

## Effect of Comprehensive Body Mechanics Demonstration on Back Pain among Teachers

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### Abstract

Background: Back pain is one of the most common health issues among adults. School teachers are particularly vulnerable to low back pain due to the physically demanding nature of their daily work, which involves prolonged standing, repetitive movements, and awkward postures.

Aim and Objectives: The study aimed to assess the effectiveness of a comprehensive body mechanics demonstration in improving knowledge and reducing back pain among teachers suffering from back pain in selected colleges.

Materials and Methods: A total of 60 teachers with back pain were selected using a one-group pre-test post-test design. A pre-test was conducted to assess knowledge regarding body mechanics, followed by an intervention involving a practical demonstration on correct body mechanics. A post-test was conducted after seven days. Data were analyzed using descriptive and inferential statistics.

Results: Before the intervention, 43.33% of participants reported severe pain, and 65.33% had poor knowledge regarding body mechanics. After the intervention, 68.33% demonstrated good knowledge, 25% had average knowledge, and only 6.66% had poor knowledge. The pre-test mean score was  $9.95 \pm 5.173$ , and the post-test mean score was  $17.97 \pm 4.442$ , showing a significant improvement in knowledge ( $t = 9.111$ ,  $p < 0.0001$ ). No significant association was found between socio-demographic variables and knowledge levels.

Conclusion: The comprehensive body mechanics demonstration was effective in significantly improving teachers' knowledge and awareness regarding correct posture and body mechanics, thereby reducing back pain. Educational interventions focusing on body mechanics can serve as an effective, low-cost strategy to promote musculoskeletal health among teachers.

Keywords: Back pain, Body mechanics, Teachers, Knowledge improvement, Musculoskeletal health, Educational intervention

### Introduction

Low back pain is defined as discomfort or pain localized between the lower costal margins and the gluteal folds, occurring at least once a month, with or without radiation extending below the knee.<sup>[1]</sup> It may be classified as acute, sub-acute, or chronic based on the duration of symptoms. Lumbar disc prolapse remains one of the leading causes of disability worldwide. The annual incidence of herniated disc cases ranges from 5 to 20 per 1,000 adults, most commonly affecting individuals between the third and fifth decades of life, with a male-to-female ratio of approximately 2:1.<sup>[2]</sup>

Low back pain is a major cause of work absenteeism and medical consultation. It can result from injury, occupational strain, or underlying medical conditions, and may affect individuals of all ages. Its prevalence is influenced by factors such as gender, age, education level, and occupation, along with psychosocial and physical stressors.<sup>[3-5]</sup> Teachers, in particular, are at higher risk due to their daily work activities involving prolonged standing, repetitive movements, and awkward postures.

Body mechanics refers to the safe and efficient use of the body during activities such as sitting, standing, lifting, carrying, bending, and sleeping.<sup>[6]</sup> Practicing proper body mechanics helps prevent and relieve back problems, whereas poor mechanics often contribute to musculoskeletal strain and spinal injuries. Maintaining correct posture and spinal alignment during movement is essential to reduce the risk of both acute and cumulative injuries.<sup>[7]</sup> For individuals with lumbar disc prolapse or chronic back pain, applying the principles of body mechanics in routine activities can protect the spine and prevent further complications.<sup>[2]</sup>

Educational interventions focusing on body mechanics have proven effective in promoting awareness and healthy movement habits. Such programs enable individuals to perform daily activities safely, thereby reducing the burden of back pain and improving overall musculoskeletal health.<sup>[2]</sup>

The present study was undertaken to assess the effectiveness of a comprehensive body mechanics demonstration in improving knowledge and reducing back pain among teachers suffering from back pain.

