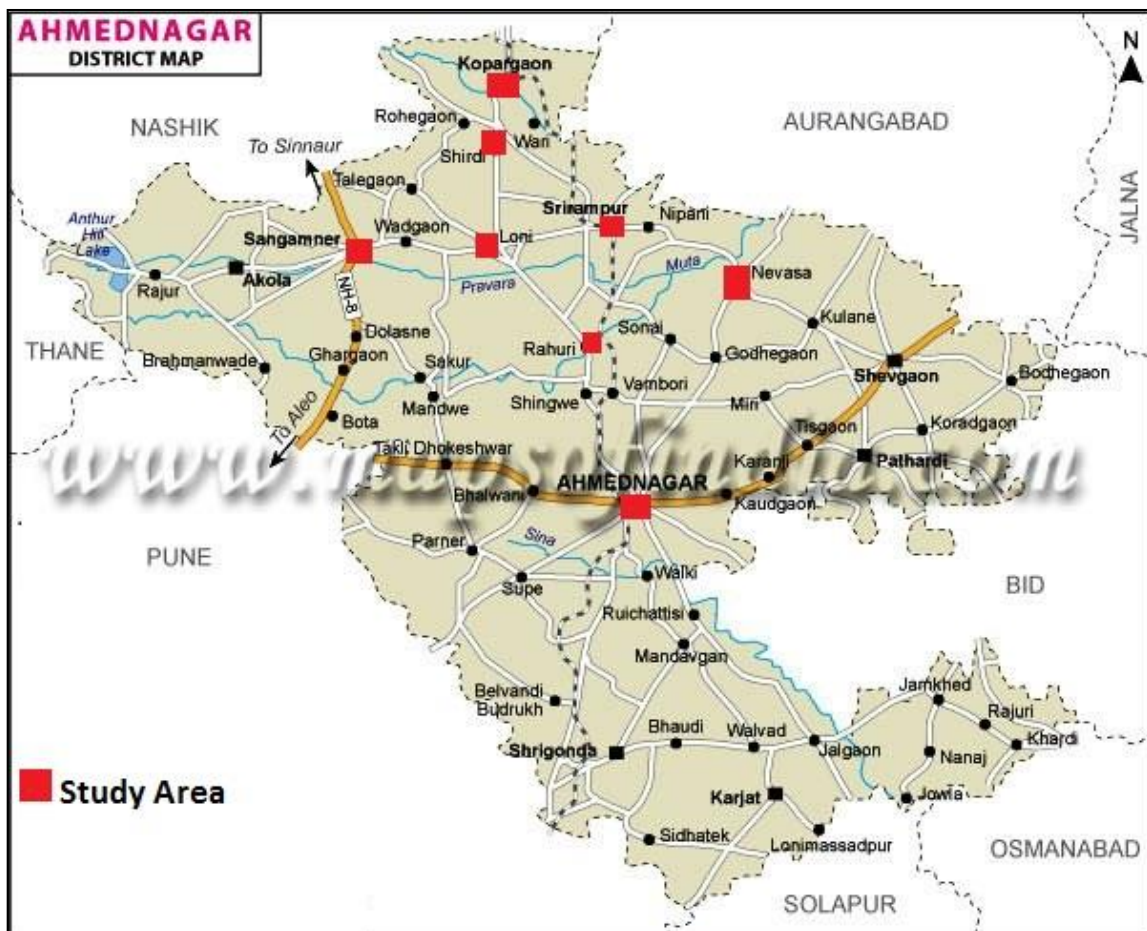
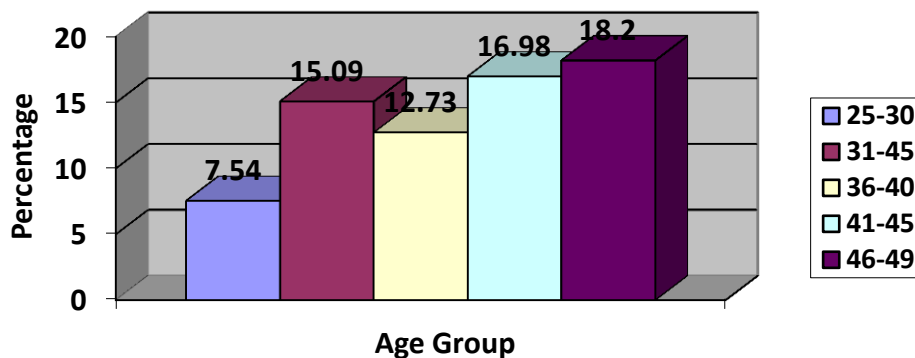


