

CLINICAL IMPLICATIONS OF ANATOMICAL POSTURES AND THE BODY MECHANICS - AN OBSERVATIONAL STUDY

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Abstract

Background: Maintaining proper posture entails teaching your body to move, sit, stand, and lie in ways that minimise the stress on your supporting muscles and ligaments as you move or bear weight. The use of one's body to create motion that is safe, energy-efficient, anatomically and physiologically efficient, and preserves balance and control is known as body mechanics. An improper working position raises the possibility of physical harm. Being cognisant of your posture combined with knowledge of good posture allows for deliberate correction. **Materials and Methods:** The study is cross-sectional study of descriptive nature to assess the knowledge, perception, and attitude towards the maintenance of proper body postures of population of Government Medical College, Akola. **Result:** The mean age of participants is 19.9 years old (Figure 1). The mean weight of participants is 52.8 kg. The mean height of participants is 162.3 cm. The dominant limb of most participants is right (131 or 91.6%), some of them use left limb as their dominant limb (11 or 7.7%) and only 1 (or 0.69%) participants use both limbs. **Conclusion:** It may not take much work to change clinical work habits to prevent chronic pain issues in the medical field. These practices include regular strengthening exercises, frequent brief breaks, and appropriate use of ergonomic equipment.

INTRODUCTION

To avoid being overly rounded forward or too arched back in what is known as a critical "C" position, one should have good posture when the spine is in a "neutral" or careless "S" position.^[1] Maintaining proper posture entails teaching your body to move, sit, stand, and lie in ways that minimise the stress on your supporting muscles and ligaments as you move or bear weight.^[2] In contrast to sitting, when the spine is thought to be comfortably straight, standing positions the spine in a neutral, healthy position. Neutral posture allows for optimal muscle and organ function while reducing the chance of injury and structural alterations.^[3-5] Permanent back injuries that result primarily from patient handling consistently rank among the top occupations for healthcare workers. Research on back pain in healthcare professionals has demonstrated a link between back pain symptoms and bad posture.^[6-9] The United Kingdom's Royal College of Physicians produced a paper that emphasised the necessity of providing advice on back injury and pain reduction to all

healthcare personnel.^[10] According to an assessment on the health and welfare of National Health Service employees, early therapies for common musculoskeletal issues including lower back injuries should be available, as these are one of the main reasons why employees get sick and miss work.^[11-14] For several occupations, a clear correlation has been established between fixed postures and musculoskeletal disorders (MSDs), which include pain, weakness, and paraesthesia. All age groups have low back discomfort often.^[15,16] Most people have at some point in their lives dealt with back discomfort. The risk of low back pain, or LBP, is higher for healthcare professionals.^[17] Many risk factors for low back pain have been identified, including physical labour, psychological issues, leading a sedentary lifestyle, and socioeconomic status.^[18-20] This made it necessary for undergraduate students to use back pain prevention techniques. There are few reliable reports of low back pain in medical students in the literature. The extensive study hours required by medical college curricula contribute to medical students' sedentary lifestyles

and increased risk of recurrent episodes of back discomfort.^[21] Undergraduate students are becoming less physically active as a result of using computers and laptops more frequently. The occurrence of back pain may also be influenced by poor posture when studying.^[22] The ability to walk on two feet is said to have been a significant advancement in human evolution and is what sets hominids apart. Humans are therefore more evolutionarily suited for long-distance travel. Abnormal gait can arise from either neurodegenerative or developmental factors.^[23] The use of one's body to create motion that is safe, energy-efficient, anatomically and physiologically efficient, and preserves balance and control is known as body mechanics. An improper working position raises the possibility of physical harm. It describes the process of effectively using the body to carry out tasks, including bending the body, lifting someone or something heavy, extending an arm, and sitting, standing, or lying down. Being cognisant of your posture combined with knowledge of good posture allows for deliberate correction.^[3,7] The study will assist in gathering data regarding medical students' understanding of body mechanics techniques and will be useful in creating a curriculum for teaching medical students about these techniques, which will further lower the morbidity associated with musculoskeletal injuries.

