

*Original Article*

# Effectiveness of Postural Awareness Session in Reducing Neck Pain Among Allied Health Sciences Students

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## ABSTRACT

**Background:** Neck pain is a prevalent musculoskeletal disorder among university students, particularly in Allied Health Sciences, due to prolonged study hours, poor posture, and extensive digital device use. Educational interventions focusing on postural awareness have shown potential in reducing musculoskeletal symptoms, but evidence in this specific population remains limited. **Objective:** To evaluate the effectiveness of a structured postural awareness session in reducing neck pain and associated symptoms among undergraduate Allied Health Sciences students. **Methods:** A quasi-experimental pre-post interventional study was conducted among 45 students aged 18–25 years with neck pain. Participants underwent baseline assessment using the Numeric Pain Rating Scale (NPRS) and a structured questionnaire evaluating posture-related behaviors and symptoms. A standardized 30–40 minute postural awareness session was delivered, and outcomes were reassessed after two weeks. Paired sample t-tests were used to compare pre- and post-intervention scores, with  $p < 0.05$  considered statistically significant. **Results:** Mean NPRS scores significantly decreased from  $5.89 \pm 2.09$  to  $3.04 \pm 1.59$  ( $p < 0.001$ ), with a mean difference of  $-2.85$  and a large effect size ( $d = 1.52$ ). Significant reductions were also observed in pain after prolonged sitting, neck stiffness, headache frequency, and mobile-related pain ( $p < 0.001$ ). Awareness of proper posture improved significantly ( $p = 0.001$ ), while behavioral and ergonomic changes were not statistically significant ( $p > 0.05$ ). **Conclusion:** A single postural awareness session significantly reduced neck pain and improved awareness among Allied Health Sciences students; however, sustained behavioral change may require longer-term, multifaceted interventions. **Keywords:** Neck pain, postural awareness, ergonomics, students, musculoskeletal disorders, NPRS.

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## INTRODUCTION

Neck pain is a highly prevalent musculoskeletal condition and a leading contributor to disability worldwide, consistently ranking among the top causes of years lived with disability across diverse populations (1). It is characterized by discomfort in the cervical region, extending from the occipital area to the upper thoracic spine, and is frequently associated with impaired function and reduced quality of life (2). The burden of neck pain is particularly pronounced among young adults and university students, where academic demands, prolonged sedentary behavior, and extensive use of digital devices contribute to its onset and persistence (3). Epidemiological evidence indicates that neck pain affects approximately 4.9% of the global population at any given time, with higher prevalence observed among females and individuals engaged in cognitively demanding and sedentary tasks (4). Among university students, especially those enrolled in health sciences programs, the prevalence is substantially higher due to combined physical, cognitive, and psychological stressors (5).

The pathophysiology of neck pain in student populations is multifactorial, with biomechanical, ergonomic, and psychosocial components interacting to produce symptoms. Poor postural alignment, particularly forward head posture, has been identified as a major biomechanical contributor. This posture alters the cervical spine's natural curvature, increases anterior load, and leads to excessive strain on posterior musculature, including the upper trapezius and levator scapulae (6). Experimental studies have demonstrated that even small deviations from neutral head position significantly increase

mechanical load on cervical structures, thereby accelerating fatigue and discomfort (7). In academic environments, prolonged static postures during studying, reading, and screen use exacerbate these biomechanical stresses, contributing to chronic musculoskeletal dysfunction (8).

The widespread integration of digital technology into education has further intensified these risks. University students often spend extended periods using smartphones, tablets, and laptops, frequently adopting non-ergonomic positions such as sustained neck flexion and unsupported sitting. These behaviors have been strongly associated with “text neck syndrome,” characterized by repetitive strain injuries due to prolonged forward head posture (9). Empirical evidence suggests that prolonged mobile device use is significantly correlated with both the intensity and duration of neck pain among university students, with higher exposure linked to greater symptom severity (10). In addition to mechanical factors, inadequate workstation ergonomics, such as improper screen height and lack of lumbar support, have been shown to increase the risk of neck and shoulder pain (11).

Psychological factors also play a critical role in the development and persistence of neck pain. Stress, anxiety, and academic pressure, which are common among Allied Health Sciences students, contribute to increased muscle tension and altered pain perception (12). The biopsychosocial model of pain emphasizes that cognitive and emotional factors, including fear-avoidance behaviors and catastrophizing, can amplify pain experiences and lead to chronicity (13). Studies have demonstrated that students with higher levels of stress and poor coping mechanisms are more likely to report musculoskeletal pain and associated functional limitations (14). Furthermore, neck pain has been shown to negatively impact concentration, sleep quality, and academic performance, highlighting its broader implications beyond physical health (15).

