

# Prevalence of Musculoskeletal Disorder among College Students in Times of COVID-19 Pandemic - An Observational Study

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## ABSTRACT

**Background:** Musculoskeletal disorders are defined as disorders and/or injuries that affect muscles, tendons, skeleton, cartilage, ligaments and nerves. Due to Covid-19, educational institutions were shut down which led to dependency on online classes. Due to decreased physical activity and spending more time on electronic devices in incorrect postures may lead to musculoskeletal disorders.

**Purpose of study:** To find out the prevalence of musculoskeletal disorders among college students during Covid-19 pandemic to help students know the most prone body areas for musculoskeletal discomfort so as to plan for ergonomic modification and for uplifting musculoskeletal health.

**Methodology:** A 'Nordic Musculoskeletal Questionnaire' was filled by 250 college students by means of Google forms. Statistical analysis was done using Microsoft Excel 2007.

**Results:** Among 250 students 64.4% had at least one musculoskeletal symptom in the previous year. The affection was in Lower back (38%), Neck (36.4%), Shoulder (27.20%), Upper back (22%), Knee (13.60%), Wrist (13.20%), Ankle (12.40%), Elbow (6.80%), Hip (6.40%).

**Conclusion:** This study concluded that due to increased screen-time on electronic devices during COVID-19 led to high prevalence of musculoskeletal disorders (64.4%) in college students. The highest musculoskeletal disorder was found in Lower back region (38%).

**Key words:** Musculoskeletal disorder, College students, COVID-19

## INTRODUCTION

Musculoskeletal disorder can be defined as "conditions comprise more than 150 diagnoses that affect the locomotor system; that is muscles, bones, joints and associated tissues such as tendons and ligaments, as listed in the International Classification of Diseases" (WHO, 2019).<sup>[1]</sup> They are caused by forceful or repetitive movements or a poor working posture. Symptoms may include tenderness, aches and pains, tingling, stiffness and swelling.

The COVID-19 pandemic has given rise to a multitude of profound changes in the daily habits of millions of people. Many

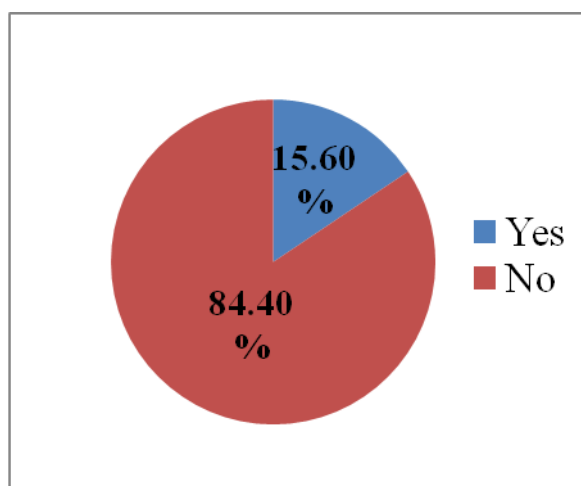
of these changes are due to lockdown conditions implemented by countries around the world.<sup>[2]</sup> COVID-19 pandemic has forced people to stay indoors. All educational institutions were shut down and they started online education, this led to dependency on online classes. Thus students were spending more time on laptops and smart phones both to support their academic activities and in their free time.<sup>[3]</sup>

In students receiving online education, additional immobility for extended duration and listening to classes in anti-ergonomic positions may cause pain and musculoskeletal alterations, especially in the upper limb and spine.<sup>[3]</sup> Computer

usage that has been more prevalent by distance education may also pose a potential obstacle to student's regular physical activity and exercise.<sup>[4]</sup> Staying at static position by repeated movements such as using a keyboard, clicking on a mouse, usage of the body in inadequate ergonomic conditions may lead to musculoskeletal disorders.<sup>[5]</sup> The absence of ergonomic classroom furniture at home may impede the adoption of a healthy posture and may promote the onset of musculoskeletal disorders.<sup>[6]</sup>

Demand for online classes is growing during COVID-19 pandemic but there are no relevant training programs to make student understand or prevent postural problems related to prolonged screen usage.<sup>[3]</sup> Musculoskeletal pain in students leads to discomfort itself, which may limit the students' daily leisure time, increases psychical stress. Recurrent musculoskeletal pain may impair study performance and affect students' future working capacity and health in their transition from university to professional life.<sup>[2]</sup> So, here arises a need of this study to know the most prone body area for musculoskeletal disorder so as to plan for ergonomic modification and for uplifting musculoskeletal health of students. The main aim of this study is to find out the prevalence of musculoskeletal disorder among college students in times of COVID-19 pandemic.

