

Awareness, Knowledge and Practices about Spinal Alignment and Posture among Under-Graduate Medical Students in a Medical College

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Abstract

Original Research Article

Background: Students tend to develop neck pain and low back pain due to prolonged sitting during lectures, completing assignments using laptops, lab activities, working on computers and playing video games. [1] This Musculo-skeletal disorder is mainly associated with ergonomically incorrect working positions. If the students continue with improper sitting posture they will develop many health problems which will affect their study life, lower productivity and early retirement as health professionals. The objective of the study is to assess the awareness, knowledge and practices about good posture disciplines and computer ergonomics among under-graduate students in a private medical college in South India. **Material and methods:** Pre-validated, semi-structured questionnaire, having 30 elements has been used for this observational, cross-sectional study. Data was collected from VIIth and IXth semester under-graduate students in a private medical college in South India. **Results:** In this study out of 294 students, 268 students participated. Most of the students (70.52%) knew about good posture. 66.41% students described it as maintaining the correct alignment with least strain to supporting muscles and ligaments whereas 21.64% described it as position that is comfortable to you. 80.59% students knew that posture is closely related to spine hence it is important to understand normal spine alignment. 55.22% students knew the correct sitting posture includes resting elbows and arms over chair or desk and keep shoulders relaxed. 68.65% students were sitting upright whereas 29.85% students were slouching. 89.55% respondents knew ergonomics is a science of comforting the workstation according to physiological aspect of human beings. **Conclusion:** Our study reveals majority of students were aware of good posture, but they are not applying it in their daily life.

Keywords: Awareness, Knowledge, Practices, Spinal alignment, Posture, Medical students.

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INTRODUCTION

Posture is a body position, the way body parts are aligned while doing any activity like sitting, standing and lying. It can be described by relative position of joints and alignment of body parts. A faulty posture results in impairment of joints, muscles and soft tissue injuries resulting in pain. Posture is directly related to spine, so it is important to understand the alignment of spine [2].

Human spine is self-supporting system of bones, cartilage, ligaments and muscles and having normal "S" shaped curve when seen from lateral side. Its main function is to - support most of the body weight, act as shock absorber, protect spinal cord and to provide structure for maintaining erect posture [3, 4].

Spinal elasticity and curvatures play a pivotal role in maintaining posture by resisting gravitational

and other forces. Muscles and other soft tissues are responsible for maintaining erect position against the gravity [5].

Spinal stability is having three components. Passive stability is provided by bones and ligaments. Active stability is provided by muscular contractions and third is neural control. All the three components must work in coordination to maintain posture. Factors affecting posture are heredity, age, gender, emotional status, physical activity and ergonomics [1, 6-12].

Everybody uses to sit in day to day activity, but students spend most of the time in sitting posture while learning in class, doing lab works, sitting in front of their computers / laptops and during study for their examinations. Dale *et al.* [13] and McKinley *et al.* [1] stated that sitting for longer in front of computers while doing work can be harmful to student's posture. Several studies documented relationship between trapezius

muscle overload with neck and shoulder musculoskeletal symptoms due to prolonged sitting in front of computers [14,15, 16].

Dale *et al.* stated good sitting posture as feet flat on ground; knees flexed to around 90° , upper body and head as straight as possible. Shoulders must be relaxed and kept down with lower back arched and keep chest lifted [13, 17].

Good sitting posture compliments the natural arch of spine. Saarni *et al* stated that a neutral erect posture while sitting exerts minimal load on spine resulting in health-related benefits [7].

Back complaints are mainly due to poor posture [18]. Muscles and soft tissues will be shortened or stretched due to abnormal postures [1]. As per Hojat *et al.* [19] 57% of students sit in kyphotic positions or bending forward and 43% students sit in slouching posture. If the students do not correct their sitting posture, it will lead to back pain and other symptoms which will adversely affect their studies and future career.

This study is aimed to study the awareness, knowledge and practices about good sitting posture among undergraduate medical students.

Study objectives

- To evaluate the awareness about good sitting posture and spinal salignment.

- To evaluate the knowledge about outcomes of bad posture.
- To identify the methods students are using to correct their sitting posture.