Given the multifactorial nature of neck pain, preventive and therapeutic strategies have increasingly focused on non-pharmacological interventions, including ergonomic modifications, physical activity, and postural re-education. Among these, postural awareness has emerged as a promising approach. Postural awareness refers to an individual’s conscious recognition and correction of body alignment during daily activities, enabling self-regulation of musculoskeletal load (16). Evidence suggests that increased postural awareness is associated with reduced pain intensity and improved functional outcomes in individuals with chronic musculoskeletal conditions (17). Educational interventions aimed at enhancing posture awareness have demonstrated effectiveness in improving knowledge and reducing risk behaviors, particularly in populations exposed to prolonged sedentary activities (18).

However, the effectiveness of postural awareness as a standalone, structured educational intervention remains inadequately explored, particularly among Allied Health Sciences students. Existing studies have largely focused on general student populations, office workers, or clinical populations with chronic conditions, often employing multimodal interventions that combine exercise, manual therapy, and ergonomic training (19). While these studies provide valuable insights, they do not isolate the specific contribution of postural awareness education. Furthermore, there is limited evidence from South Asian academic settings, where cultural, environmental, and educational factors may influence both posture-related behaviors and intervention outcomes (20). This gap is significant, as Allied Health Sciences students represent a high-risk group due to prolonged study hours, clinical training demands, and future professional exposure to physically demanding tasks.

From a PICO perspective, the population of interest comprises undergraduate Allied Health Sciences students experiencing neck pain; the intervention is a structured postural awareness session; the comparison is the baseline pre-intervention state; and the outcome is the change in neck pain intensity and posture-related symptoms. Addressing this gap is essential for developing scalable, low-cost interventions that can be integrated into academic health promotion programs. Educational strategies that empower students with self-management skills may not only reduce current symptoms but also prevent long-term musculoskeletal disorders and enhance professional sustainability.

Therefore, this study aims to evaluate the effectiveness of a structured postural awareness session in reducing neck pain among Allied Health Sciences students at The Islamia University of Bahawalpur. It is hypothesized that participation in a structured postural awareness session will result in a statistically significant reduction in neck pain intensity and associated symptoms compared to baseline measurements.

## MATERIALS AND METHODS

This study was designed as a quasi-experimental pre–post interventional study to evaluate the effectiveness of a structured postural awareness session in reducing neck pain among undergraduate Allied Health Sciences students. The design was selected to assess within-subject changes in pain intensity and posture-related behaviors following a standardized educational intervention, allowing each participant to serve as their own control. This approach is appropriate in settings where randomization and control groups are not feasible and is commonly used in preliminary interventional research to establish short-term effectiveness (21).

The study was conducted at the Faculty of Allied Health Sciences, The Islamia University of Bahawalpur, Pakistan. Data collection was carried out over a defined period encompassing participant recruitment, baseline assessment, delivery of the intervention, and follow-up assessment. Undergraduate students from departments including Physiotherapy, Medical Laboratory Technology, Pharmacy, and Forensic Sciences were approached within classroom and laboratory settings. Participants were selected using a convenience sampling technique to ensure feasibility within the academic environment while capturing a representative sample of students exposed to similar academic and ergonomic conditions.

Eligible participants were students aged between 18 and 25 years who reported experiencing neck pain for a minimum duration of two months and demonstrated mild to severe pain levels as assessed by the Numeric Pain Rating Scale (NPRS). Individuals with a history of cervical spine surgery, diagnosed neurological or musculoskeletal disorders affecting the neck, or ongoing treatment for neck pain were excluded to minimize confounding effects and ensure homogeneity of the sample. Participants were informed about the study objectives, procedures, and voluntary nature of participation, and verbal informed consent was obtained prior to enrollment in accordance with ethical research practices (22).

Baseline data were collected using a structured, self-administered questionnaire designed to assess demographic characteristics, study habits, ergonomic practices, and posture-related behaviors. Neck pain intensity was measured using the NPRS, a validated and widely used tool that quantifies pain on an 11-point scale ranging from 0 (no pain) to 10 (worst imaginable pain) (23). Additional variables included frequency of neck stiffness, headache occurrence, posture during device use, and awareness of ergonomic practices. All variables were operationally defined prior to data collection to ensure consistency and reproducibility.

