

Knowledge, Attitude and Practice Related to Physical Ergonomics Among School Teachers

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ABSTRACT

Introduction: Teaching involves various physical demands such as prolonged standing, sitting, repetitive movements and sustained postures, which may increase the risk of work-related Musculoskeletal disorders among teachers. Poor ergonomic practices, inadequate workplace conditions and limited awareness of physical ergonomics can contribute to discomfort, fatigue and reduced work efficiency. Despite increasing recognition of ergonomic importance, limited research has specifically focused on assessing knowledge, attitude and practice related to physical ergonomics among school teachers. Understanding teachers' awareness, perceptions and implementation of ergonomic principles is necessary to identify existing gaps and develop effective educational interventions. Therefore, this study aims to assess the knowledge, attitude and practice related to physical ergonomics among school teachers.

Objective Of the Study: Aim of this study was to find out Knowledge, Attitude and Practice related to Physical Ergonomic among School Teachers of Surat, Gujarat.

Methodology: School Teachers from Surat, Gujarat, India, participated in this online survey study. The principal investigators personally met the principals of Schools at their workplace and explained the study and got the consent form and google form filled. Total 204 teachers' response was received.

Result: Among 204 school teachers, 78% were female, 75% used smartboards and only 22.1% had received ergonomic training. Most teachers (76%) reported work-related pain, with the feet, shoulders and neck being the most commonly affected body regions. Participants demonstrated VII good knowledge and a positive attitude toward ergonomics, with the majority recognizing the importance of proper posture, regular breaks, stretching and ergonomic practices in preventing Musculoskeletal disorders. However, ergonomic practices were followed inconsistently and many teachers reported prolonged standing and inadequate ergonomic facilities.

Conclusion: School teachers had good knowledge and a positive attitude toward ergonomics, but ergonomic practices were not consistently followed. The high prevalence of work-related musculoskeletal pain and limited ergonomic training highlight the need for ergonomic education, workplace modifications and regular training programs to improve teachers' health and reduce Musculoskeletal disorders.

Keywords: Knowledge, Attitude, Practice, Physical Ergonomics, School Teachers

1. INTRODUCTION

Ergonomics is the science of designing work environments and tasks to optimize human performance, safety, comfort, and

well-being. Physical ergonomics focuses on human anatomical, physiological, and biomechanical characteristics in relation to work activities, aiming to reduce physical stress and prevent work-related musculoskeletal disorders (WMSDs).

Teaching is a profession associated with prolonged standing, extended sitting, repetitive writing, computer use, and sustained static postures. These occupational demands expose school teachers to ergonomic risk factors that may lead to musculoskeletal disorders (MSDs), particularly affecting the neck, shoulders, and lower back. Such disorders can reduce work efficiency, increase absenteeism, and negatively affect quality of life.¹

The physical work environment, including classroom furniture, workstation design, and computer setup, plays an important role in maintaining ergonomic safety. Inadequate workplace design and poor postural habits can increase physical strain and discomfort. Although ergonomic principles are well established, their effective implementation in educational settings remains limited.

Assessment of knowledge, attitude, and practice (KAP) provides valuable insight into teachers' awareness, perceptions, and application of ergonomic principles. While teachers may possess adequate knowledge and positive attitudes toward ergonomics, these do not always translate into appropriate workplace practices because of environmental constraints, workload, and habitual behaviors.²⁻⁴

Ergonomic education and workplace interventions, including posture correction, workstation modifications, and regular training, have been shown to improve ergonomic behavior and reduce musculoskeletal discomfort. Furthermore, the increasing use of digital teaching has introduced additional ergonomic challenges due to prolonged computer use and screen exposure, emphasizing the need for greater ergonomic awareness among teachers.⁵⁻⁸

Ergonomic modifications in the workplace can help reduce musculoskeletal discomfort and improve overall worker comfort.

Adjustments such as appropriate workstation design and proper ergonomic arrangements serve as effective preventive measures for minimizing occupational MSD and promoting a healthier working environment.¹⁰

Despite the high prevalence of MSDs among teachers, limited studies have specifically assessed knowledge, attitude, and practice related to physical ergonomics among school teachers in India. Identifying these factors is essential for developing effective educational and preventive strategies to promote occupational health.