## Materials and Methods

### Study Design and Setting

A quantitative research approach was adopted for the present study, utilizing a one-group pre-test post-test design. The study was conducted among teachers from selected colleges experiencing back pain. A total of 60 participants were selected through a convenience sampling technique based on predefined inclusion and exclusion criteria. A written informed consent was obtained from all participants before data collection and confidentiality and anonymity were maintained throughout the study. The research instruments consisted of a structured tool divided into three sections. Section I included a performa designed to collect the socio-demographic data of participants. Section II employed the Numerical Rating Scale (NRS), a standardized 0–10 scale used to assess the intensity of back pain. Section III comprised a structured knowledge questionnaire on body mechanics to evaluate participants' understanding before and after the intervention.

### Intervention

During the pre-test phase, baseline data and knowledge regarding body mechanics were assessed using the structured questionnaire. Participants then received a practical demonstration on comprehensive body mechanics, which included correct techniques for sitting, standing, lifting, carrying, bending, and performing daily activities to prevent back strain. The post-test was conducted seven days after the intervention using the same structured questionnaire to assess changes in knowledge and pain intensity.

### Study Variables

- Independent Variable: Demonstration of comprehensive body mechanics.
- Dependent Variable: Level of knowledge regarding body mechanics and intensity of back pain.

### Data Analysis

The collected data were analyzed using descriptive and inferential statistics. Frequency, percentage, mean, and standard deviation were used to summarize socio-demographic characteristics and pain scores. The paired t-test was applied to determine the effectiveness of the intervention in reducing back pain and improving knowledge among the participants.

## Results

### Demographic characteristics of the study population

The study included a total of 60 teachers from selected colleges who were suffering from back pain. The demographic details of the participants are presented in Table 1.

**Table 1: Frequency and percentage distribution of participants according to their demographic variables (n = 60)**

Demographic Variables		Experimental Group	
		F	%
Age (Years)	20-30	36	60%
	31-40	8	13.33%
	41-50	14	23.33%
	50-60	2	3.33%
Gender	Male	38	63.33%
	Female	22	36.67%
Education	Professional Degree	17	28.33%
	Graduate or post graduate	43	71.66%
Residency	Urban	35	58.33%
	Rural	25	41.66%
Type of Family	Joint family	27	45%
	Nuclear family	31	51.67%
	Extended family	2	3.33%
Teaching Experience (Years)	<1	27	45%
	1-5	18	30%
	6-10	8	13.33%
	<10	7	11.67%
Monthly Family Income (Rupees)	<52,000/-	7	11.67%
	26,000-52,000/-	23	38.33%
	19,000-26,000/-	26	43.33%
	13,000-19,000/-	4	6.67%

The data indicate that the majority of participants, 36 (60%), were in the age group of 20–30 years, and most were male teachers, 17(28.33%), had Professional Degree, Most teachers, 35 (58.33%), resided in urban areas, and 31 (51.67%) belonged to nuclear families, 38 (63.33%). Nearly half of the teachers, 27 (45%), had less than one year of teaching experience. Regarding income, 26 (43.33%) participants had a monthly income between ₹19,000–₹26,000.

#### **Level of Pain Among Participants**

Table 2 presents the distribution of participants according to their pain levels as measured by the Numerical Rating Scale (NRS).

**Table 2: Distribution of participants according to their pain level (n = 60)**

Level of Pain	Experimental Group	
	Frequency	Percentage
No pain (0)	0	0.00
Mild pain (1–3)	16	26.67
Moderate pain (4–6)	13	21.67
Severe pain (7–10)	26	43.33
Worst pain ever felt (10)	5	8.33

The findings reveal that a majority of participants, 26 (43.33%), reported severe pain, followed by 16 (26.67%) who had mild pain, and 13 (21.67%) with moderate pain. Only 5 (8.33%) participants reported experiencing the worst pain.

#### **Pre-Test Knowledge Score on Body Mechanics**

Table 3 shows the pre-test knowledge scores of teachers regarding body mechanics.