## RESULTS



Graph-1: Prevalence of MSD before COVID-19

## METHODOLOGY

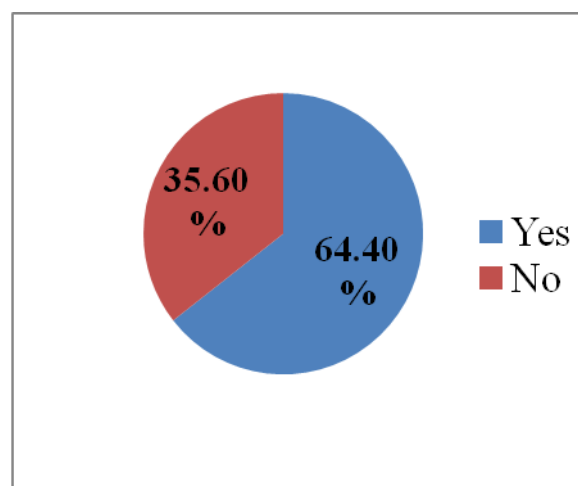
A cross-sectional study was conducted from September 2020 to November 2020. 250 undergraduate college students were selected by convenience sampling. A Google form of Nordic Musculoskeletal Questionnaire was created and sent to various undergraduate college students of Ahmedabad and Vadodara city.

**Inclusion criteria:** Willingness of subject to participate, Both male and female college students, Age group - 18 to 24 years, students who are attending online classes for studies.

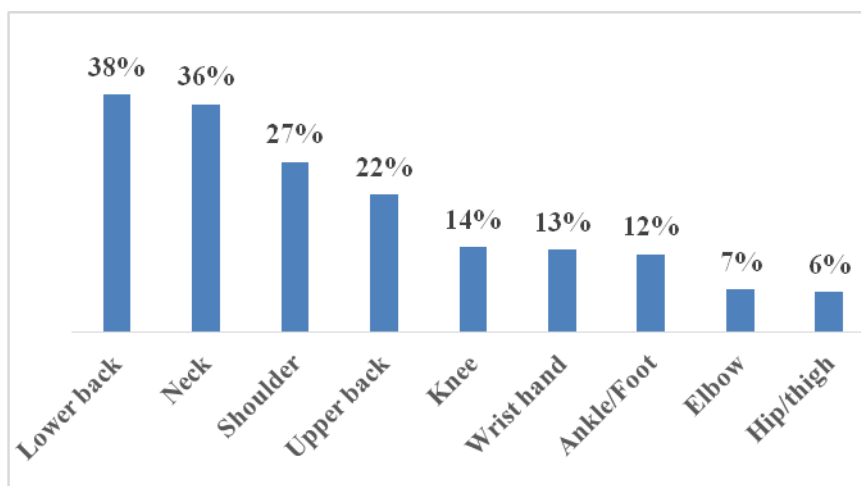
**Exclusion criteria:** Any recent injury/trauma/fracture within 1 year, History of cardiovascular or respiratory problems, On medication or analgesics, Incomplete questionnaire filled by students.

### Outcome Measure: Nordic Musculoskeletal Questionnaire (NMQ)

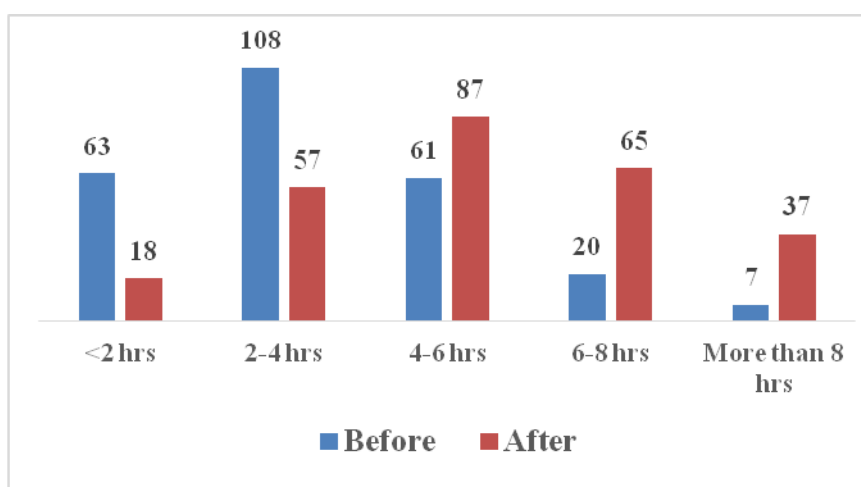
NMQ interrogates ache, pain or discomfort experienced in the nine body parts (neck, shoulders, back, elbows, wrists/hands, waist, hips/thighs, knees, ankles/feet) during the last 12 months, during last 7 days with binary choice questions (yes or no).