MATERIALS AND METHODS

A cross-sectional research survey was done. Respondents were VIIth and IXth semester undergraduate medical students of a medical college located in South India. Out of 294 students, 268 students participated after clearly explaining the objective of study and questionnaire. Students unwilling to participate or absent were excluded from the study. The tool for collecting data was a semi-structured questionnaire consisting of 30 elements. Different question types such as closed ended, open ended and multiple-choice questions were used in questionnaire. The questionnaire was pre-tested on a group of 5 students to check ambiguity and reliability of questions, then modified to present form. The questions were designed considering three variables namely awareness and understanding about good posture, effects of bad sitting posture and methods to improve their sitting posture. Later data was organised and recorded in Microsoft excel sheet.

RESULTS

Out of 295 students 264 students participated in survey. There were 155 females and 113 males. All respondents were between age 20-25 yrs. The female to male ratio is 1.4:1 (Fig.1).

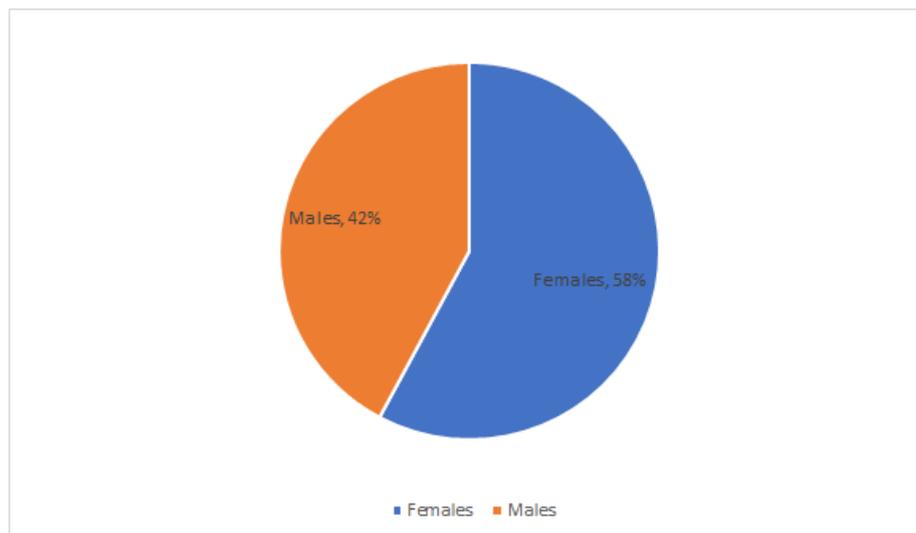


Fig-1: Demographic characteristics

Awareness about good posture (Fig 2)

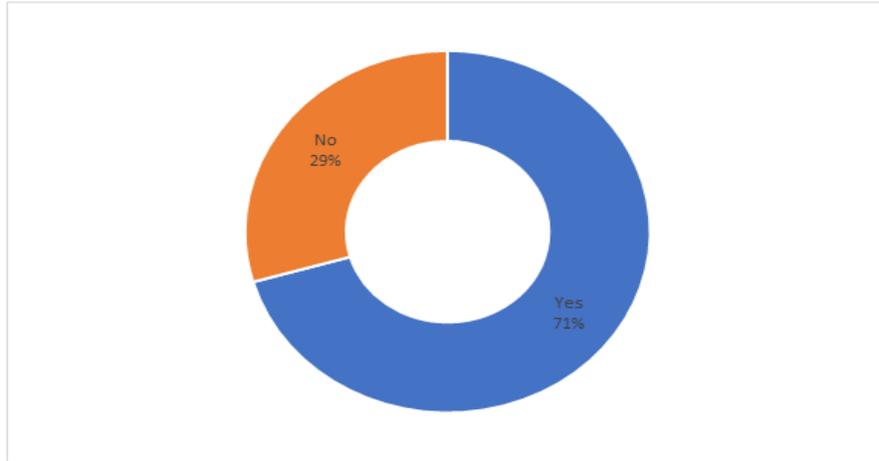


Fig-2: Awareness about good sitting posture

178 students (66.41%) knew that good posture at work means to maintain with least strain to supporting muscles and ligaments whereas 58 students (21.64%) responded it as position that is comfortable to you and 38 students (11.94%) did not know the answer.

