

Musculoskeletal Disorders among Medical Laboratory Professionals-A Prevalence Study

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Abstract

Background: Work –related musculoskeletal disorders (WRMSD) have been reported very often in various occupations. Laboratory personnel are also exposed to many ergonomic risk factors due to the nature of their work. As their work demands awkward and static postures, high repetition, excessive force, excessive reaching, compression or contact stress, forceful or static exertions, lifting and pinch grip lifting, and repetitive motions, they may be at increased risk for work related musculoskeletal disorder which is often ignored. So the study was aimed at estimating the prevalence of work related musculoskeletal disorders among laboratory professionals. **Methods:** It was a cross sectional study done on 250 laboratory professionals (lab technicians, pathologists, microbiologists, biochemistry technologist) in Udupi district of Karnataka state and validated questionnaire was used to screen for the symptoms. Data were analyzed using descriptive statistics. **Results:** Prevalence of musculoskeletal symptoms among laboratory professionals was found to be 21.2%. The neck and lower back are observed to be the most affected with symptoms of pain and discomfort with prevalence of 8% and 6.8% respectively. **Conclusion:** Medical laboratory professionals are at high risk for the development of MSDs related to cumulative trauma. Thus, laboratory professionals are strongly encouraged to adopt preventive measures before symptoms develop.

Keywords: Work related musculoskeletal disorders; Occupational; Health Risk; Cumulative trauma, Laboratory professional

Introduction

Musculoskeletal disorders (MSDs) are an increasing health problem in workplaces. These disorders are a major cause of concern for several reasons: the health problem leading to workers' disability and the lost time from work (WHO, 2003). Work-related Musculoskeletal Disorders (WMSDs) are the musculoskeletal disorders to which the

work environment and the performance of work contribute significantly (Wolf et al, 2006).

Hospitals are large, organizationally complex, system driven institutions employing large numbers of workers from different professional streams. They are also potentially hazardous workplace and expose their workers to a wide range of physical, chemical, biological,

ergonomical and psychological hazards. Oftentimes, healthcare workers experience musculoskeletal disorders (MSDs) as well as respiratory symptoms at a rate exceeding the rate of workers involved in construction, mining, and manufacturing sectors (Howells & Knight, 1981).

Stricoff, and Walters, (1995) reported that healthcare workers, including pathologists, microbiologists, and technicians are exposed to a number of risk factors in the workplace for musculoskeletal disorders such as back and shoulder injuries and even other joints and muscles exertion, which are aggravated or prolonged by their work conditions. The primary functions of the hospital laboratory in the hospital are to perform analytic tests and procedures on body fluids and tissues taken from patients and to provide the results of these tests to physicians in order to confirm diagnosis determine prognosis or ascertain or assess the patient's treatment. The laboratory medical staff functions in an atmosphere of continual pressure from the responsibility of providing accurate and precise information with virtually no margin of error. Results must be carefully checked and rechecked by them since the responsibility for treatment of the patient depends on the reports issued from the laboratory (Stricoff and Walters, 1995)

Along with the risk of working daily with hazardous substances, laboratory personnel are also exposed to many ergonomic risk factors due to the nature of their work and the research they conduct (Thomas, 2011). Ergonomic risk factors for laboratory staff causing MSD consist of awkward and static postures, high

repetition, excessive force, excessive reaching, compression or contact stress, Forceful or static exertions, lifting and pinch grip lifting, and repetitive motions affecting the comfort and productivity (Wahlstrom, 2005).

The laboratory workers are considered to be sedentary workers and often a time the stress involved with this job that can affect their musculoskeletal system causing its function to decline if ignored. The literature on medical laboratory hazards has largely centered on infections, this is partly because laboratory acquired infections tends to be more easily remembered than the hazardous events (Skinhoj, 1974; Harrington, 1982), its impact on musculoskeletal system are often ignored.

So, the aim of the study was to estimate the prevalence of work related musculoskeletal disorders among laboratory professionals.