Figure 1: Prevalence of work related musculoskeletal disorders in different body regions.



**Table 2: Job risk factor percentage.**

| Percentage indicating respondents' perceptions of job risk factors that may contribute to development of work-related musculoskeletal disorders among all respondents (Greater than 7 on a scale of 0 - 10) |            |
|---|------------|
| Job risk factor   | Percentage |
| 1. Working in the same positions for long periods (Standing, bend over, sitting, kneeling)  | 47.6       |
| 2. Lifting or transferring dependent patients   | 52.4       |
| 3. Bending or twisting your back in an awkward way  | 48.5       |
| 4. Treating an excessive number of patients in one day  | 41.0       |
| 5. Carrying, lifting, or moving heavy materials or equipment (e.g., continuous passive motion machines)   | 42.4       |
| 6. Performing manual orthopaedic techniques (Joint mobilizations, soft tissue mobilization)   | 32.7       |
| 7. Not enough rest breaks or pauses during the workday  | 31.4       |
| 8. Work scheduling (Overtime, irregular shifts, length of workday)  | 26.0       |
| 9. Working in awkward and cramped positions   | 35.2       |
| 10. Continuing to work while injured or hurt  | 29.6       |
| 11. Reaching or working away from your body   | 41.2       |
| 12. Unanticipated sudden movement or fall by patient  | 21.8       |
| 13. Inadequate training on injury prevention  | 12.1       |
| 14. Working near or at your physical limits   | 20.3       |
| 15. Working with confused or agitated patients  | 10.0       |
| 16. Performing the same task over and over  | 22.4       |
| 17. Assisting patients during gait activities   | 17.2       |



**Figure 2: Age group Affected by Work related Musculoskeletal Disorders.**

**Table 3: Coping strategies.**

| Percentage indicating the coping strategies of the respondents toward reducing the risk for development of work-related musculoskeletal disorders |            |
|---|------------|
| Strategies  | Percentage |
| 1. I get someone to help me handle a heavy patient  | 57.1       |
| 2. I modify my nursing procedure in order to avoid stressing an injury  | 50.2       |
| 3. I modify patient's position/my position  | 41.2       |
| 4. I stop a treatment if it causes or aggravate my discomfort   | 28.1       |
| 5. I warm up and stretch before performing my nursing duties  | 16.2       |
| 6. I select techniques/procedures that will not aggravate or provoke my discomfort  | 23.2       |
| 7. I adjust plinth/bed height so I can stretch and change posture   | 18.3       |
| 8. I use different part of my body for ease in administering my nursing procedure   | 19.2       |
| 9. I pause regularly so I can stretch and change posture  | 10.2       |

## DISCUSSION

Our study was a questionnaire-based self-reported survey; thus, reflecting the attitude and perception of nurses regarding ache, pain and discomfort. Therefore, the prevalence of WMSDs among nurses working in rural hospitals in different countries with those exposed to the same level of hazards may be very different due to their different attitudes and perception.

Nurses in our study, working in the rural setup, (89.1%) reported WMSDs of some description occurring over the period of 12 months. This prevalence reported in our study was less than previous studies performed on nurses from Japan (91.9%)<sup>12</sup> and higher than studies from Sweden (84%)<sup>13</sup> and US (72.5%)<sup>14</sup>. In a previous study from Nigeria, Fabunmi et al<sup>15</sup> reported the 12 months prevalence period of self reported musculoskeletal disorders at anybody site to be 90.7%.