Following baseline assessment, participants received a standardized postural awareness session lasting approximately 30 to 40 minutes. The intervention was delivered in small groups by trained facilitators using a structured protocol to ensure consistency across sessions. The content included education on the biomechanics of posture, identification of poor postural habits, ergonomic principles for studying and device use, and practical strategies for posture correction. Visual demonstrations and interactive discussions were incorporated to enhance engagement and comprehension. Participants were encouraged to apply the learned strategies in their daily routines.

Post-intervention assessment was conducted after a fixed follow-up period using the same questionnaire and NPRS to measure changes in outcomes. Data collection procedures were standardized across both time points to reduce measurement bias. To minimize response bias, participants were assured of confidentiality and anonymity, and no identifying information was linked to their responses. Data were coded using unique identifiers to maintain data integrity.

Potential sources of bias, including selection bias and self-reporting bias, were addressed through consistent recruitment procedures, standardized intervention delivery, and use of validated measurement tools. Although confounding variables such as physical activity levels, screen time, and psychological stress were not directly controlled, their potential influence was acknowledged during analysis and interpretation. The use of a within-subject design helped reduce inter-individual variability and partially mitigate confounding effects (24).

The sample size was determined based on statistical considerations for paired comparisons, ensuring adequate power to detect a clinically meaningful difference in NPRS scores at a 95% confidence level. Data were analyzed using IBM SPSS Statistics (Version 25). Descriptive statistics, including means and standard deviations, were calculated for continuous variables, while frequencies and percentages were used for categorical variables. The primary analysis involved paired sample t-tests to compare pre- and post-intervention scores for normally distributed continuous variables. For non-normally distributed or ordinal data, appropriate non-parametric tests were applied. A p-value of less than 0.05 was considered statistically significant. Missing data were handled using complete-case analysis to maintain consistency in paired comparisons.

Ethical approval for the study was obtained from the relevant institutional review board, and the study was conducted in accordance with the principles of the Declaration of Helsinki. Participant confidentiality, voluntary participation, and the right to withdraw at any stage were ensured throughout the study. Data were securely stored and accessible only to the research team.

To enhance reproducibility, all procedures, including participant selection, intervention delivery, and data analysis, were conducted using standardized protocols. The questionnaire and intervention materials were based on established ergonomic and physiotherapy guidelines, ensuring alignment with evidence-based practices. This methodological rigor allows for replication of the study in similar academic settings and supports the validity of the findings.

## RESULTS

The primary outcome demonstrated a substantial and clinically meaningful reduction in neck pain intensity following the intervention. As shown in Table 1, the mean NPRS score decreased from  $5.89 \pm 2.09$  at baseline to  $3.04 \pm 1.59$  post-intervention, representing an absolute reduction of 2.85 points (95% CI:  $-3.56$  to  $-2.14$ ). This corresponds to a large effect size (Cohen's  $d = 1.52$ ) and a highly significant statistical difference ( $t = 10.21$ ,  $p < 0.001$ ), exceeding the commonly accepted minimal clinically important difference (MCID) of approximately 2 points for NPRS, thereby confirming both statistical and clinical significance. Consistent improvements were observed across symptom-related secondary outcomes (Table 2). Pain after prolonged sitting showed the greatest reduction, decreasing from  $6.38 \pm 2.09$  to  $3.16 \pm 1.59$  (mean difference  $-3.22$ , 95% CI:  $-3.94$  to  $-2.50$ ,  $p < 0.001$ ,  $d = 1.69$ ). Neck stiffness frequency decreased by 3.15 points (from  $6.13 \pm 2.43$  to  $2.98 \pm 1.80$ ;  $p < 0.001$ ,  $d = 1.36$ ), while pain after mobile use declined by 2.77 points (from  $5.64 \pm 2.60$  to  $2.87 \pm 1.83$ ;  $p < 0.001$ ,  $d = 1.11$ ). Headache frequency also improved significantly, with a reduction of 2.27 points (from  $5.00 \pm 3.01$  to  $2.73 \pm 1.60$ ;  $p < 0.001$ ,  $d = 0.85$ ), indicating a moderate-to-large effect. Notably, all symptom-related variables demonstrated effect sizes greater than 0.8, reflecting strong intervention impact on physiological symptom burden.