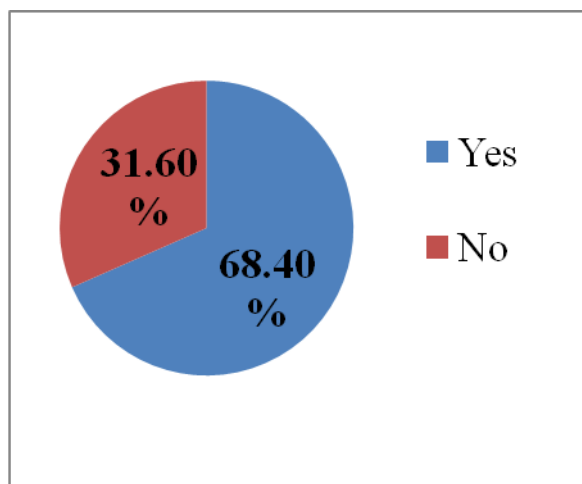
Graph-2: Overall prevalence of MSD during COVID-19



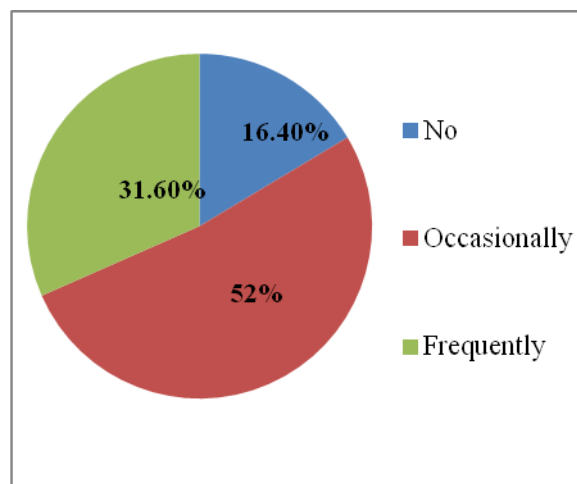
Graph-3: Prevalence of MSD in different body regions



Graph-4: Screen time usage before and during COVID-19



Graph-5: Physical activity before lockdown



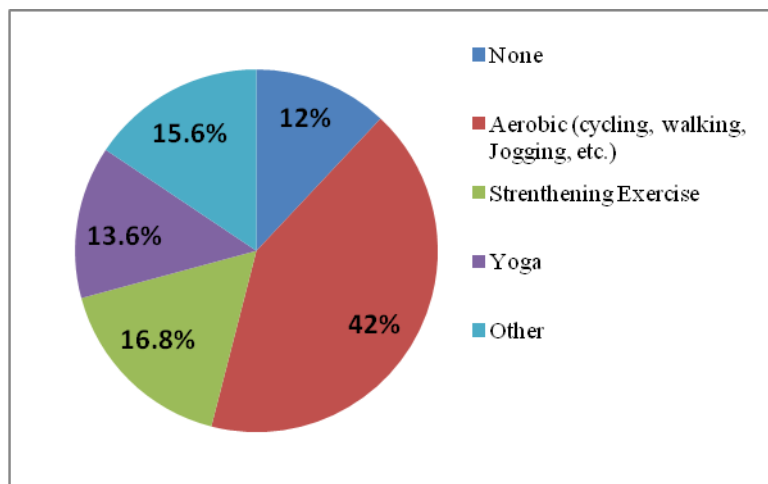
Graph-6: Physical activity during Covid-19

Statistical analysis was done using Microsoft Excel 2007. 250 subjects participated in the study. Mean age of the subjects was 19.6 years. Graph-1 illustrates 15.6% prevalence of MSD before COVID-19. Graph-2 demonstrates 64.4% prevalence of MSD during COVID-19. Graph-3