Most prevalent WMSD reported in nurses from Japan was that of shoulder (71.9%) followed by low back (71.3%), neck (54.7%), and upper back (33.9%).<sup>21,22</sup> While in this study, most WMSD during the 12 month prevalence period reported was that of Low back (48.2%), neck (34.6%), followed by knees (29.0%), thoracic (10.5%), feet and ankle (7.6%) , elbow (1.88%) and hip (1.6 %). In another study by Choobineh, the 12-month prevalence of MSDs among Iranian nurses in Shiraz medical school was 84.4% which is less than what we found in our study;<sup>16</sup> low back symptoms were the most prevalent MSDs in their report, which are similar to our study. There is considerable international literature

regarding LBP in nursing, with the 12-month period-prevalence previously reported in the following countries: Hong Kong (40.6%),<sup>19</sup> France (41.1%),<sup>20</sup> England (45%),<sup>18</sup> metropolitan Japan (54.7%),<sup>21</sup> rural Japan (59.0%)<sup>22</sup> and Sweden (64%).<sup>23</sup>

According to Sheikhzadeh, the most prevalent MSDs among nurses was low back pain (84%) followed by ankles/feet (74%) and shoulders (74%).<sup>17</sup> Fabunmi reported low back pain was the most common MSDs (78.0%) and elbows MSD was the least reported site (23.4%).<sup>15</sup> These findings are in accordance with our findings though the order of sites affected were not similar. This pattern of distribution is consistent with literature. LBP is the most common musculoskeletal disorder in adults and about 60-80% of all individuals will experience the condition at some stage in their life time.<sup>18</sup> LBP is one of the most important WMSDs among nursing professionals, accounting for a point prevalence of approximately 17%, an annual prevalence of 40-50% and a life time prevalence of 35-80%.<sup>19</sup> Some researchers reported that more than half (56%) of their Nurses have ongoing back troubles.<sup>20</sup>

Second, commonly reported WMSDs were at shoulder region (34.6 %) which was much less than Shoulder MSD among Japanese nurses (61.1%) , Australia (60%)<sup>16</sup> and Sweden (60%)<sup>24</sup> and South Africa (41%)<sup>27</sup> and the US (35.1%).<sup>24</sup> This result suggests that shoulder MSDs represent a considerable problem for nurses all over the world and may be particularly prevalent in certain countries, including Japan.

Involvement of the neck was the third commonly reported MSD within rural Indian nurses, affecting 33.1%. This result was lower than other studies conducted in Sweden (48-53%)<sup>24</sup>, and the US (45.8%).<sup>25</sup>

Lifting patients in bed, transferring patients out of bed, and lifting patients from the floor were the job activities most commonly reported as sources of back pain among nurses.<sup>31</sup> Working in the same positions for long periods, lifting or transferring dependent patients and treating an excessive number of patients in one day were the most perceived job risk factors precipitating WMSDs among the nurses in this study. These findings are consistent with previous reports indicating manual patient handling, transferring or moving as important predictors of musculoskeletal disorders and low back pain among nurses.<sup>32-35</sup> Manual handling is a particularly important issue in nursing, because staff must meet the demands of patients at any time.<sup>37</sup> Furthermore, many patient-related manual handling activities need to be undertaken in less than ideal spaces and in suboptimal time frames.<sup>36</sup> Such situations often incur great biomechanical strain, which may eventually lead to the development of MSD.

From our study on rural nurses, getting assistance or support staff in handling heavy patients, modification of nursing procedures in order to avoid re-injury or stressing an injury, and modification of patient's/nurse position were the top three coping strategies in reducing the risk of WMSDs. Similar coping strategies were found in a study on Nigerian nurses.<sup>38</sup> These coping strategies among Indian rural nurses seem similar to previous findings.

## CONCLUSION

This study found a high prevalence of LBP, Shoulder, neck and Knee pain over a 12-month period among nurses working in Rural hospitals in Maharashtra state, 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 rural Maharashtra. 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. Physiotherapy interventions like spinal muscle strengthening, lower limb and upper limb exercises, relaxation and Ergonomic advice can treat the WMSD's.

