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PREVALENCE OF MUSCULOSKELETAL DYSFUNCTIONS IN HEALTH CARE STUDENTS USING LIBRARY FOR PROLONGED PERIOD –A CROSS-SECTIONAL STUDY.

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Abstract: Introduction: Non-ergonomic, uncomfortable posture for extended period of time increases the risk of musculoskeletal disorders in students. This study uses REBA Scale to detect the level of musculoskeletal dysfunction. This ergonomic assessment tool uses a systematic process to evaluate whole body postural MSD and risks associated with job tasks and to plan different physiotherapy interventions for the same. **Aim**: The aim of this cross-sectional study was to evaluate musculoskeletal dysfunctions in students sitting in library for prolonged period. **Procedure**: 146 health care students sitting in the Central library and Samarth Nursing College Library participated in this cross-sectional study. Assessment included Numerical Pain Rating Scale and Postural Analysis based on REBA scale and score was interpreted. **Result**: According to this study, 82% of students were having medium risk of developing Musculoskeletal disorders whereas remaining 12% and 6% showed high risk and low risk respectively. **Conclusion**: The current findings are consistent with earlier research that demonstrated healthcare students have an increased risk of musculoskeletal problems.

Keywords: Musculoskeletal Dysfunction, REBA, NPRS

INTRODUCTION

The tendency to sit for extended periods of time was encouraged by human evolution, which altered the body's biomechanical and physiological makeup. Adopting this posture in a learning environment might lead to musculoskeletal issues and physical discomfort that may or may not be related to learning. People in a variety of professions have benefited from ergonomics, particularly when it comes to using the right seating furniture. The majority of students spend a significant portion of their day seated, and anthropometric and biomechanical studies have shown that the conventional chairs that are currently in use are not ideal for their physical type due to their lack of adjustability. When people adopt bad postures for extended periods of time, their bodies experience discomfort and pain.[1] The college students adopted a lifestyle of sitting with uncomfortable, non-ergonomic positions and experienced various musculoskeletal and other health problems.[2]

A stable alignment of the body that can be maintained with the least amount of energy expenditure and the least amount of stress on body components is the ultimate goal of sitting posture. In addition to the gravitational moments that apply to standing posture, we also need to take into account the contact forces that are generated when different body parts get in contact with different chair components, such as the seats and the head, back, and foot rests. The chair or stool's placement and degree of support for different body parts can alter how the body parts are positioned and, consequently, how much stress is placed on the body structures.[3]

Additionally, compared to both relaxed erect and slouched sitting, there is more muscle activation in the active erect sitting posture. The line of gravity (LoG) is just slightly anterior in relaxed erect sitting compared to active erect sitting. Less muscular activity is needed in the slouched position than in the active erect posture because the LoG is posterior to the hips and spine and the chair's back is supporting the body's weight.[3]

In addition to increasing spinal compression pressures when seated without support, this slumped posture causes distortion of the intervertebral discs, which are compressed in the front and separated in the rear. Consequently, extended periods of sitting have been linked to disc herniations. In addition, when the intervertebral discs deteriorate, more weight is carried to the facet joints and pressure is applied to the spinal column's neurons. The lumbar vertebrae must be in their natural standing posture for the person to "sit up straight" and for their weight to be supported by the spinal muscles. This static muscular loading can cause postural pain over extended periods of sitting, particularly in people who are prone to back problems. While sitting by itself is not strongly associated with lower back discomfort, multiple studies have demonstrated that sitting in conjunction with other factors, such as uncomfortable postures, significantly increases the risk of lower back injury.[2]

The dynamic relationship that characterizes body posture defines the way the skeletal muscles, in particular, adjust to the cues that they receive. The act of sitting is characterized by the pelvic ischial tuberosities and the surrounding soft tissues bearing the majority of the body weight. The human column biomechanical model was not designed to conduct repetitive actions, maintain static postures, or spend extended amounts of time sitting down. Long periods of sitting have been linked to biomechanical issues for decades. These issues include compression of the diaphragm and viscera, a decrease in venous return from lower limbs, and an overload of stabilizing muscles in the spinal column.[1]

In order to obtain aid for the creation of physiotherapeutic interventions that enable the modification of the furniture used by these individuals, as well as for a proposal for behavioural changes, it is essential to comprehend the relationship between extended sitting and the presence of pain in health care students.