Therefore, the present study aimed to assess the knowledge, attitude, and practice related to physical ergonomics among school teachers in Surat, Gujarat.

Objective of the Study

To assess the knowledge, attitude, and practice related to physical ergonomics among school teachers in Surat, Gujarat.

2. MATERIALS & METHODS

Study Design and Setting

A cross-sectional study was conducted among school teachers in Surat, Gujarat, India, during April–May 2026 to assess their knowledge, attitude and practice (KAP) regarding physical ergonomics.

Participants and Sample Size

Teachers from pre-primary, primary, secondary and higher-secondary schools were invited to participate. Of approximately 250 teachers approached, 204 completed the questionnaire and were included in the study (response rate: 81.6%). The sample comprised 22 pre-primary, 68 primary, 56 secondary and 58 higher-secondary teachers. Teachers working in Surat who were willing to participate and provided informed consent were included.

Study Instrument and Data Collection

Participation was voluntary and informed consent was obtained from all participants. Confidentiality and anonymity were maintained throughout the study.

Data were collected using a structured 40-item questionnaire administered through Google Forms. It included demographic characteristics (11 items), knowledge (11 items), attitude (10 items) and practice (8 items) related to physical ergonomics. School authorities were contacted with prior appointments and eligible teachers were invited to complete the questionnaire electronically.

3. Statistical Analysis

Table 1: Gender

Gender	No.	Percentage
Male	45	22%
Female	159	78%

Table no.2 Years of Teaching Experience

Years	No.	Percentage
<5 Years	58	28.4%
5-10 Years	58	28.4%
10-15 Years	43	21.1%
>15 Years	45	22.1%

Table no.3 Teaching Section

Teaching Section	No.	Percentage
Pre-Primary Section	22	10.8%
Primary Section	68	33.3%
Secondary Section	56	27.5%
Higher-Secondary Section	58	28.4%

Table no.4 Average Teaching Hours

No. Of Hours	No.	Percentage
<3 Hours	9	4.4%
3-5 Hours	75	36.8%
>5 Hours	120	58.8%

Table no.5 Use of smartboard

Use of smartboard	No.	Percentage
Yes	152	75%
No	52	25%

Table no.6 Received Ergonomic Training

Ergonomic Training	No.	Percentage
Yes	45	22.1%
No	159	77.9%

Table no.7 Result based on pain experience during or after teaching.

Pain experience	No.	Percentage
Yes	155	76%
No	49	24%

Table no.8 Result based on body part affected.

Body Part	No.	Percentage
Neck	58	36.3%
Shoulder	65	40.6%
Upper Back	35	21.9%
Lower back	48	30%
Knees	37	23.1%
Feet	84	52.5%

Table no.9 Result based on Frequency of Pain

Frequency	No.	Percentage
Rarely	33	18.3%
Often	37	20.6%
Sometimes	110	61.1%

4. Knowledge about ergonomics

Table no.10 Results based on awareness of the term Ergonomics

Have heard of term	No.	Percentage
Yes	113	55.4%
No	64	31.4%
Not Sure	27	13.2%

Table no.11 Results Based on Source of Knowledge Regarding Ergonomics

	No.	Percentage
Self-reading	29	20.6%
Friends/Co-workers	22	15.6%
Internet/ Social-media	60	42.6%
Workshop/ Seminar	3	2.1%
Healthcare professionals	17	12.1%
Other	10	7.1%

Table no.12 Results Based on Perceived Importance of Ergonomics in the Teaching Profession

Do you think it is important	No.	Percentage
Yes	155	76%
No	3	1.5%
Maybe	46	22.5%

Table no.13 Results Based on Knowledge of the Meaning of Ergonomics

Responses	No.	Percentage
True	199	97.5%
False	5	2.5%

Table no.14 Results Based on Knowledge of the Effect of Poor Posture on Musculoskeletal Pain.

Responses	No.	Percentage
True	199	97.5%
False	5	2.5%

Table no.15. Results Based on Knowledge of the Effect of Prolonged Standing on Musculoskeletal Problems.