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**Authors' contributions:** Dr. Deepak participated in the design of the study, literature review, carried out the survey, performed the statistical analysis and drafted the manuscript. Dr. Chandra and Dr. Keerthi finalised survey questionnaire, co-ordinated the survey, helped in design of the study, ethical clearance and revised the manuscript. All authors read and approved the final manuscript.

## REFERENCES

1. Kakosy T, Németh L. Musculoskeletal disorders caused by hand-arm vibration. *Global Occup Health Network* 2003;4(winter):3-6.
2. Stubbs DA, Buckle P, Hudson MP, Butler PE, Rivers PM: Back pain in the nursing profession, part I: epidemiology and pilot methodology. *Ergon* 1983, 26:755-65.
3. Videman T, Nurminen T, Tola S, Kuorinka I, Vanharanta H, Troup JD: Low back pain in nurses and some loading factors at work. *Spine* 1984;9:400-4.
4. Wilkinson WE, Salazar MK, Uhl JE, Koepsell TD, DeRoos RL, Long RJ: Occupational injuries: a study of health care workers at a northwestern health science center and teaching hospital. *Am Assoc Occup Health Nurs J* 1992;40:287-93.
5. Kemmlert K: Labour inspectorate investigation for the prevention of occupational musculoskeletal injuries (licentiate thesis). National institute of occupational health: Solna, Sweden 1994.
6. Chiou WK, Wonk MK, Lee YH: Epidemiology of low back pain in Chinese nurses. *Int J Nurs Studies* 1994;31:361-8.
7. Smedley J, Egger P, Cooper C, Coggon D: Manual handling activities and risk of low back pain in nurses. *Occup Environ Med* 1995;52:160-3.
8. Lusted MJ, Carrasco CL, Mandyk JA, Healey S. Self reported symptoms of the neck and upper limbs in nurses. *Appl Ergon* 1996;27:381-7.
9. Yip YB: A study of work stress, patient handling activities and the risk of low back pain among nurses in Hong Kong. *Journal of Advanced Nursing* 2001;36:794-804.
10. Alexopoulos EC, Burdorf A, Kalokerinou A: Risk factors for musculoskeletal disorders among nursing personnel in Greek hospitals. *Int Arch Occup Environ Health* 2003;76:289-94.
11. Kuorinka I, Jonsson B, Kilbom A, Vinterberg H, Biering-Sørensen F, Andersson G, Jørgensen K: Standardised Nordic questionnaire for the analysis of musculoskeletal symptoms. *App Ergon* 1987;18:233-7.
12. Musculoskeletal disorders among hospital nurses in rural Japan. Smith DR, Kondo N, Tanaka E, Tanaka