Assessment tools which will be used here are REBA(Rapid Entire Body Assessment Tool) and NRS (numerical pain rating scale).

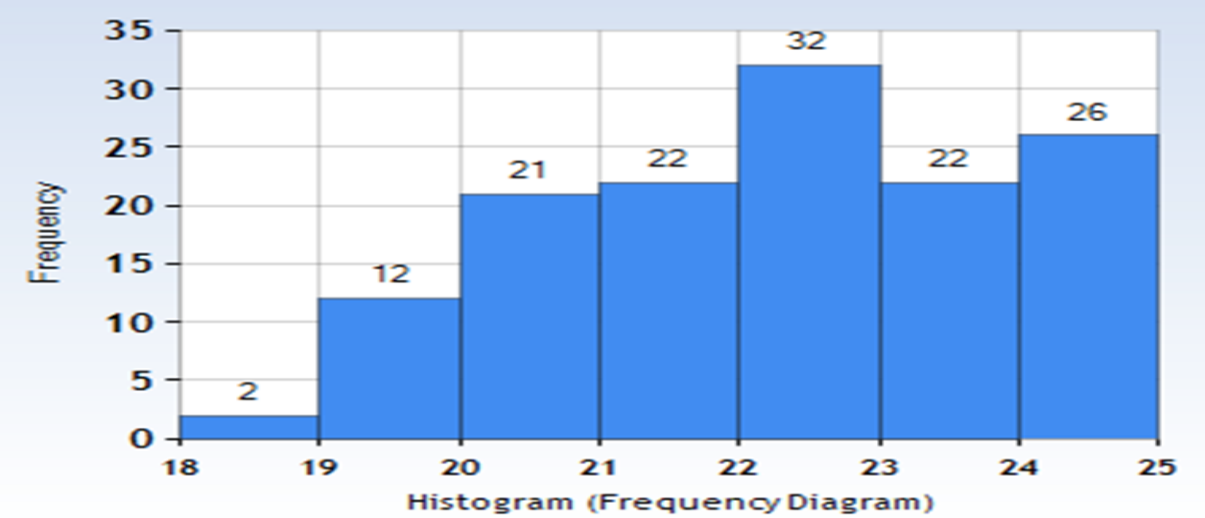
REBA: This ergonomic assessment tool uses a systematic process to evaluate whole body postural MSD and risks associated with job tasks. A single page worksheet is used to evaluate required or selected body posture, forceful exertions, type of movement or action, repetition, and coupling.
The REBA was made to be simple to use without requiring expensive equipment. All you need is a pen and the worksheet. Each of the following body parts will receive a score from the evaluator using the REBA worksheet: wrists, forearms, elbows, shoulders, neck, trunk, back, legs, and knees. Tables on the form are used to build the risk factor variables once the data for each location is gathered and scored. This results in a single score that indicates the degree of MSD risk.[8,9,10,11]

NRS: A numeric rating system (NRS) usually consists of a set of numbers that, along with verbal anchors, indicate the whole range of possible pain intensities. Patients typically assign a number to their discomfort, ranging from 0 to 10, 0 to 20, or 0 to 100.On the pain continuum, zero indicates "no pain," while ten, twenty, or one hundred indicates the other extreme (e.g., "the most intense pain imaginable," "pain as intense as it could be," "maximum pain"). The NRS is easy to administer and score, and it can be done so both orally and in writing. It is also straightforward and easy to understand.[12]

Methodology:

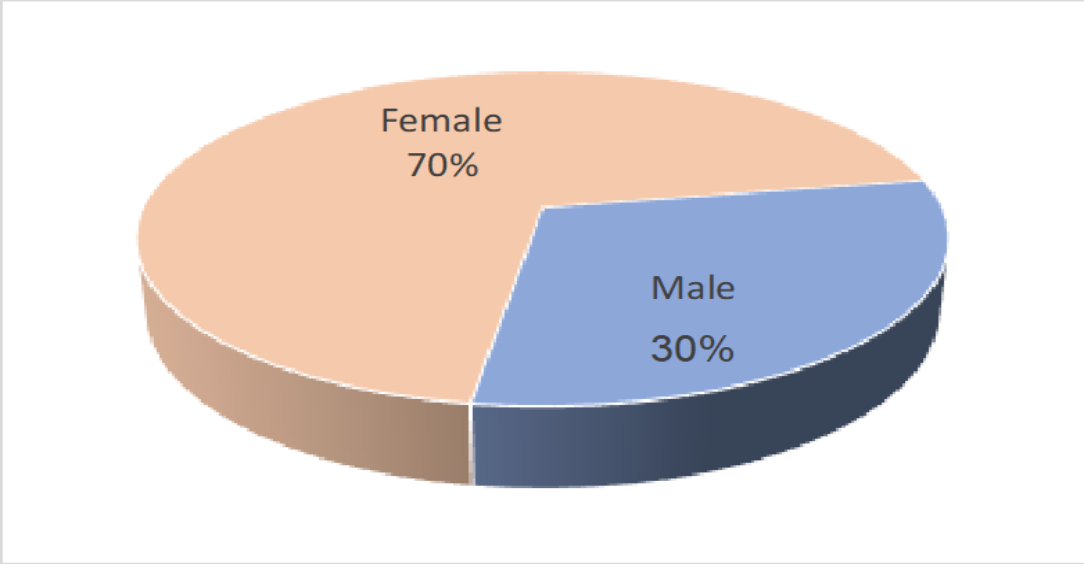
This is a cross sectional study including Undergraduate Health Care students with a sample size of 146. Stratified Random Sampling method was opted for the data collection where students from MBBS, BPTh, Nursing and BPMT were approached. Duration of this study was 3 months were Ethical approval by the Institutional Review Board was taken and BKL Walawalkar Rural Medical College, BKL Walawalkar College of Physiotherapy and Samarth Nursing College were approached for the permission. After attaining permission, students from the above mentioned colleges were approached and their willingness to participate was observed. Aim and objectives of the study were explained. According to the inclusion and exclusion criteria, students were screened. A consent form was given to all the participants. A consent form relevant to this study was asked to be filled out and signed by the participants once they had received verbal information about it, attesting to the fact that they understood everything about the study's requirements and procedures. Along with a consent form, Rapid Entire Body Assessment (REBA) was given. 'Consent forms' and 'questionnaire' were filled by the students and data was analysed using R software version 4.0.2. Sampling criteria included all full time enrolled health care speciality student's willingness and the age group included was 17-25 years. Physical trauma and incomplete questionnaires were excluded. Outcome Measure used was Rapid Entire Body Assessment (REBA) and Numeric Pain Rating Scale (NPRS).

RESULTS



Age Wise Distribution

Age in years	
Mean	21.9
Standard Deviation	1.77
Sample Size	146

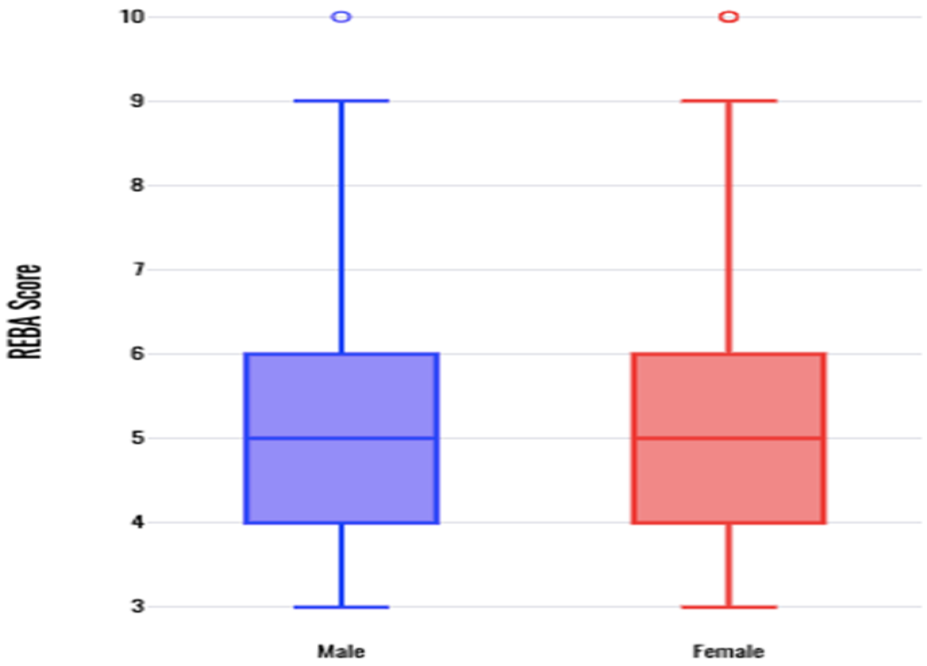


Gender Wise Distribution

Out of 146 participants, 70% participants were Female and 30% were Male.