Responses	No.	Percentage
Yes	170	83.3%
No	3	1.5%
Not sure	31	15.2%

Table no.16. Results Based on Knowledge of the Importance of Correct Chair and Desk Height

Responses	No.	Percentage
Yes	189	92.6%
No	13	6.4%
Not sure	2	1%

Table no.17. Results Based on Knowledge of the Importance of Regular Breaks During Work

Responses	No.	Percentage
Yes	187	91.7%
No	15	7.4%
Not sure	2	1%

Table no.18 Results Based on Knowledge of the Benefits of Stretching Exercises

Responses	No.	Percentage
Yes	186	91.2%
No	6	2.9%
Not sure	12	5.9%

Table no.19 Results Based on Knowledge of Proper Lifting Techniques.

Responses	No.	Percentage
Yes	156	76.5%
No	11	5.4%
Not sure	37	18.1%

Table no.20 Results Based on Perception of the Effect of Ergonomic Practices on Work Efficiency.

Responses	No.	Percentage
Yes	183	89.7%
No	3	1.5%
Not sure	18	8.8%

5. Attitude towards ergonomics

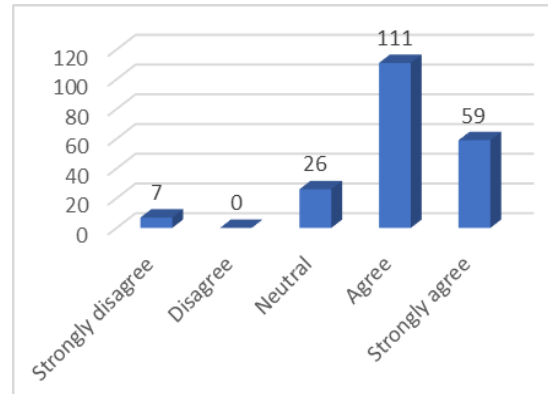


Chart no.1 Results Based on Perception of the Importance of Ergonomics for Teachers' Health.

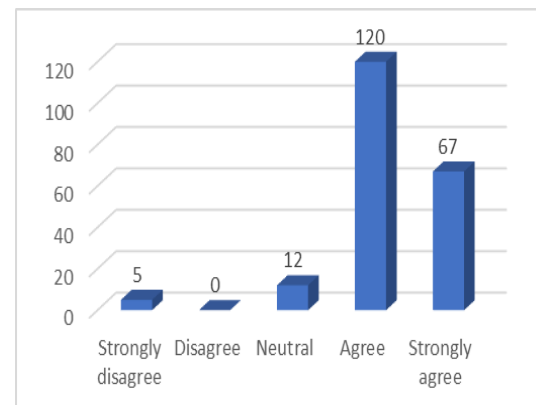


Chart no.2 Results Based on Knowledge of Correct Posture in Preventing Musculoskeletal disorders