- H, Hirasawa K, Yamagata Z. *Rural Remote Health.* 2003;3:241.
13. Josephson M, Larger strom M, Hagberg M, Hjelm EW: Musculoskeletal Symptoms and job strain among nursing personnel: a study over a three year period. *Occup Environ Med* 1997;52:47-57.
  14. Lipscomb, J., Trinkoff, A., Brady, B., & Geiger-Brown, J. (2004). Health care system changes and reported musculoskeletal disorders among registered nurses. *Am J Public Health* 2004;94:1431-5.
  15. Fabunmi AA, Oworu JO, Odunaiya NA. Prevalence of musculoskeletal Disorders among nurses in University College Hospital, Ibadan. *West African Journal of Nursing* 2008;19:21-5.
  16. Choobineh A, Rajaefard A, Neghab M. Association between perceived demands and musculoskeletal disorders among hospital nurses of Shiraz University of Medical Sciences: a questionnaire survey. *Int J Occup Saf Ergon* 2006;12:409-16.
  17. Sheikhzadeh A, Gore C, Zuckerman JD, Nordin M. Perioperating nurses and technicians' perceptions of ergonomic risk factors in the surgical environment. *Appl Ergon* 2009;40:833-9.
  18. Smedley J, Egger P, Cooper C, Coggon D. Manual handling activities and risk of low back pain in nurses. *Occup Environ Med* 1995;52:160-3.
  19. Yip YB. A study of work stress, patient handling activities and the risk of low back pain among nurses in Hong Kong. *J Adv Nurs* 2001;36:794-804.
  20. Niedhammer I, Lert F, Marne MJ. Back pain and associated factors in French nurses. *Int Arch Occup Environ Health* 1994;66:349-57.
  21. Ando S, Ono Y, Shimaoka M, Hiruta S, Hattori Y, Hori F, et al. Associations of self estimated workloads with musculoskeletal symptoms among hospital nurses. *Occup Environ Med* 2000;57:211-6.
  22. Smith DR, Ohmura K, Yamagata Z, Minai J. Musculoskeletal disorders among female nurses in a rural Japanese hospital. *Nurs Health Sci* 2003;5:185-8.
  23. Josephson M, Lagerström M, Hagberg M, Hjelm EW. Musculoskeletal symptoms and job strain among nursing personnel: a study over a three year period. *Occup Environ Med* 1997;54:681-5.
  24. Trinkoff AM, Lipscomb JA, Geiger-Brown J, Brady B. Musculoskeletal problems of the neck, shoulder and back and functional consequences in nurses. *American Journal of Industrial Medicine* 2002;41:170-8.
  25. Lagerström M, Wenemark M, Hagberg M, Hjelm EW, The Moses Study Group. Occupational and individual factors related to musculoskeletal symptoms in five body regions among Swedish nursing personnel. *International Archives of Occupational and Environmental Health* 1995;68:27-35.
  26. Lusted MJ, Carrasco CL, Mandryk JA, Healey S. Self reported symptoms in the neck and upper limbs in nurses. *Applied Ergonomics* 1996;27:381-7.
  27. Botha WE, Bridger RS. Anthropometric variability, equipment usability and musculoskeletal pain in a group of nurses in the Western Cape. *Applied Ergonomics* 1998;29:481-90.
  28. Waddell G, Burton AK. Occupational health guidelines for the management of low back pain at work. *Occupational Medicine* 2001;51:124-35.
  29. Hignett S. Work-related back pain in nurses. *J Adv Nurs* 1996;23:1238-46.
  30. Lagerström M, Bremme K, Eneroth P, Janson CG. Occupational and individual factors related to musculoskeletal symptoms in five body regions among Swedish nursing personnel. *International Archives of Occupational and Environmental Health* 1995;68:27-35.
  31. Smedley J, Egger P, Cooper C, Coggon D. Manual handling activities and risk of low back pain in nurses. *Occup Environ Med* 1995;52:160-3.
  32. Chiou WK, Wonk MK, Lee YH. Epidemiology of low back pain in Chinese nurses. *Int J Nurs Studies* 1994;31:361-8.
  33. Smedley J, Egger P, Cooper C, Coggon D: Manual handling activities and risk of low back pain in nurses. *Occup Environ Med* 1995;52:160-3.
  34. Lusted MJ, Carrasco CL, Mandryk JA, Healey S. Self reported symptoms of the neck and upper limbs in nurses. *Appl Ergon* 1996;27:381-7.
  35. Yip YB. A study of work stress, patient handling activities and the risk of low back pain among nurses in Hong Kong. *Journal of Advanced Nursing* 2001;36:794-804.
  36. Smith DR, Leggat PA. Musculoskeletal disorders in nursing. *Australian Nursing Journal* 2003;11:1-4.
  37. Chiou WK, Wong MK, Lee YH. Epidemiology of low back pain in Chinese nurses. *International Journal of Nursing Studies* 1994;31:361-8.
  38. Tinubu BMS, Mbada CE, Oyeyemi AL, Fabunmi AA. Work-Related Musculoskeletal Disorders among Nurses in Ibadan, South-west Nigeria: a cross-sectional survey. *BMC Musculoskelet Disord* 2010;11:12.

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