Materials & Methods

The Manipal University ethical committee clearance was obtained before the study. The study conducted is a cross sectional survey of laboratory professionals (lab technicians, pathologists, microbiologists, biochemistry technologist) belonging to the Udupi district. The target sample size was the whole community of laboratory professionals in the selected district. Participants that were in the age group ranging in age from 19 to 60 years and having minimum experience of one year were included in the study. The subjects having history of unhealed fractures, recent dislocations, inflammatory arthritis, tumors, diagnosed psychiatric illness, recent traumatic soft tissue injuries,

diagnosed disc lesion were excluded from the study.

A validated questionnaire pertaining to symptoms related to different body parts (neck, upper back, lower back, shoulder, elbow, wrist /hand, hip/thigh, knees, ankle/feet), demographic data and Occupational history was used to screen for symptoms.

Procedure: After identification of the subjects, informed consent was obtained following which, interviews were carried out using validated questionnaire to screen for the musculoskeletal symptoms during the previous 12 months in nine body regions (head/neck, shoulders, elbows, wrists/hands, upper back, low back, hips, knees and ankles/feet). Demographic data, occupational case history like years of experience, number of hours at work etc. were also taken. All the data collected were analyzed by SPSS version 16 software and descriptive statistics was used to summarize the data.

Results & Discussion:

260 subjects were screened of which 10 were excluded (6- due to less than one year experience, 4- due to the diagnosed disc lesion).

Table 1: Demographic characteristic of the participants

Variables	Mean (SD)
Age, years	30.64 ± 9.89
No. of hours in a day at work	6 (median) 9 (interquartile range)
Duration of experience, yrs	8.13 ± 1.88 (mean±SD)
Gender	Female 73.6% Male 26.4 %
Involvement in Physical activity	No-78.4% Yes-21.6%
Perception of their general health	Good-85.2% Fair-13.6% Poor-1.2%

A total of 250 subjects participated in the study. Table 1 shows the details of demographic characteristics of the participants.

Looking at the prevalence among 250 subjects, it was found that 21.2% participants were observed to suffer from musculoskeletal symptoms in various regions of the body. Further analysis revealed that 8% of the subjects reported neck pain and 6.8% of the subjects suffered from lower back complain indicating relatively greater prevalence of symptoms in neck and upper back region. Tables 2 and 3 enlist the prevalence rates of symptoms in various body regions as well as distribution based on type of laboratory profession.

Table 2: Prevalence rates among different professions

Laboratory profession	Number of subjects with musculoskeletal complaints
Laboratory technician	44
pathologist	6
Microbiologist	1
Biochemistry profession	2

62.2% of the subjects reported, work to be the prime reason for their complaint as they had to use the microscope as well computer to document the report for maximum number of time in their working hours. Regarding the nature of complain 45.2% of the subjects labelled their discomfort as stiffness around the respective body region. 98% of subjects had been on sick leave during the previous year for a median of 4 (mean = 6) days. The change in their ability to work because of specific musculoskeletal complaint graded on 0-10 point scale, where 0 is no change and 10 is the extreme change, 66% of subjects with musculoskeletal complain graded their

ability to work between 1 to 3 which is indicative of minimal change in the ability.

In the present study although maximum subjects (85.2%) perceived their general health to be good, 21.2% of the participants had reported musculoskeletal symptoms. The mean age of the participants in the present study was 30.64 ± 9.8 yrs which show that this problem is being experienced by many young technicians. This observation is similar to the findings of *Florian et al (2012)* who argued against a mere aging effect of this disorder, and also underlines the importance of addressing this problem not only on middle aged to older employees but in the younger ones, at an early stage in their career. Similar to the study reported by *Florian et al (2012)*, female gender was predominant in our study, 83% of the subjects with musculoskeletal complaint were observed to be females. It was further observed that, average number of hours they were involved in their work were 8.13 ± 1.8 which itself could be a major contributing factor in getting musculoskeletal symptoms in this population. More so 78.4% of the participants were not involved in any kind of physical activity. Lack of physical activity may have had an impact on their fitness level which might have contributed to the cause of complaints among this population.