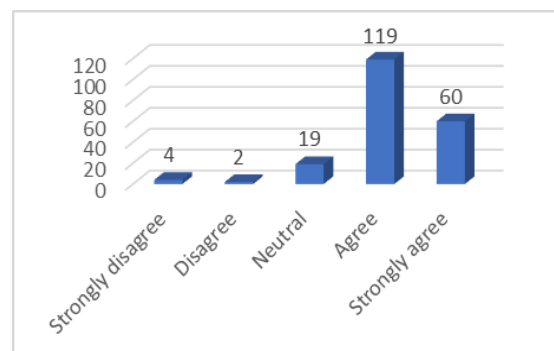


Chart no.3 Results Based on Opinion Regarding Ergonomic Training for Teachers

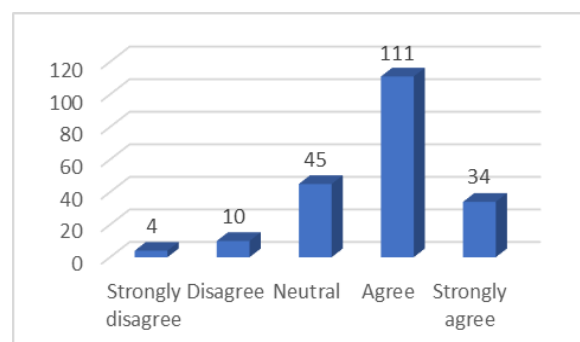


Chart no. 4 Results Based on Discomfort Experienced Due to Prolonged Standing

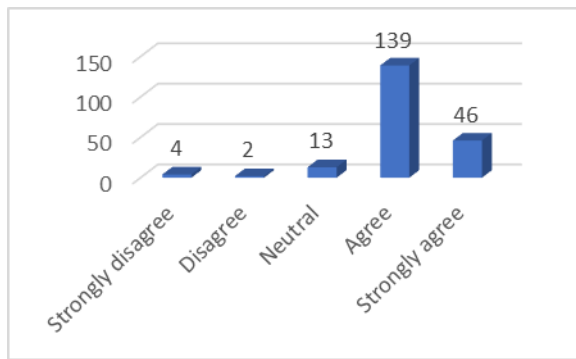


Chart no. 14 Results Based on Perception of the Benefits of Regular Exercise in Preventing Work-Related Pain

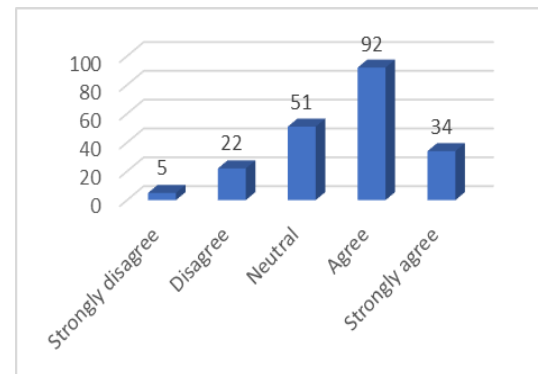


Chart no. 18 Results Based on Availability of Adjustable Furniture for Teachers

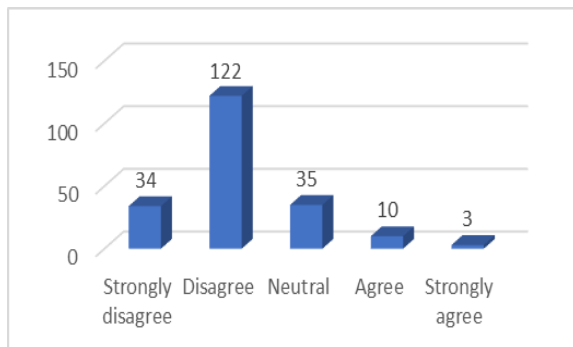


Chart no. 15 Results Based on Perception of the Importance of Ergonomics.