240 respondents (89.55%) knew ergonomics as a science to comfort the workstation according to

physiological needs of human beings whereas 28 students (10.44%) responded negatively.

216 students (80.59%) knew the importance of normal spinal alignment as it is closely associated with good posture whereas 36 students (13.43%) were unaware of the fact.

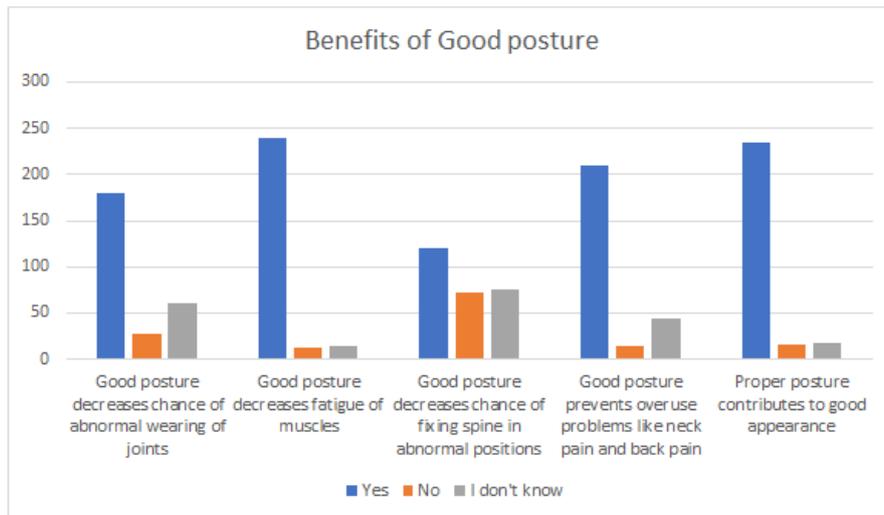


Fig-3: Benefits of good posture is shown

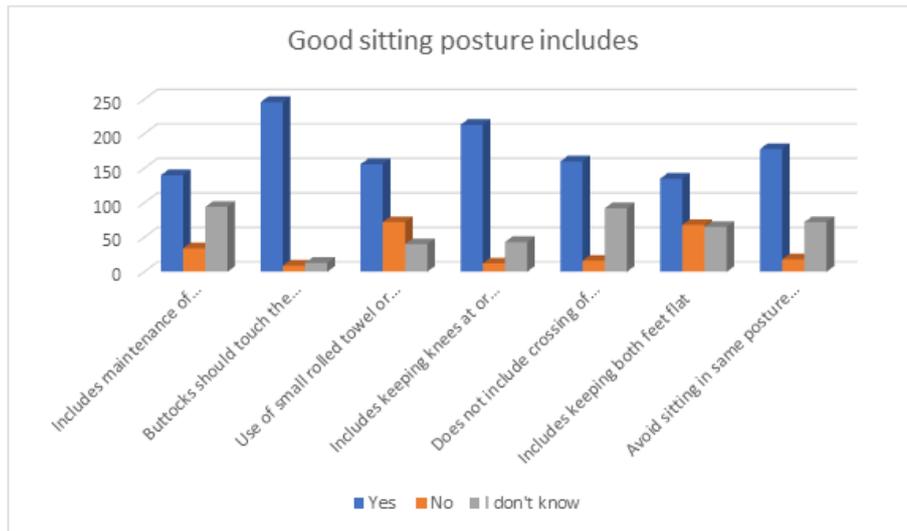


Fig-4: Awareness about Good sitting posture is shown

182 students (67.91%) knew that correct position for lying down includes maintenance of normal spinal curves (Use of pillow below knees and lumbar roll) whereas 80 students (29.85%) were unaware of this fact.

240 students (89.55%) knew that it is incorrect to sleep on stomach especially on saggy mattress

whereas 27 students (10.07%) were unaware of this fact.

122 students (45.52%) knew the correct way of sitting from sleeping position includes turning on side with drawing up both knees and swinging by the side of bed and getting up with the support of hands whereas 120 students (44.77%) were unaware about it.