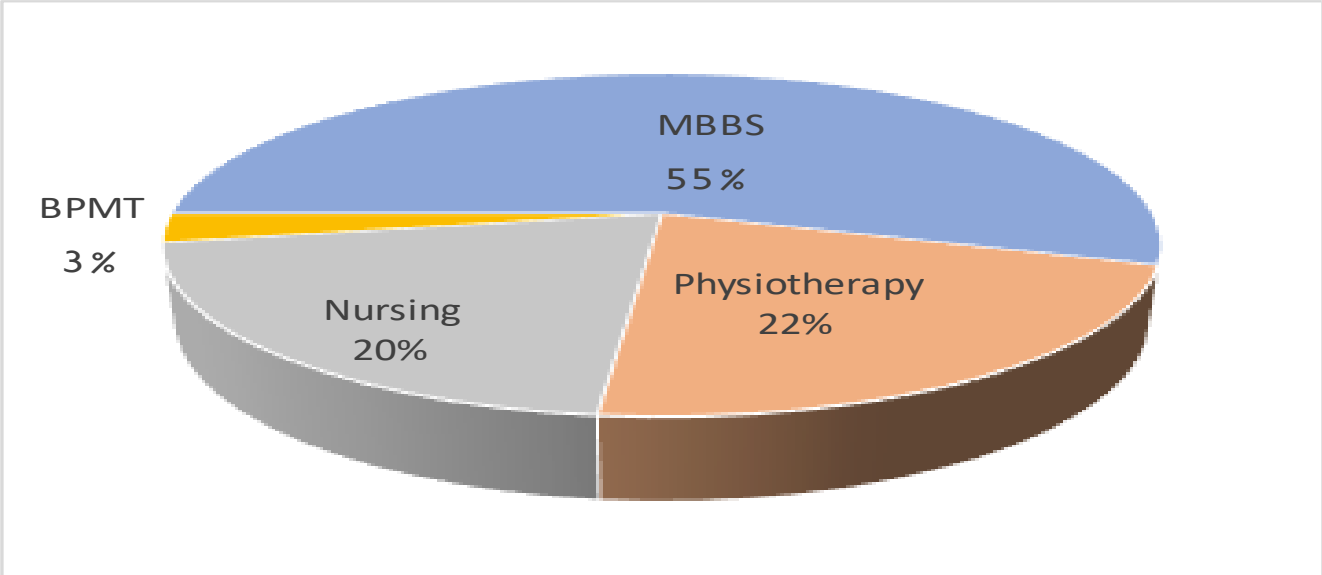
	Male	Female
Sample size (n)	44	102
Minimum	3	3
Q1	4	4
Median	5	5
Q3	6	6
Maximum	10	10