In light of this, an effort was made to conduct a questionnaire-based cross-sectional study to gauge the level of awareness and understanding of the advantages of good posture and body mechanics of the students at a tertiary care medical college of Maharashtra.

MATERIALS AND METHODS

Study type and design: The study is cross-sectional study of descriptive nature to assess the knowledge, perception, and attitude towards the maintenance of proper body postures of population of Government Medical College, Akola.

Participants and data collection: A sample of 143 MBBS undergraduate students at Government Medical College and Hospital in Akola, India who satisfied the following inclusion criteria—medical students of any age or gender who are willing to engage in the study—were given the questionnaires. Students with spine abnormalities and gait impairments, as well as those who engage in other occupations that necessitate forced postures, were excluded from the study based on the following criteria.

A structured questionnaire was utilised for the purpose of gathering data. Questions about the recipient's age, gender, and other sociodemographic details; ergonomic features (height, weight, dominant limb, working chair characteristics, etc.); medical information; musculoskeletal demands; posture-related queries; and tools and exercises were all included in the questionnaire. To verify validity and clarity, a group of students participated in a pilot test

of the questionnaire before it was finalised. The Department of Community Medicine verified the questionnaire. The questionnaire was created with an estimated 10-minute completion time in mind. The students were questioned after completing the questionnaire to address any questions and supply any missing information.

Data analysis: Simple statistical analysis methods were used to analyse the data, which were presented and analysed as numbers (n), percentages (%), and means. Pie charts are employed in the visualisation of dimensional data. To make the data easier to understand, it is mostly used to display the proportions of different categories with comparable sizes. The study is approved by the Institutional Ethics Committee (IEC) before it is started.

Ethical consideration for participants: Only those who volunteered and filed a written consent form were included in the study, in order to protect the participants' ethical rights. Participants were informed of the study's goal and methodology prior to the distribution of questionnaires.

RESULTS

The questionnaire was completed by 143 medical students. The sample population consist of 99 (69%) female participants and 44 (31%) male participants GMCH, Akola. It mainly consists of information about demographic data, medical information, Knowledge and body mechanics techniques practices, practices of participants, relation of proper posture and study, the relation of exercise with proper posture. The mean age of participants is 19.9 years old [Figure 1]. The mean weight of participants is 52.8 kg. The mean height of participants is 162.3 cm. The dominant limb of most participants is right (131 or 91.6%), some of them use left limb as their dominant limb (11 or 7.7%) and only 1 (or 0.69%) participants use both limbs. To assess the students' awareness, few questions were included in the questionnaire regarding the working chair. The type of chairs used by students is tabulated in the form of pie-chart in [Figure 2].

When participants were questioned about the backrest and comfortability, 98 out of 143 (68.5%) responded negative about their working chair while 41 out of 143 (28.7%) were satisfied and 04 out of 143 (2.8%) has not answered the question.

In this study % of low back pain is 69.9% (n=100 out of 143). The data shows, 22.4% (n=32) participants follow preventive measures to avoid acute low back pain while 74.1% participants did not follow any preventive measures and 3.5% (n=5) has not answered the question. Types of preventive measures followed by respondents to reduce acute low back pain are shown in proportion in the form of pie-chart in Figure 3. History of musculoskeletal disorder or fracture is present in only 7.7% of the study participants (n=11 out of 143).

Different framed questions were asked to the participants about knowledge and body mechanics techniques.

The study revealed that the knowledge of body mechanics was known to only 37.8% (n=54) participants and 53.8% (n=77) has no idea about body mechanics principles. Asking help from friend when lifting loads, 45.6% (n=68) agree, 48.3% (n=69) strongly disagree while 4.2%.