In the present investigation prevalence of neck complaint was found to be 8%. The main reason for neck symptoms could be the static posture adopted by neck during laboratory work which is support the view expressed by *George (2010)* in a study stating strong evidence that high levels of static contraction,

prolonged static loads, and awkward postures involving the neck and shoulder muscles were associated with an increased risk for MSDs. Many studies linking static postures/static loads with “tension-neck syndrome” were cited by him (odds ratios were greater than 3.0 and statistically significant). Emphasis therefore must be placed on the term static because most of us do not intuitively associate sitting in a chair for prolonged intervals with tissue injury.

Lower back complaint also found with 6.8% prevalence in the present study. The neck and back muscles truly are involved while sitting down and viewing slides at the microscope or staring at a computer; this has been confirmed by surface electromyography (*Falla, 2004*). This could be the reason for observing higher percentage of symptoms in neck and lower back in the present study. Further 83.01% subjects were laboratory technicians who reported musculoskeletal complaints. This can be explained by the fact that they are mainly involved in clinical work and most of the clinical load is borne by them unlike the pathologist or microbiologist who are involved in teaching also. 66% of subjects with musculoskeletal symptoms in our study graded their ability to work between 1 and 3 which is indicative of minimal change in their ability. As this study was questionnaire interview based, during interview many subjects might have perceived these symptoms as part of their daily work pattern and were trying to ignore it, the reason could be lack of awareness about serious impact of these musculoskeletal symptoms on their health.

Strength and Limitation of the study: As the study adopted face to face interview method for collecting data so it is more reliable which can be considered as the strength of the study. As analysis of the perceived load and stress based on the various tasks and time spent in various tasks during work that might have thrown light on to the specific posture or activity predisposing to symptoms so further detail evaluation of these components are indicated in future research.

Conclusion; This study noted that prevalence of work related musculoskeletal disorder among medical laboratory professionals is 21.2%. The results suggest that practicing medical laboratory professionals are at high risk for the development of MSDs related to cumulative trauma. Thus, it is recommended that there exist the need for evaluation of laboratory professionals. Also, laboratory professionals are strongly encouraged to adopt preventive measures before symptoms develop as well as physical activity promotion.

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References

- Falla, D. 2004. Unravelling the complexity of muscle impairment in chronic neck pain. *Man. Ther.*, **9**: 125-133.
- Fritzsche, Florian, Rudolf; Ramach, Constanze; Soldini, Davide; Caduff, Rosmarie; Tinguely, Marianne; Cassoly, Estelle; Moch, Holger and Stewart, Antony. 2012. Occupational health risks of pathologists - results from a nationwide online questionnaire in Switzerland. *BMC Public Health*, **12**: 1054
- George. Evan. 2010. Occupational Hazard for Pathologists Microscope Use and Musculoskeletal Disorders. *Am. J. Clin. Pathol.*, **133**: 543-548
- Harrington, J.M. 1982. Health and safety in medical laboratories. *Bulletin of World Health Organization*, **60(1)**: 9-16.
- Howells, R.A., Knight, J.L. 1981. *Safety considerations for hospital populations, Handbook of Hospital Safety. Boca Raton, Florida: CRC Press; 13-42*
- Skinhoj. P. 1974. Occupational Risks in Danish Clinical Chemical Laboratories II. *Infections*, **33(1)**: 27-29
- Stricoff, R.S., and Walters. D.B. 1995. *Handbook of Laboratory Health and Safety, 2nd edition.* John Wiley and Sons, Inc., NY.
- Thomas, Walters. 2011. Naval Facilities Engineering Command, Ergonomic Risk Assessment for Naval Hospital Laboratory- a report. DOD environment, safety and occupational health network and information exchange. *Website* : www.denix.osd.mil
- Wahlström, J. 2005. Ergonomics, musculoskeletal disorders and computer work. *Occup. Med. (Lond)*, **55**: 168–176.
- Wolf, Li; Evanoff, W.; Fragala, N.; & Menzel. 2006. NIOSH efforts to prevent MSD in health care industry orthopaedic nursing, **25(6)**: 380-389.
- World Health Organization. 2003. The Burden of Musculoskeletal Conditions at the Start of the New Millennium: Report of a WHO Scientific Group. Geneva, Switzerland: World Health Organization. *Technical Report Series*, 919.

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