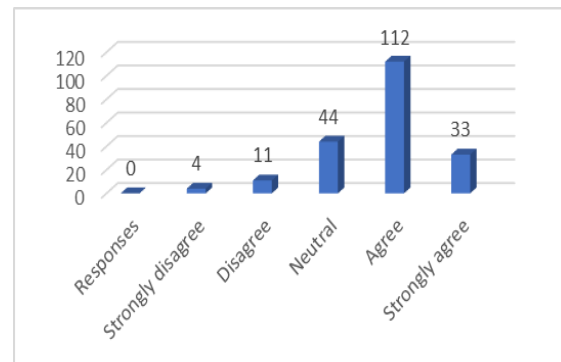


Chart no. 19 Results Based on Awareness of Proper Ergonomic Posture

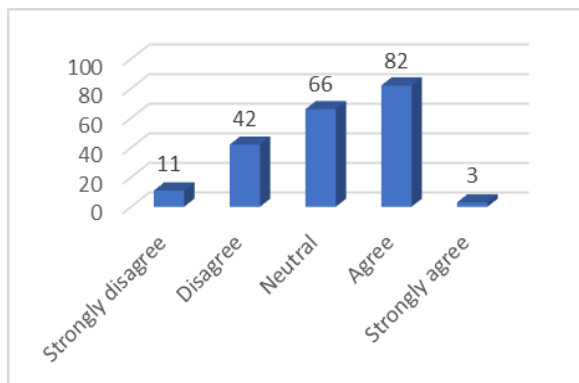


Chart no. 16 Results Based on Difficulty in Adopting Ergonomic Habits

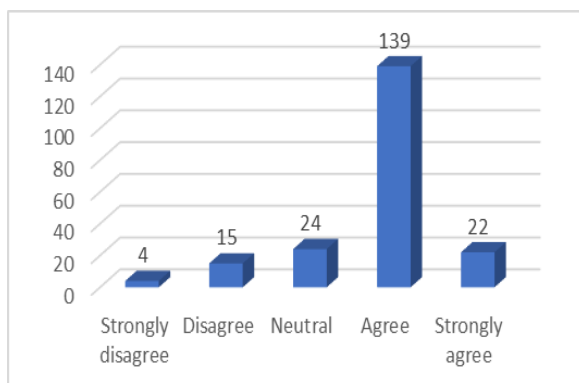


Chart no. 17 Results Based on the Practice of Ignoring Minor Pain or Discomfort.

Practice for ergonomics

Table no.31 Results Based on Maintenance of Correct Posture During Prolonged Standing.

Responses	No.	Percentage
Always	62	30.4%
Sometimes	136	66.7%
Never	6	2.9%

Table no. 32 Results Based on Changing Position When Experiencing Discomfort.

Responses	No.	Percentage
Always	115	56.4%
Sometimes	86	42.2%
Never	3	1.5%

Table no. 33 Results Based on Arrangement of Teaching Materials Within Easy Reach.

Responses	No.	Percentage
Always	124	60.8%
Sometimes	79	38.7%
Never	1	0.5%

Table no. 34 Results Based on Maintenance of Proper Posture While Writing on the Board

Responses	No.	Percentage
Always	105	51.5%
Sometimes	91	44.6%
Never	8	3.9%

Table no. 35 Results Based on Raising the Arms Above Shoulder Level During Teaching

Responses	No.	Percentage
Always	92	45.1%
Sometimes	108	52.9%
Never	4	2%

Table no. 36 Results Based on Wrist Position While Working.

Responses	No.	Percentage
Always	46	22.5%
Sometimes	135	66.2%
Never	23	11.3%

Table no. 37 Results Based on Maintenance of Proper Posture While Correcting papers.

Responses	No.	Percentage
Always	68	33.3%
Sometimes	126	61.8%
Never	10	4.9%

Table no. 38 Results Based on Regular Physical Activity or Exercise to Prevent Work-Related Pain.

Responses	No.	Percentage
Always	47	23%
Sometimes	122	59.8%
Never	35	17.2%

6. DISCUSSION

6.2.1 Discussion of Demographic Findings

The present study included 204 school teachers with 78% females and 22% males. Participants had varied teaching experience and represented different educational levels. More than half of the teachers (58.8%) reported teaching for more than 5 hours per day. Prolonged standing, repetitive writing and awkward postures are recognized occupational risk factors for musculoskeletal disorders (MSD) among teachers.^{1,12} Kundra et al.¹¹ also reported that longer teaching hours increase the risk of musculoskeletal discomfort.

In the present study, 75% of teachers used smartboards. However, smartboard use alone may not ensure proper ergonomic posture.¹³ Only 22.1% of teachers had received ergonomic training while 77.9% had not. This indicates a significant gap in formal ergonomic education and supports the need for ergonomic awareness in teaching environments.³

A total of 76% of teachers reported pain during or after teaching. Previous studies have reported a high prevalence of MSD among teachers.^{1,12} The most commonly affected body region was the feet (52.5%) followed by shoulders (40.6%), neck (36.3%), lower back (30%), knees (23.1%) and upper back (21.9%). Foot pain may be related to prolonged standing. Similar findings have been reported in previous studies.^{9,11} Among those experiencing pain, 61.1% reported pain sometimes, indicating the importance of early preventive measures.¹⁴

6.2.2 Discussion of Knowledge Findings

In the present study, 55.4% of teachers had heard about ergonomics while 31.4% had not and 13.2% were unsure. The main source of information was the internet and social media (42.6%) followed by self-reading (20.6%), friends or co-workers (15.6%), healthcare professionals (12.1%) and workshops or seminars (2.1%). Similar moderate awareness has been reported previously.⁵