For straightening knees and bending back when lifting object from the floor, 66.4% (n=95) agree, 23.8% (n=34) disagree and 9.8% (n=14) has not answered the question. About wearing comfortable attire during working time, 66.4% (n=95) agree with this statement, and about 26.6% (n=38) disagree with this statement and remaining 8.4% (n=12) has not commented anything. The data shows that participants mostly 65% (n=93) reacted positively on the statement that attire e.g. shoes, sandals play an important role in influencing back pain while almost 26.6% (n=8) participants reacted negatively and 8.4% (n=12) has no response. The study shows, 28% (n=40) students actively practice body mechanics principle all the time during working hours while 59.4% (n=85) did not and 12.6% (n=18) has not responded at all. With the statement improper postures limit work output, 85.3% students agreed while 7% (n=10) students disagreed. The data in the shows that maximum incidences of injuries occur mostly due to wrong body mechanics 44%, regular use of lifts and other devices 27%, awkward static posture 25%, and repetitive movements 4%.

Types of work performed by the participants in study were mostly involved in sedentary(passive) work approx. 66.4% (n=95), and only 6.3% (n=9) were involved in active work, almost 4.2% (n=6) participants were involved in both the type of work. The study shows 63.6% (n=91) students are satisfied with the sitting arrangement provide in classrooms/ tutorials while 29.4% (n=42) were not satisfied and 7% (n=10) has not answered the question. Similarly, 65% (n=93) students are satisfied with the sitting arrangement provided in examination hall while 28.7% (n=41) students reacted negatively about the sitting arrangements and 6.3% (n=9) students has not responded.

The data shows that 35% (n=50) students wanted that college authority should change the type of chair provided in library while 56% (n=80) felt comfortable with the sitting arrangement and remaining 95 (n=13) has not answered. Mostly students preferred to study on table and chair 49%, on bed 33%, on only chair 11%, on floor 5%, and on sofa 2% (as shown in pie chart. In the study, 59.4% (n=85) participants have back pain while studying while 37.8% (n=54) participants did not have back pain and 2.8% (n=4) has no response. 83.9% (n=120) students strongly believe that improper sitting habits while studying affects the concentration while 4.9% (n=7) students reacted negatively and 11.2% (n=16) students did not have response. The study found that about of 143 medical students who participated in the

study, 68.5% (n=98) students exercise daily while 14% (n=20) students does not exercise at all and remaining 17.5% (n=25) has not answer the question. The exercises like Yoga (34%) are mostly preferred, then Sports 20%, Gym 13%, Cycling 12%, Aerobics 9%, Gymnastics 7%, Zumba 5% for maintaining proper posture. Out of all the participants, about 53.8% (n=77) participants agreed that lifting heavy loads during exercise affects posture while 8.4% (n=12) participants disagreed and about 37.85 (n=54) has no response (The exercises like Yoga 34% is mostly preferred, then Sports 20%, Gym 13%, Cycling 12%, Aerobics 9%, Gymnastics 7%, Zumba 5% for maintaining proper posture. Students showed more interest in outdoor games almost 52.4% (n=75), compared to indoor games i.e. 27.3% (n=39) and interestingly 11.95 (n=17) students showed interest in both the games equally and remaining 8.4% (n=12) has no response.