REBA SCORE

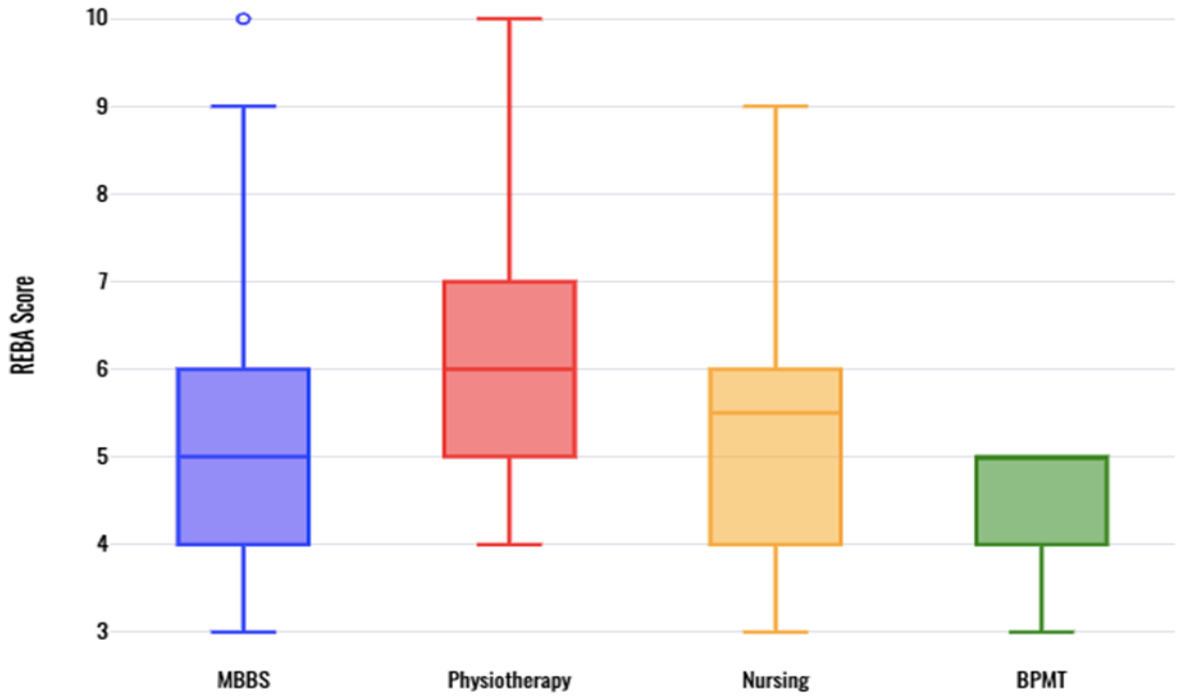


Row Labels	Low risk	Medium risk	High risk	Total
Female	4	85	13	102
Male	5	35	4	44
Total	9	120	17	146

Specialty Wise Distribution.

