

# PREVELANCE OF MUSCULOSKELETAL PROBLEMS AND AWARENESS ABOUT ERGONOMICS IN LABORATORY TECHNICIANS WORKING ON MICROSCOPE

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## ABSTRACT

**Background:** In current times increase in number of diseases has led to an increased work load on health care professionals. This has led to an increase in work related musculoskeletal problems amongst them. One such professional are the laboratory technicians working on microscope who deal with slide preparation, culture techniques, slide observation regularly.

**Context and purpose of study:** As laboratory technicians have to maintain static postures, awkward bodily adjustments, constant forward bending, contact stress, they are at a greater risk of developing musculoskeletal problems with time. Therefore this study was aimed at finding out the prevalence of musculoskeletal problems and awareness about ergonomics in using microscope amongst them.

**Result:** The result of the study carried out showed that neck, lowerback, upperback, were most severely affected followed by head, left arm and eyes in decreasing order of severity. Also 57.47% laboratory technicians were aware about role of ergonomics and 81.60 % were aware about the ideal sitting posture while working on microscope.

**Main findings:** 87.87% population with a female predominance who had work experience of more than 10 years experienced a dull aching musculoskeletal pain at neck, lower back and upper back. Leaning forward towards the eyepiece was favoured by 67.81% technicians and 51.72% technicians preferred chair with lower back support and with an adjustable height. About 57.87% laboratory technicians were aware about ergonomics and 81.06% knew the ideal sitting posture while working on microscope.

**Conclusion:** The study thus concludes that 87.35% laboratory technicians showed a prevalence of musculoskeletal problems while only 57.47% were aware about correct ergonomics in using microscope and 81.60% knew the ideal sitting posture while working on microscope, yet the ideal sitting posture was not regularized in daily practice which led to work related musculoskeletal problems in them.

**KEY WORDS:** Musculoskeletal Problems, Laboratory Technicians, Awareness, Ergonomics, Microscope.

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## INTRODUCTION

In current times due to increased workload, Musculoskeletal Disorders are on a high rise.

Though prolonged usage of microscopes has implicated to various deleterious effects, there is still lack of understanding of role of ergonom-

ics in the field of pathologists and microbiologists [1].

As work demands awkward and static postures, high repetition, excessive force, excessive reaching, compression or contact stress, static exertions, and repetitive motions, laboratory technicians may be at increased risk for work related musculoskeletal disorder due improper posture while working on microscope which is often ignored. Numerous health problems are associated with every profession, likewise the hazards associated with improper posture while microscope use usually go unheard. So this study is aimed at estimating the prevalence of work related musculoskeletal problems among laboratory professionals working on microscopes and finding the awareness of correct ergonomics while working on microscopes in them.

## MATERIALS AND METHODS

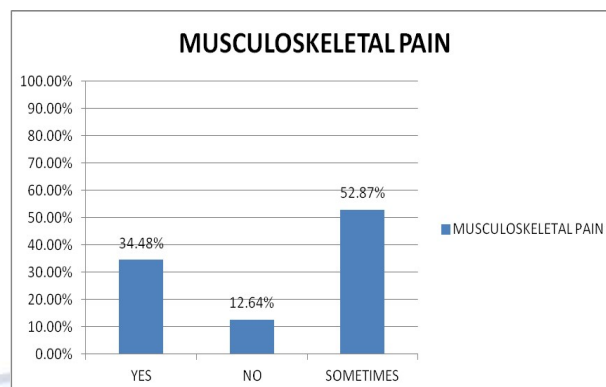
**Present study conducted as a questionnaire based study,** Total 100 laboratory technicians working on microscope were approached in different pathology laboratories, diagnostic centers for the study. A consent form along with a questionnaire was made which included 20 questions regarding their demographic details, work experience, work place description, pain assessment and knowledge regarding ergonomics. Consent was taken and questionnaires were collected. Data was stored in Microsoft excel 10 and analyzed.