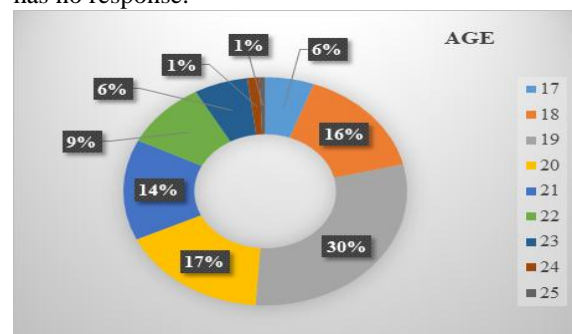


Figure 1: showing age distribution in study population

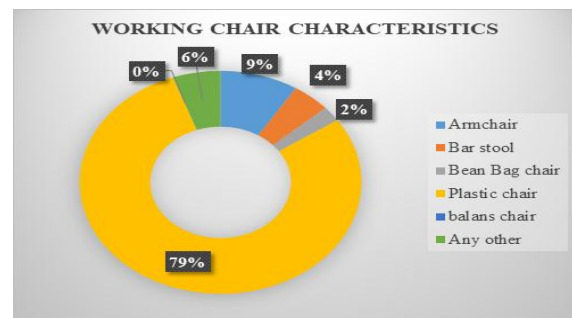


Figure 2: showing working chair pattern among the study participants

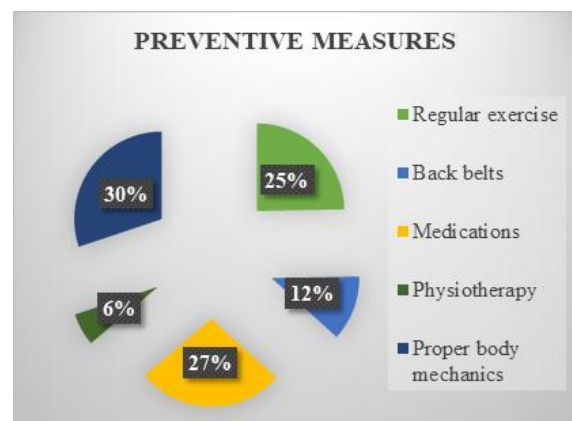


Figure 3: showing type of preventive measures taken by the study participants for better body posture and back pain

Almost 67.8% (n=97) participants believed that emotions and postures are correlated, 25.9% (n=37) participants were against it and 6.3% (n=9) participants has not responded. The data shows that out of all students 91.6% (n=131) students wanted postural training programs in schools/ colleges while 4.95 (n=7) students are against it and remaining 3.5% (n=5) has not answered the question (Almost 67.8% (n=97) participants believed that emotions and postures are correlated, 25.9% (n=37) participants were against it and 6.3% (n=9) participants has not responded.

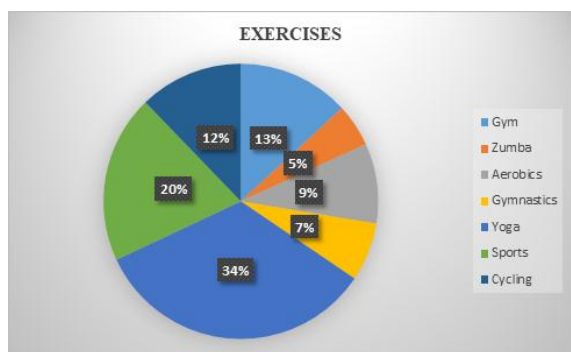


Figure 4 showing types of exercises for maintaining proper posture by the study participants

DISCUSSION

The purpose of this study was to ascertain the medical students' habits and understanding regarding body mechanics at Government Medical College, Akola. Here, a few of the findings are talked about. According to demographic statistics, 31% of the 143 participants were men and 69% of the participants were women. Out of all the participants, their mean age was 19.9. Of them, only 28.7% were satisfied with the features of their working chair, while the majority, 68.5%, were not, and 2.8% did not respond to the question. Of the 143 students, 69.9% had back pain, while only 31.1% did not. Of the participants, only 22.4% took preventive measures to avoid acute low back pain, compared to 74.1% who did not, and 3.5% did not respond to the question.