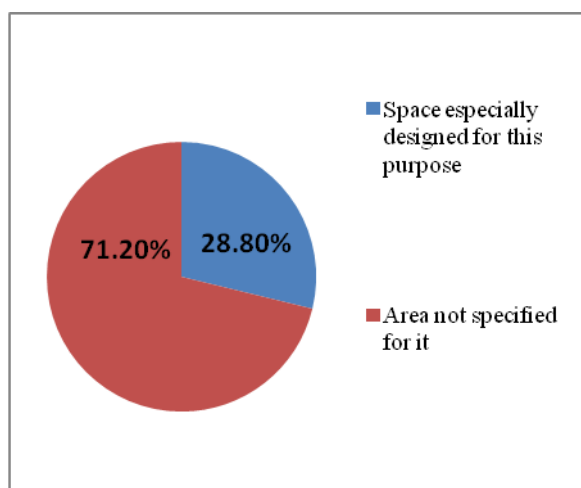
demonstrates prevalence of MSD in different body regions which is highest in lower back (38%) followed by Neck (36%) and Shoulder (27%). Graph-4 illustrates screen-time usage before and after COVID-19. Graph-5,6,7 demonstrate physical activity before, during Covid-19 and type of

physical activity respectively, which shows highest number of students did aerobic exercise(42%). Graph-8 shows 71.2%

population of students has not use specific workplace area for online classes.



Graph-7: Type of physical activity during COVID-19



Graph-8: study area for online classes

## DISCUSSION

The present study was conducted to see the prevalence of musculoskeletal disorder among 250 college students during COVID-19 pandemic. Result clearly suggests that there is high prevalence of musculoskeletal pain among college students during COVID-19 which has been increased from 15.6% to 64.4%.

Students' average screen-time usage has increased from average 3 hours before lockdown to 5 hours during lockdown. Pre lockdown around 70% students were doing exercise, whereas during lockdown around 70% students were doing physical activity occasionally or not at all. Also, 42% students were doing aerobic exercise like

walking, running, cycling, etc., which might not be possible in the initial phase of lockdown. 71.2% population of students, has not use any specific ergonomically designed area to attend online classes, which can also adversely affect the students' posture.

Sometimes students did not have chair at home that is ergonomically standard and students often sat with slouched posture, it will reduce the muscular effort that is required to maintain a seated position will cause the ligaments and muscles which support the spine happens the increasing the tension. So, seated position is possible to cause the upper and lower back pain. [3] Prolonged static contraction of the skeletal muscles of the back causes impairment of the blood flow to the muscles (ischemia), together with oedema and accumulation of the waste metabolites which will trigger the pain spasm. [5]

As stated by Burdorf et al., a sustained sedentary job in a forced non-neutral trunk posture is a risk factor for LBP. [7] Due to low-grade activation of lumbar muscles while sitting, the load is conducted by passive structures such as ligaments and intervertebral discs. Because of the viscoelasticity of these structures and deactivation of lumbar muscles, the lumbar

spine may be predisposed to deconditioning and LBP.<sup>[8]</sup>

Forward head posture is a known cause which puts lot of pressure on cervical and lumbosacral spine, intervertebral disc and the pain resulting from the respective nerve territories. Fixed postures of neck while focusing on the monitor probably caused severe pain in the neck and shoulder muscles. The persistent pain in the shoulder area is also attributable to static loading or isometric contraction of muscles of neck, shoulder and arms in order to maintain the position of function.<sup>[3]</sup> During working activities in front of the computer, upper trapezius muscle was the most exerted muscle that leads to the generation of internal forces within the body in which it will increase the muscle tension and pain in the shoulder and neck.<sup>[5]</sup>

Wrist and hand pain may be due to overuse of touch screen devices. Repetitive typing or clicking on mouse can cause micro trauma in carpal tunnels.<sup>[3]</sup>

Erik and Smith (2011) confirmed by the systemic review that prevalence of MSD ranges between 39% and 95% in which most prevalent body sites to be the neck, back and upper limbs.<sup>[9]</sup>

The important limitation of this study is small sample size. Large sample size would be more helpful. According to screen-time usage and type of electronic device wise prevalence of musculoskeletal pain can be carried out in future. Musculoskeletal disorder has a variety of simultaneous influences that need to be accounted for in future studies.

#### **Clinical implications:**

- Teachers, parents and students must be trained in fundamentals of workstation ergonomics.
- Students should advise for deskbound stretches.
- Students should be encouraged to have a frequent micro breaks from their sitting.
- Students with musculoskeletal disorders should be treated according to their condition.

## **CONCLUSION**

This study concluded that due to increased screen-time on electronic devices during COVID-19 led to high prevalence of musculo-skeletal disorders (64.4%) in college students. The highest prevalence was found in Lower back region (38%).

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**Conflict of Interest:** None

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