## RESULT

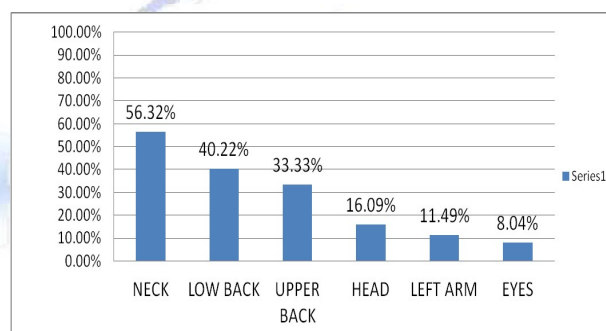
In all 87 laboratory technicians responded to the questionnaire. Out of which 47.12% were males and 52.87% were females. Participants between the age group 31-50 years were seen to be more affected compared to age group 21-30 years. Participants with a work experience of more than 10 years, working for 7 to 8 hours a day were maximally hit with musculoskeletal problems while those with work experience of >5, >2 and 1 year were less affected. About 51.72% laboratory technicians preferred chair modification of having an adjustable height and a low back support while 29.88% and 18.39% preferred chair with only an adjustable height and chair with only low back support respectively. Majority i.e.

about 67.81% laboratory technicians chose to lean towards the eyepiece while viewing through the microscope compared to 22.98% who practiced erect posture and 9.19% who leaned toward the chair.

**Graph 1:** Showing the musculoskeletal pain experienced.



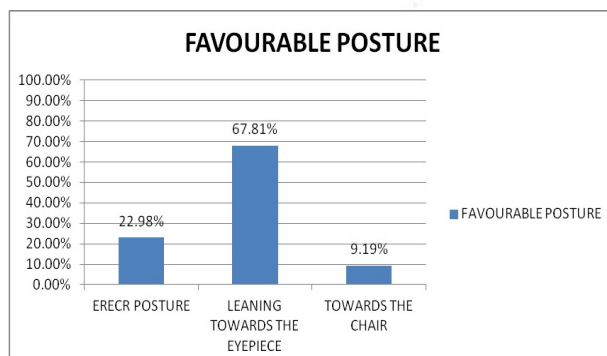
**Graph 2:** Showing the common sites of pain.



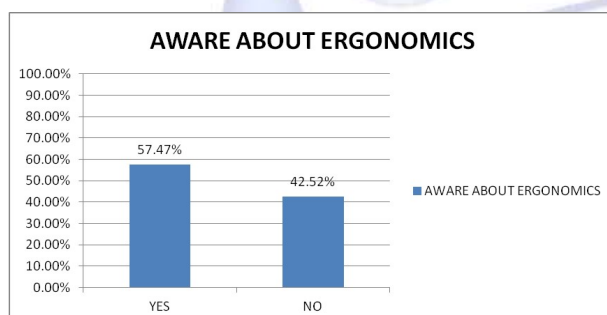
Regarding musculoskeletal pain, 34.48% laboratory technicians said they experienced musculoskeletal pain while 12.64% said they did not experience any musculoskeletal pain whereas 52.87% said they occasionally experienced musculoskeletal pain. Severity of pain was assessed with the help of numerical rating scale (pain assessment scale) which showed that pain was most experienced between the range 1 to 7 out of which 43.67% experienced a dull aching pain, 24.13% experienced sharp shooting, 18.39% radiating and 17.24% experienced stretch pain. 47.27% study population reported that the pain aggravated if breaks were not taken during the working hours and 52.87% said pain was relieved on taking rest. Despite a large no of technicians being affected with musculoskeletal pain, only 16.09% laboratory technicians had consulted a physiotherapist and 31.03% has consulted a doctor but the remaining 78.16% had just ignored. On assessing the knowledge about ergonomics, 57.47% were found to be aware about ergonomics in using microscope compared to 42.52% who were unaware and 81.06% were

found to be aware about the ideal sitting posture in using microscope, which was not seen to be practiced by a majority of the study population.