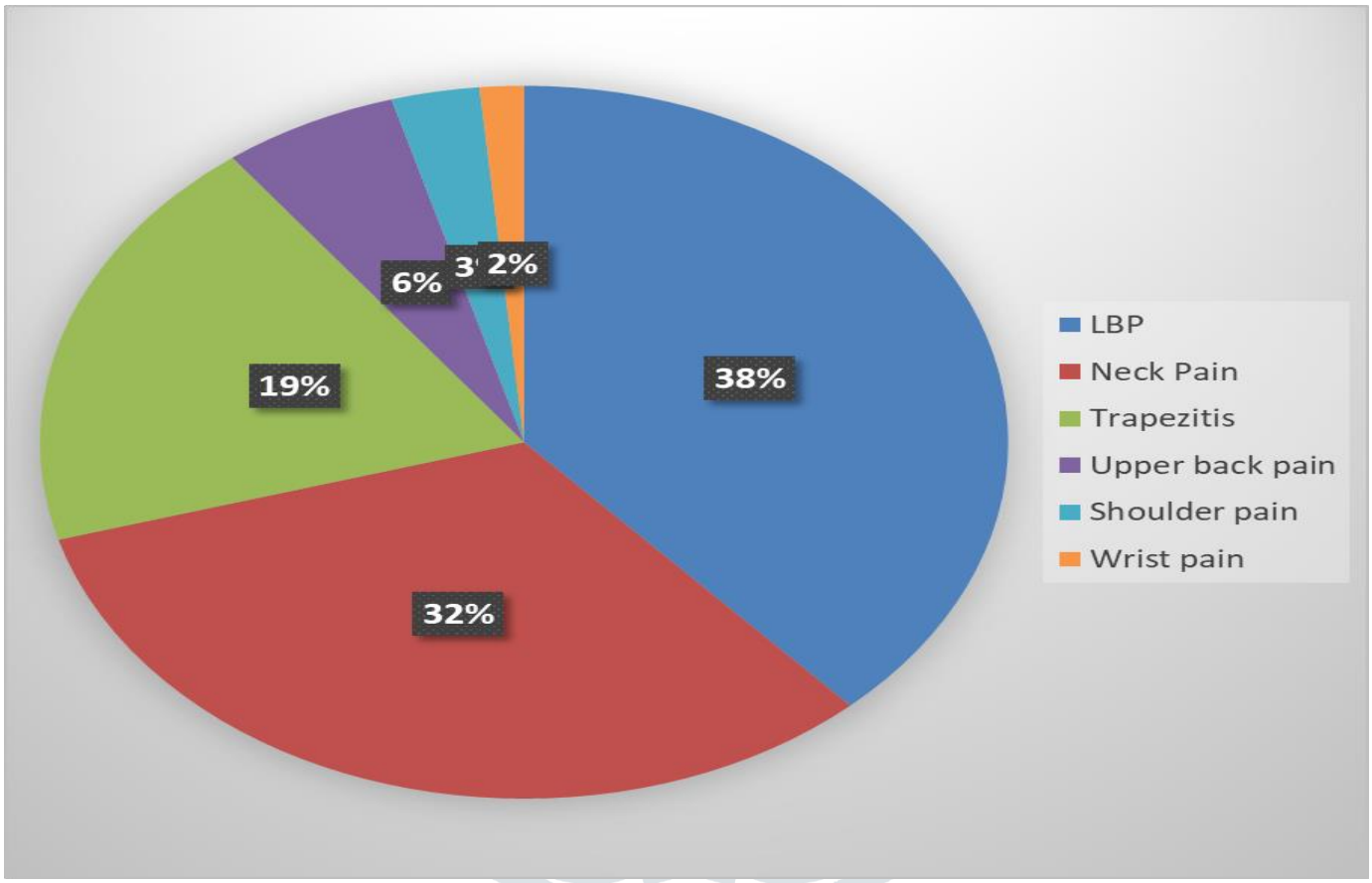


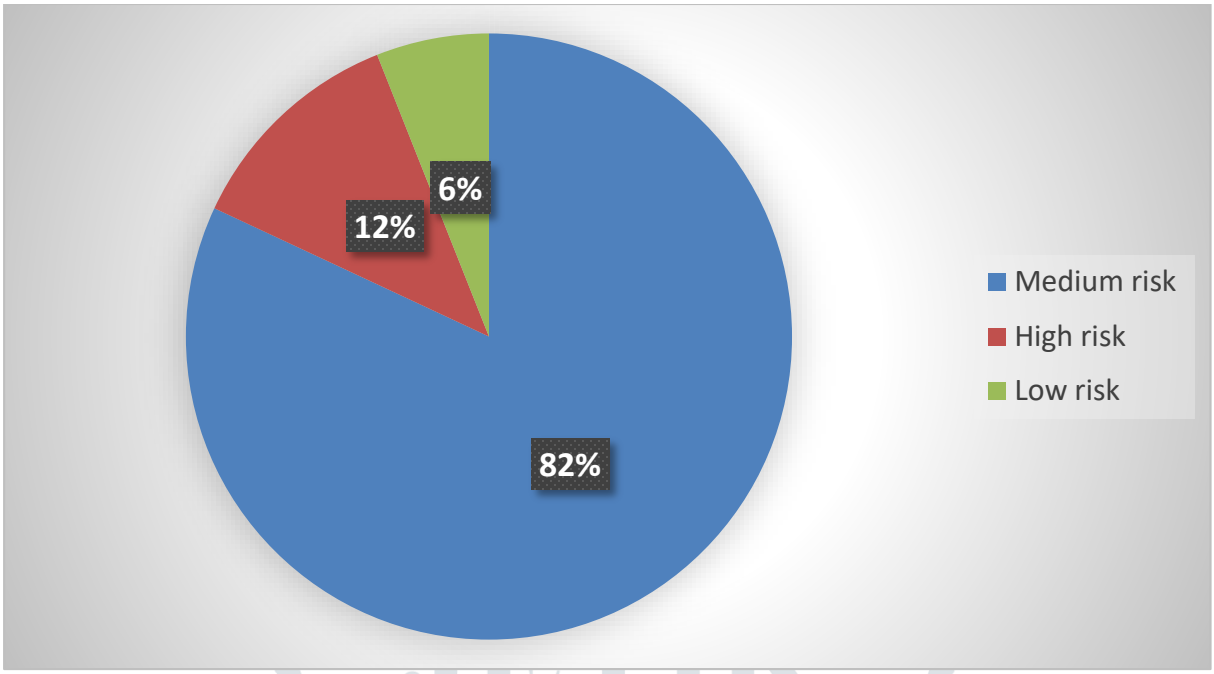
Speciality	Low risk	Medium risk	High risk	Total
BPMT	1	3		4
MBBS	7	63	10	80
NURSING	1	28	1	30
PHYSIOTHERAPY		26	6	32



SITE OF PAIN

Pain Site	Total-69	
Low back pain	26	38%
Neck pain	22	32%
Trapezitis	13	19%
Upper back pain	4	6%
Shoulder pain	2	3%
Wrist pain	1	2%





Musculoskeletal dysfunction risk

MSD Risk	Percentage
Medium risk	82%
High risk	12%
Low risk	6%

DISCUSSION

The current cross-sectional study investigated the occurrence of pain and musculoskeletal disorders among health care students studying in the library for prolonged period. Other important objectives of this study were to evaluate posture and to determine risk levels for developing musculoskeletal disorders among these library going students. Out of 146 participants, 80 MBBS students, 32 Physiotherapy students, 30 and 4 were Nursing and BPMT students respectively.