**Table 3: Pre-test and post-test knowledge score regarding body mechanics (n = 60)**

<i>Pre-Test Knowledge Score</i>		
Knowledge Level	Experimental Group	
	Frequency	Percentage
Good (18–25)	5	8.00
Average (11–17)	16	26.33
Poor (3–10)	39	65.33
<i>Post-Test Knowledge Score</i>		
Good (18–25)	41	68.33
Average (11–17)	15	25.00
Poor (3–10)	4	6.66

Before the intervention, the majority of participants, 39 (65.33%), demonstrated poor knowledge of body mechanics, while 16 (26.33%) had an average level, and only 5 (8%) exhibited good knowledge.

After the intervention, the majority of participants, 41 (68.33%), demonstrated good knowledge of body mechanics, while 15 (25.00%) had an average level, and only 4 (6.66%) exhibited poor knowledge.

#### **Comparison of Pre-Test and Post-Test Knowledge Scores**

Table 5 displays the comparison of pre-test and post-test knowledge scores of participants.

Test	Mean ± SD	T Value	P Value
Pre-test	9.95 ± 5.173	9.111	< 0.0001
Post-test	17.97 ± 4.442		

The pre-test mean score was 9.95 ± 5.17, whereas the post-test mean score increased to 17.97 ± 4.44. The difference between the two was statistically significant (t = 9.111, p < 0.0001), indicating that the demonstration of comprehensive body mechanics effectively improved participants' knowledge.

#### **Association Between Socio-Demographic Variables and Knowledge Levels**

No significant association was found between socio-demographic variables (such as age, gender, income, teaching experience, residency, or family type) and the level of knowledge regarding body mechanics among the participants.

## Discussion

The present study assessed the effectiveness of body mechanics training in improving knowledge and reducing pain among school teachers experiencing low back pain. The findings revealed a statistically significant improvement in post-test knowledge scores following the intervention, indicating that body mechanics education effectively enhanced awareness and understanding of correct posture and movement practices.

The demographic data showed that the majority of participants (60%) belonged to the 20–30 years age group, with most being male teachers (63.33%). Nearly half of the subjects (45%) had less than one year of teaching experience, and a large proportion (43.33%) reported a monthly income between ₹19,000–26,000. The majority resided in urban areas (58.33%) and belonged to nuclear families (51.66%).

In terms of pain levels, most participants (43.33%) experienced severe pain, followed by mild (26.67%) and moderate (21.67%) pain, while 8.33% reported the worst possible pain. After the intervention, there was a notable improvement in knowledge regarding body mechanics, with the mean pre-test score ( $9.95 \pm 5.173$ ) increasing to  $17.97 \pm 4.442$  post-test. This difference was statistically significant ( $t = 9.111$ ,  $p < 0.0001$ ), confirming the effectiveness of the educational intervention.

The findings of this study are consistent with those of Akter et al. [8], who reported that most school teachers experiencing low back pain were aged 25–34 years (60%). Similar results were found by Beheral & Kole [9], who observed that the majority of teachers with low back pain were males (75%). Likewise, Gemedo et al. [10] found that 39.61% of teachers reported moderate levels of pain in a multicenter cross-sectional study conducted in Ethiopia.

The present study's results also align with Mary [11], who observed that 53.3% of participants reported severe low back pain and 46.7% moderate pain before intervention with McKenzie therapy. Furthermore, Ibrahim & Atya [2] demonstrated that implementing a body mechanics training program significantly improved knowledge scores and reduced low back pain and disability among patients with lumbar disc prolapse.

The current study reinforces the importance of structured training programs on body mechanics for teachers, who are at risk of work-related musculoskeletal issues. The improvement in knowledge scores post-intervention highlights that awareness-based strategies can play a crucial role in promoting proper body posture and preventing occupational low back pain.

## Conclusion

The present study adds to the growing body of evidence highlighting the high prevalence of back pain among school teachers and emphasizes that structured demonstration of body mechanics is an effective method to enhance knowledge and promote back care awareness, thereby contributing to the prevention and management of work-related musculoskeletal discomfort.

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