Despite moderate awareness of the term, 97.5% correctly identified ergonomics as designing the workplace according to comfort and safety and 97.5% recognized that poor posture can cause musculoskeletal pain.^{8,15} A total of 83.3% agreed that prolonged standing can cause MSD while more than 92% recognized the importance of appropriate chair and desk height.¹⁶ Similarly, 91.7% believed that regular breaks prevent muscle strain and 91.2% believed that stretching reduces work-related pain.^{17,18}

Regarding lifting techniques, 76.5% correctly identified bending the knees while keeping the back straight as appropriate.¹² Nearly 90% believed that proper ergonomic practices improve work efficiency.¹⁶ Overall, the findings indicate good basic ergonomic knowledge. However, only 22.1% had received formal ergonomic training, suggesting that knowledge alone may not translate into appropriate workplace behaviour.²

6.2.3 Discussion of Attitude Findings

The findings demonstrated a generally positive attitude towards ergonomics. About 54.4% agreed and 28.9% strongly agreed that ergonomics is important for maintaining teachers' health. Similarly, 58.8% agreed and 32.8% strongly agreed that correct posture can prevent MSD.^{5,8}

Nearly 90% of teachers agreed or strongly agreed that they should receive ergonomic training, indicating a strong need for formal guidance.⁵ About 54.4% agreed and 16.7% strongly agreed that prolonged standing causes discomfort. Regular exercise was considered beneficial by 68.1% who agreed and 22.5% who strongly agreed.¹⁹

Although teachers showed a positive attitude, 40.2% reported difficulty changing their work-related habits.² Further, 68.1% agreed and 10.8% strongly agreed that they ignored minor pain or discomfort.¹ A lack of adjustable furniture was also reported by 61.8% of participants while 71.1% agreed or strongly agreed that they lacked awareness regarding proper ergonomic posture.¹⁶

These findings indicate that teachers generally understand the importance of ergonomics but face difficulties in translating this awareness into regular workplace practices.

6.2.4 Discussion of Practice Findings

The practice findings showed a clear gap between knowledge, attitude and actual ergonomic behaviour. Although 56.4% of teachers always changed their position when they experienced discomfort, 42.2% delayed changing position. Prolonged static posture may increase muscle fatigue and musculoskeletal strain.²⁰

About 60.8% always kept teaching materials within easy reach while 38.7% did so sometimes. Proper arrangement of materials can reduce unnecessary bending and stretching and may decrease physical strain.²¹

Only 51.5% always maintained proper posture while writing on the board and 44.6% did so sometimes. In addition, 45.1% reported always elevating their arms above

shoulder level while 52.9% did so sometimes. Such repetitive and awkward upper-limb postures may contribute to neck and shoulder discomfort.²²

Regarding wrist posture, 66.2% reported bending their wrists sometimes and 22.5% always. Only 23% always performed exercise to prevent work-related pain while 59.8% exercised sometimes and 17.2% never exercised. Regular physical activity has been associated with better musculoskeletal health among teachers.¹⁹

Overall, the present study demonstrates that teachers possess good ergonomic knowledge and positive attitudes but do not consistently implement appropriate ergonomic practices. This knowledge-practice gap is consistent with previous findings showing that knowledge and attitude alone may not result in behavioural change when workplace and organizational support are inadequate.^{2,5}

Therefore, regular ergonomic training, workplace modifications, adjustable classroom furniture, promotion of exercise and supportive institutional policies are recommended to reduce MSD and improve teachers' occupational health and productivity.^{1,2,11,12}

CONCLUSION

School teachers had good knowledge and a positive attitude toward ergonomics, but ergonomic practices were not consistently followed. The high prevalence of work-related musculoskeletal pain and limited ergonomic training highlight the need for ergonomic education, workplace modifications and regular training programs to improve teachers' health and reduce Musculoskeletal disorders.

Declaration by Authors

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Conflict of Interest: No conflicts of interest declared.

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