The results of this study showed that participants' lower back, neck, shoulder, and wrist regions all had a significant prevalence of musculoskeletal pain. In all, 69 (47%) students reported pain.

The prevalence rates of pain in the neck, trapezitis, upper back discomfort, shoulder, and wrist regions were 22, 13, 4, 2, 1, and about 26 respondents reported having lower back pain in the previous one to two years.

In accordance with the most prevalent site of the body for reported pain, the present results showed that among responders, disability in the lower back was the most common disorder in these students. This finding is consistent with previous studies which have reported lower back pain as a common disability due to prolonged sitting[1].The prevalence of Musculoskeletal Dysfunction among library students is a significant concern with implications for their academic and professional wellbeing. Among these students' higher prevalence of pain was seen in physiotherapy students probably due to the awkward postures attained during application of manual techniques leading to pain.[15]

In addition to evaluating the prevalence of musculoskeletal disorders, postural analysis was performed using REBA to detect the level of musculoskeletal disorder risk. In the dynamic field of healthcare, where physical strain and ergonomic challenges are prevalent, it is crucial for students to develop an understanding of ergonomic assessment tools to ensure the well-being of both patients and healthcare workers. One such tool gaining prominence is the Rapid Entire Body

Assessment (REBA) scale. This discussion explores the integration of the REBA scale into health care education and its implications for student learning and professional practice.

The current findings showed that level of musculoskeletal dysfunction risk was medium to high, and 82% of the students (based on the REBA tool) were at medium for developing musculoskeletal disorders; the prevalence of high-risk level and low risk level were 12% and 6% respectively.

The current findings are consistent with earlier research that demonstrated healthcare students have an increased risk of musculoskeletal problems.
The results of this study suggest that health care students should receive training on good posture for both clinical and library work.
The results of the literature analysis are consistent with the study's significant incidence of pain in the head, neck, shoulders, and trapezius muscle region. The finding might be connected to uncomfortable seating, inappropriate furnishings, or even extended durations of sitting that promote bad postures.[16]
Despite their awareness of the importance of good workplace ergonomics, health professionals have a significantly greater prevalence of musculoskeletal disorders.[1]

Long-term improper posture along with the increased strain on the discs, thighs, and buttocks are major contributors to the development of physical issues, fatigue, and discomfort symptoms.

The current findings indicate that it is necessary for health care students to be trained for optimal posture during clinical work.[13]

By educating and teaching students on ergonomics, good posture, and workstation arrangement, you can reduce the likelihood of musculoskeletal problems and encourage them to adopt healthy behaviours. Environmental Modifications is essential for students studying in libraries who have varying BMIs. Enhancing library rooms with ergonomic features like movable furniture, ergonomic accent pieces, and dedicated rest places can foster a more encouraging and health-promoting atmosphere for students' musculoskeletal systems. Promoting frequent pauses, stretches, and physical movement can help release tense muscles, increase blood flow, and lessen the chance of experiencing pain and discomfort in the musculoskeletal system.

Apart from ergonomics, physiotherapy intervention is also an effective method for the prevention of risk of low back pain. Physiotherapy intervention includes various exercises and stretches for avoiding the further pain and to improve overall strength.[17]

CONCLUSION

The study concluded that 82% of students were having medium risk of developing Musculoskeletal disorders whereas remaining 12% and 6% showed high risk and low risk respectively.

LIMITATIONS

- Sample size can be increased.
- Other health care professions can be included.
- Single centered study.

SUGGESTIONS

- Prevalence of awareness towards the appropriate ergonomics as well as optimum posture can be studied.
- Objectivity of the postural changes leading to Musculoskeletal dysfunction can be studied.
- Interventions benefitting towards the treatment and prevention can be studied.

Conflict of Interest – All authors shows no conflict of interest.

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Ethical Clearance – Letter from Institutional Review board was obtained. Letter number is SVJCT/BKLWCOP/83/2023-24 and its dated on 19/03/2024.

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