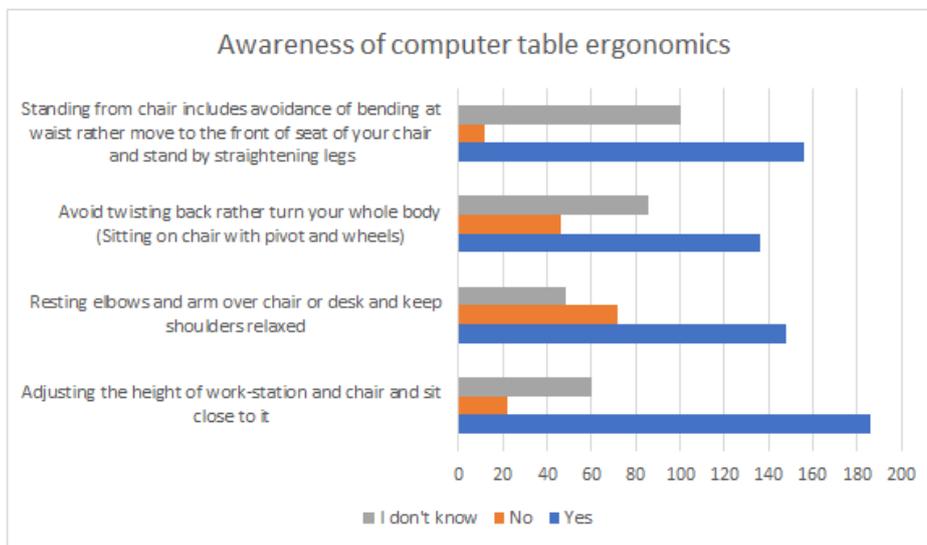


Fig-5: Describes about awareness of computer table ergonomics

Table-1: Demonstrates various places where students were keeping laptop while using

Places where students use laptop	Percentage
On the study table	49.25% (132 students)
On Floor or small table	1.49% (4 students)
On the bed	48.88% (131 students)
On the lap	0.37% (1 student)

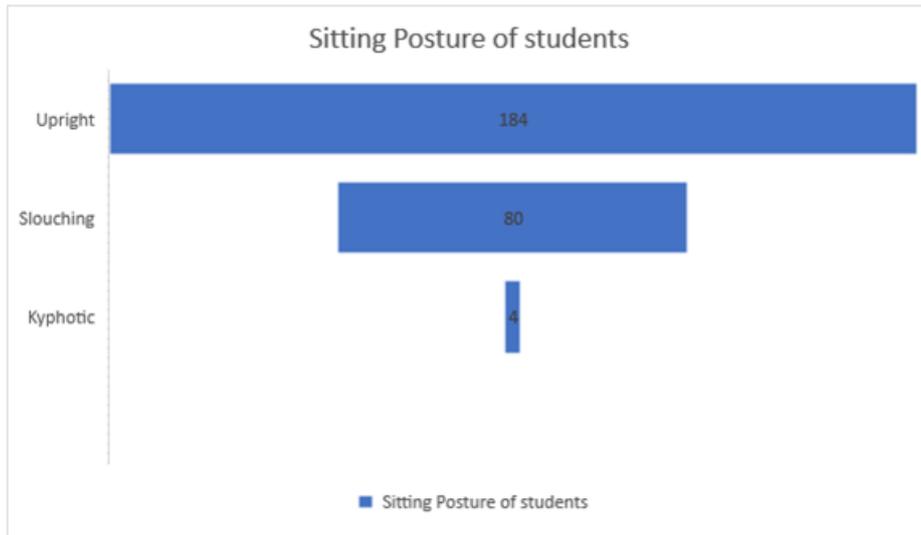


Fig-6: Shows Posture of students while sitting
211 students (78.73%) felt pain while sitting for extended period.