Of the 143 participants in this study, 54 (37.8%) had high understanding of body mechanic technique, whereas 77 (53.8%) had no knowledge at all, meaning they were unaware of the necessary body movements. While 48.3% of students did not require assistance to lift big objects, nearly 45.6% did (with 2.2% not responding to the question). When picking up anything off the ground, about 61.5% of respondents bend their back and straighten their knees. In addition to their understanding of body mechanics, 59.4% of participants did not practise it while they were at work. Similarly, a study by Kilic Akoa et al. [2013] discovered that individuals with LDH experienced higher pain levels in proportion to their impaired body mechanics knowledge.^[24] In the current study, about 65% of participants

acknowledged that clothing—such as shoes and sandals—influences back discomfort.

Research exhibiting comparable findings to ours has indicated that low back pain is commonly caused by and can become chronic because of repetitive body movements and activities (e.g., heavy lifting and bending over without bending at the knees, pushing, pulling, hard standing for extended periods of time, bending, reaching up or forward, holding, hugging/cuddling, and abruptly returning). It is also known that these repetitive actions can lead to lack of rest in between them or to serial repetition of the excessive movements.^[25-28] The main goals of body mechanics education are to achieve proper anatomical posture, use proper body mechanics in daily life and at work, provide information on back pain and coping mechanisms, and improve quality of life and self-confidence.^[29-31]

Of the medical students who took part in this study, nearly all of them were medical students. Of them, only 6.3% worked actively, 66.4% worked sedentarily, and 4.2% performed equally well in both types of labour. Studying and posture have a very strong correlation. A whopping 83.9% of respondents even concurred that poor seating posture during study sessions impairs focus. Of them, 67.8% believed that there is a correlation between posture and emotions. It is possible to correlate the current study's findings with those of prior research. The presence and severity of pain have a substantial impact on patients' functional status and quality of life; mild pain might even be the primary factor contributing to a high rate of function loss and a decline in quality of life.^[32,33]

Other than this, though, medical students understood the value of exercise in relation to their sedentary lifestyle. 14% of students exercise no at all, 68.5% of students exercise daily, and 17.5% of students have not responded. The effectiveness of body mechanics education on recurrent or low back pain was compared in a meta-analysis between exercise, manipulation, and a miofacial group and controls. The results showed moderate evidence that body mechanics education, whether short- or medium-term, was more effective on pain levels, returning to work, and functional capacity.^[34]

At the current study, 91.6% of the students need the postural training that is required at colleges; 4.9% of the students did not want it, and the remaining 3.5% did not respond. The teaching of medical students about active postural habits requires a proactive initiative. Medical professionals' working efficiency will rise with a tiny effort that can have a big impact. Back pain may be less of an issue if students participate in seminars, workshops, and postural training programs. These body mechanics methods ought to be included in the curriculum. To increase their productivity at work, students should also adjust their resting, sitting, and working positions.^[35,36]

Muscle discomfort is a common issue among medical students. It affects the spine, neck, shoulders, hands, and other places, and it starts when they begin their professional education and continues throughout

their practice. The study found that most backache cases are caused by unpleasant situations. According to the study, applying the body mechanics principle can improve practice satisfaction and lessen weariness from clinical work. Additionally, the study showed that students with worsening symptoms also lacked understanding on body mechanics principles and ergonomics. As a result, it is essential to incorporate and teach good posture practices into the curriculum. This will help students adopt healthy postures and, as a result, lower their chance of developing MSDs.^[37]

The primary constraint of the present investigation is its cross-sectional design, which relies on a convenience sample that is restricted to a certain population. Consequently, generalising its result is not possible. Additional health science study involving all medical practitioners from different parts of India is needed.

CONCLUSION

It may not take much work to change clinical work habits to prevent chronic pain issues in the medical field. These practices include regular strengthening exercises, frequent brief breaks, and appropriate use of ergonomic equipment. Professionals with expertise in body mechanics and physiotherapists organise educational programs to help students with acute low back pain live better lives by preventing problems. A range of educational lectures, workshops, and yoga programs must be available to the medical students, where the curricular integration of body mechanics instruction can be done for better and healthy lifestyle.

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