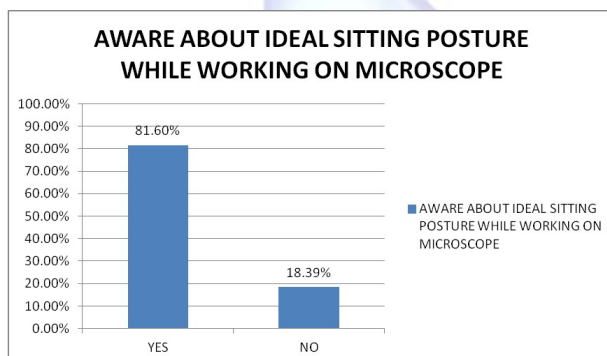
**Graph 3:** Showing the favorable posture.



**Graph 4:** Showing the aware about ergonomics.



**Graph 5:** Showing the aware about ideal sitting posture.



## DISCUSSION

87.35% of the study population show a prevalence of musculoskeletal problems, with neck 56.32%, low back 40.22%, upper back 33.33%, head 16.09%, left arm 11.49%, eyes 8.04% being the most commonly affected sites in decreasing order of severity. This result is similar to the study conducted by Anish Asok Gupta et al where 67% general pathologists and 70.3% microbiologists experienced neck and back pain [1] but differs from the study done by author Eshetu Lemma Haile where majority of complaints were ankle/ feet (21.7%) and knees 20.8% respectively [2].

8.04% experienced eye pain. The reason could be that the work of pathologists is associated with possibly eye-straining activities such as long lasting microscopy and computer work [3,4].

Female predominance seen in the study by Sandul Yasobant and Paramshivam Rajkumar [5] and was supported in our study, where females were seen to be affected 5.75% higher than the male laboratory technicians. Also study population between the ages 31-50 years were found to be maximally affected by musculoskeletal problems. This is because the bone mineral density begins to decrease in both men and women after 30 years of age, and is accelerated in women towards the menopausal age. This result contradicts to the study done by Cromie et al and Sandul Yasobant and Paramshivam Rajkumar, where younger age group of <30 yrs, with <5 years experience showed a greater chance of musculoskeletal problems [6] and author Eshetu Lemma Haile where participants within age group 22-33 years having work experience of 1-6 years were more affected with work related musculoskeletal pain.

About 55.17% study population working regularly on microscope for >10 years have a greater chance of developing musculoskeletal problems. This result is supported by author Maulik S, Iqbal R which shows daily microscope users with >9 years of experience are more prone to musculoskeletal problems [7].

About 67.81% population prefer leaning forward towards the eyepiece while working on microscope, which is a major factor for musculoskeletal pain compared to 22.98% and 9.19% who prefer erect posture and towards the chair respectively while working. This is a major factor for musculoskeletal pain as leaning forward towards the eyepiece causes prolonged static cervical, thoracic and lumbar spine flexion and protraction of shoulders for extended period of time. Left arm was found to be more affected with musculoskeletal pain. This may be due to the working style and hand placement of individual and also due to the comfort level with respect to the arm involved. The highest numbers of WMSDs reported were of those that affected the ankles or feet and the knees. However, the study performed in Iran [9] showed that



the lower back, neck, and knees were the most likely body parts to sustain work related musculoskeletal disorder [8].

To our surprise 81.60% laboratory technicians were aware of the ideal sitting posture while working on microscope and 57.47% laboratory technicians knew the role of ergonomics, yet the ideal sitting posture is not regularized in daily practice which possess a great threat of work related musculoskeletal problems on them.

## CONCLUSION

The study thus concludes that 87.35% laboratory technicians show a prevalence of musculoskeletal problems which is due to their working posture i.e. Leaning towards the eyepiece wherein there is prolonged static flexion of cervical, thoracic and lumbar spine causing neck and back pain. While 57.47% are aware of the correct ergonomics and know the ideal sitting posture while working on microscope, yet the ideal sitting posture is not regularized in daily practice which possess a great threat of work related musculoskeletal problems on them.

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**Conflicts of interest: None**

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