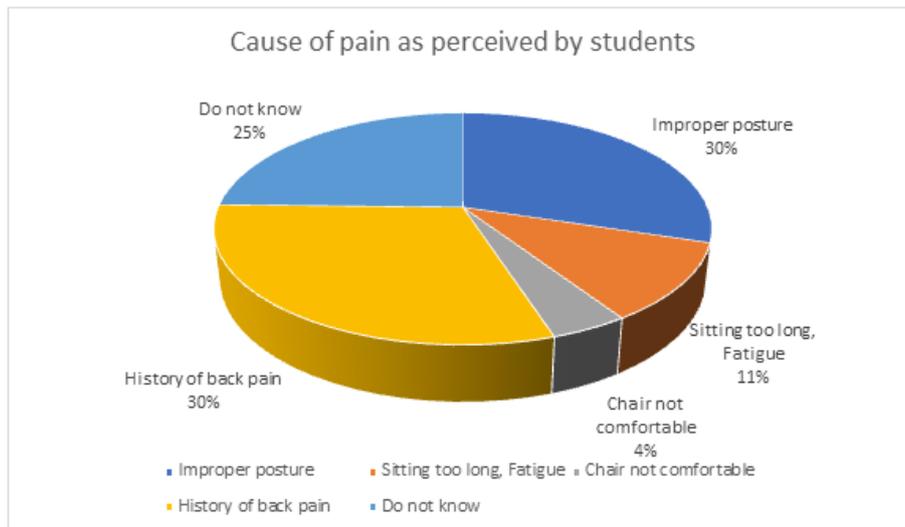


Fig-7: shows the cause of pain as perceived by students

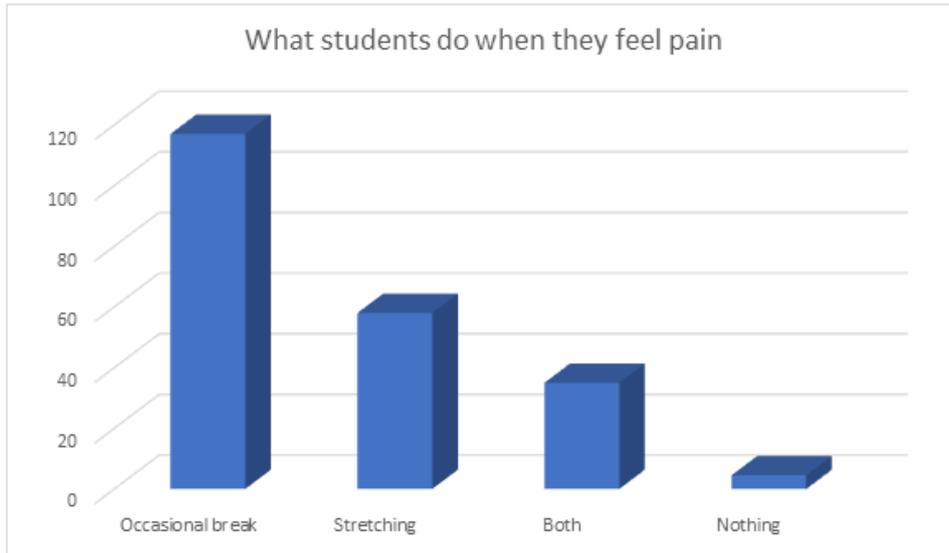


Fig-8: Depicts what students do when they feel pain

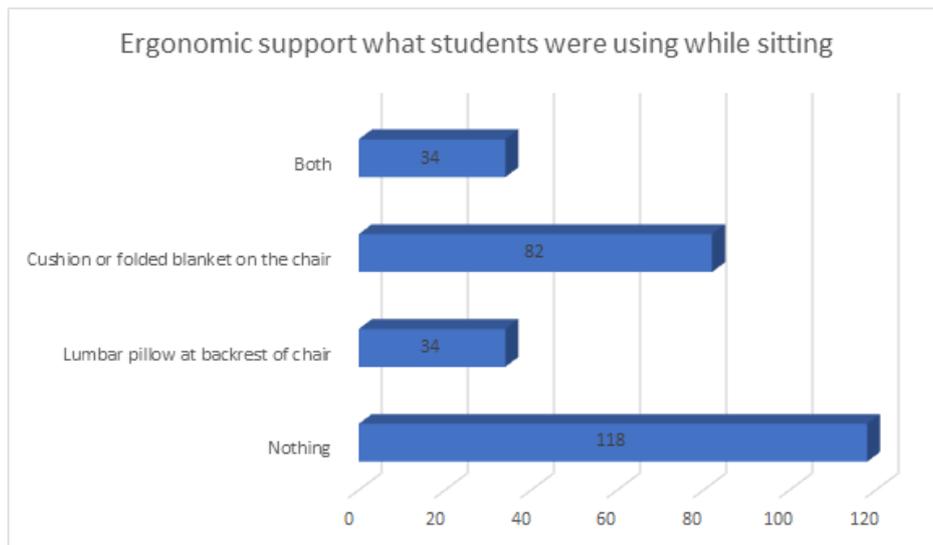


Fig-9: Shows the type of support what students were using while sitting

DISCUSSION

In our study, 70.52% students were aware of good posture which is comparable to 72 % student's awareness stated by Aisah *et al.* [1.26] and 80% stated by Hafiz *et al.* [1] and 52.2% by Khan R *et al.* [22]. These results were anticipated as all respondents were undergraduate medical students, hence they might have learnt about good sitting posture.

In our study 64.41% described the good posture correctly which is comparable to 67% students reported by Aisah *et al.* [20]. Another study reported 34% students [21] and 30% students. [22] Dale *et al.* [13] and American chiropractic association [17] both described good sitting posture as knee flexion near 90° and upper torso and head as straight as possible.

In our study 80.59% students respond positively about close relationship between normal spine alignment and good posture. Maniarasu R *et al.* [23] stated that “ in neutral spine there is optimal balance of muscles between right to left and front to back. This balance allows optimal efficiency and minimum stress on joints. The pelvis should tilt forwards allowing spine to maintain its normal “S” shape in sagittal plane allowing weight to distribute evenly among all inter-vertebral discs and musculature balance. Neutral posture is essential for holding body weight optimally, body balance, good breathing, cognitive functions and memory. Bending this natural “S” curve out of shape for long period results in fatigue and strain of muscles.”

In our study, majority of students knew about good sitting posture, but 29.85% students were sitting in

slouching position and 1.49% was sitting in kyphotic posture which is comparable to 28% slouching position and 8% kyphotic position reported by Aisah *et al.* [20]. As stated in [20], students those knew about good sitting posture and did not apply it may be due to their habit of young age. Students those have been taught by their parents in younger age to sit upright continued to do so. Research has shown, bad habits are difficult to break especially those developed in childhood.

In present study, 10.90% students knew that sitting too long in static position can cause back pain whereas it was 24% as reported by Aisah *et al.* [20] As stated by Breithecker *et al.* [24] sitting still for long period of time is the dangerous form of sitting. Movements like walking or stretching should be included in between sittings.

In present study, 49.25% students were using laptop on study table which is comparable to 44% students reported by Aisah *et al.* [20]. The reason may be due to using laptop on study-table creates less stress on neck and back. In our study 48.88% students were using laptops on bed compared to 44% reported by Aisah *et al.* [20]. They might have chosen to sit at bed due to initial comfort, but due to leaning forward, a hunch back will develop later in life if they continue to do so. Students those were lying prone with face down while using laptops on bed, will have restricted entry and exit of air during respiration due to compression of rib cage [19].

In present study 12.68% of students were using lumbar pillow at back rest of chair, 30.59% were using small cushion or folded blanket over the chair and 12.68% were using both. The reason might by the chair and table were not ergonomically correct to maintain the normal "S" shape curve of spine.

In present study 55.45% students took occasional break, 27.48% students done stretching and 16.58% done both. This may be due to awareness about good posture or as a response to decrease pain while sitting.

CONCLUSIONS

Most of the students were aware of good posture but they were not applying this knowledge in their daily life. This may be attributed to their bad habits developed during their childhood. Health hazards due to poor posture should be emphasised to correct their habit.

Majority of students were using some form of ergonomic support. Ergonomically designed furniture which can complement the natural "S" shape curve of spine should be used.

The limitation of this study lies in the fact that sample is taken from one medical college hence more

such studies with bigger sample size are needed from other centres to evaluate about awareness of posture and whether this knowledge has been translated into their daily life.

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Questionnaire

1. Are you aware of good posture?
 - a. Yes
 - b. No
 - c. I don't know
2. What does good posture at work mean?
 - a. To maintain the correct alignment with least strain to supporting muscles, ligaments
 - b. Position that is comfortable to you
 - c. I don't know
3. Ergonomics is a science to comfort the work station according to physiological aspects of human being.
 - a. Yes
 - b. No
 - c. I don't know
4. Posture is closely related to spine hence it is important to understand normal spine alignment?
 - a. Yes
 - b. No
 - c. I don't know
5. Whether proper posture decreases the chances of abnormal wearing of joints which can lead to arthritis?
 - a. Yes
 - b. No
 - c. I don't know
6. Whether proper posture decreases the fatigue due to proper use of muscles and allowing the body to use less energy?
 - a. Yes
 - b. No
 - c. I don't know
7. Whether proper posture decreases the chances of fixing spine in abnormal positions?
 - a. Yes
 - b. No
 - c. I don't know
8. Whether proper posture prevents overuse problems like neck pain and back pain?
 - a. Yes
 - b. No
 - c. I don't know
9. Whether proper posture contributes to good appearance?
 - a. Yes
 - b. No
 - c. I don't know
10. Correct sitting posture includes buttocks touching the back of chair.
 - a. Yes
 - b. No
 - c. I don't know
11. Correct sitting posture includes maintenance of three normal back curves.
 - a. Yes
 - b. No
 - c. I don't know
12. Correct sitting posture includes use of small rolled up towel or lumbar support.
 - a. Yes
 - b. No
 - c. I don't know
13. Correct sitting posture includes keeping knees at 90⁰ or higher than hip level (Use of foot rest).
 - a. Yes
 - b. No
 - c. I don't know
14. Correct sitting posture does not include crossing of legs
 - a. Yes
 - b. No
 - c. I don't know
15. Correct sitting posture includes keeping both feet flat.
 - a. Yes
 - b. No
 - c. I don't know
16. Correct sitting posture includes to avoid sitting in same posture for more than 30 mins.
 - a. Yes
 - b. No
 - c. I don't know
17. Correct sitting posture includes adjusting the height of workstation and chair and sit close to work station
 - a. Yes
 - b. No
 - c. I don't know
18. Correct sitting posture includes resting elbows and arm over chair or desk and keep shoulders relaxed
 - a. Yes
 - b. No
 - c. I don't know
19. Correct sitting posture on chair having rolls and pivot includes avoidance of twisting back while sitting rather turn your whole body
 - a. Yes
 - b. No
 - c. I don't know
20. Correct way of standing from chair includes avoidance of bending at waist rather move to the front of seat of your chair and stand by straightening legs
 - a. Yes
 - b. No
 - c. I don't know

21. Correct position for lying down includes maintenance of normal spinal curves (Use of pillow below knees and lumbar roll)
 - a. Yes
 - b. No
 - c. I don't know
22. Correct position for lying down does not include sleeping on stomach especially on saggy mattresses
 - a. Yes
 - b. No
 - c. I don't know
23. Correct way of sitting from sleeping position includes turning on side with drawing up both knees and swinging by the side of bed. Getting up with the support of hands.
 - a. Yes
 - b. No
 - c. I don't know
24. Correct way of sitting from sleeping position includes avoidance of bending at waist.
 - a. Yes
 - b. No
 - c. I don't know
25. Where do you keep the laptop while using?
 - a. On study table
 - b. On floor or small table
 - c. On bed
 - d. On your lap
26. Are you sitting
 - a. Upright
 - b. Slouching
 - c. Kyphotic
27. Have you ever felt backpain while sitting for extended period?
 - a. Yes
 - b. No
 - c. I don't know
28. What you think is the cause of pain
 - a. Improper posture
 - b. Sitting for too long, fatigue
 - c. Chair not comfortable
 - d. History of backpain and overweight
 - e. Do not know
29. What do you do when you experience pain?
 - a. Occasional break
 - b. Stretching
 - c. Both
 - d. Nothing
30. What type of support are you using while sitting
 - a. Nothing
 - b. Lumbar pillow at backrest of chair
 - c. Small cushion or folded blanket on the chair
 - d. Both