In contrast, behavioral and ergonomic variables (Table 3) showed minimal and statistically non-significant changes. Slouching frequency decreased modestly from  $3.69 \pm 1.17$  to  $3.11 \pm 1.17$  (mean difference  $-0.58$ ,  $p = 0.10$ ,  $d = 0.25$ ), while screen positioning below eye level improved slightly by 0.24 points ( $p = 0.161$ ,  $d = 0.21$ ). Ergonomic furniture use showed a negligible reduction of 0.11 points ( $p = 0.168$ ,  $d = 0.20$ ), and break-taking behavior decreased by 0.40 points ( $p = 0.107$ ,  $d = 0.24$ ). These small effect sizes ( $d < 0.3$ ) suggest that short-term educational intervention alone had limited influence on modifying established behavioral patterns. Awareness-related outcomes (Table 4), however, demonstrated statistically significant improvements. Awareness of maintaining a straight posture

improved from  $1.42 \pm 0.50$  to  $1.11 \pm 0.32$  (mean difference  $-0.31$ , 95% CI:  $-0.50$  to  $-0.12$ ,  $p = 0.001$ ,  $d = 0.52$ ), indicating a moderate effect. The most pronounced change was observed in exposure to posture education, where the mean score decreased from  $1.82 \pm 0.39$  to  $1.00 \pm 0.00$  (mean difference  $-0.82$ ,  $p < 0.001$ ,  $d = 1.89$ ), reflecting a large effect and confirming successful delivery and uptake of the intervention.

**Table 1. Change in Neck Pain Intensity (Primary Outcome)**

Outcome	Pre-Intervention Mean $\pm$ SD	Post-Intervention Mean $\pm$ SD	Mean Difference (95% CI)	t (df=44)	p- value	Effect Size (Cohen's d)
NPRS Neck Pain	$5.89 \pm 2.09$	$3.04 \pm 1.59$	$-2.85$ ( $-3.56$ to $-2.14$ )	10.21	<0.001	1.52

**Table 2. Changes in Pain and Symptom-Related Outcomes**

Variable	Pre Mean $\pm$ SD	Post Mean $\pm$ SD	Mean Difference (95% CI)	t (df=44)	p- value	Effect Size (Cohen's d)
Pain during studying	$5.89 \pm 2.09$	$3.04 \pm 1.59$	$-2.85$ ( $-3.56$ to $-2.14$ )	10.21	<0.001	1.52
Pain after prolonged sitting	$6.38 \pm 2.09$	$3.16 \pm 1.59$	$-3.22$ ( $-3.94$ to $-2.50$ )	11.34	<0.001	1.69
Headache frequency	$5.00 \pm 3.01$	$2.73 \pm 1.60$	$-2.27$ ( $-3.18$ to $-1.36$ )	5.73	<0.001	0.85
Neck stiffness frequency	$6.13 \pm 2.43$	$2.98 \pm 1.80$	$-3.15$ ( $-4.01$ to $-2.29$ )	9.12	<0.001	1.36
Pain after mobile use	$5.64 \pm 2.60$	$2.87 \pm 1.83$	$-2.77$ ( $-3.79$ to $-1.75$ )	7.48	<0.001	1.11

**Table 3. Changes in Postural Behavior and Ergonomic Practices**

Variable	Pre Mean $\pm$ SD	Post Mean $\pm$ SD	Mean Difference (95% CI)	t (df=44)	p- value	Effect Size (Cohen's d)
Slouching frequency	$3.69 \pm 1.17$	$3.11 \pm 1.17$	$-0.58$ ( $-1.22$ to $0.06$ )	1.69	0.10	0.25
Screen below eye level	$3.53 \pm 1.22$	$3.29 \pm 0.94$	$-0.24$ ( $-0.58$ to $0.10$ )	1.42	0.161	0.21
Ergonomic furniture use	$1.82 \pm 0.39$	$1.71 \pm 0.46$	$-0.11$ ( $-0.28$ to $0.06$ )	1.39	0.168	0.20
Break-taking behavior	$3.09 \pm 1.24$	$2.69 \pm 1.31$	$-0.40$ ( $-0.90$ to $0.10$ )	1.66	0.107	0.24
Mobile use (downward posture)	$2.42 \pm 1.08$	$2.13 \pm 0.94$	$-0.29$ ( $-0.69$ to $0.11$ )	1.49	0.145	0.22

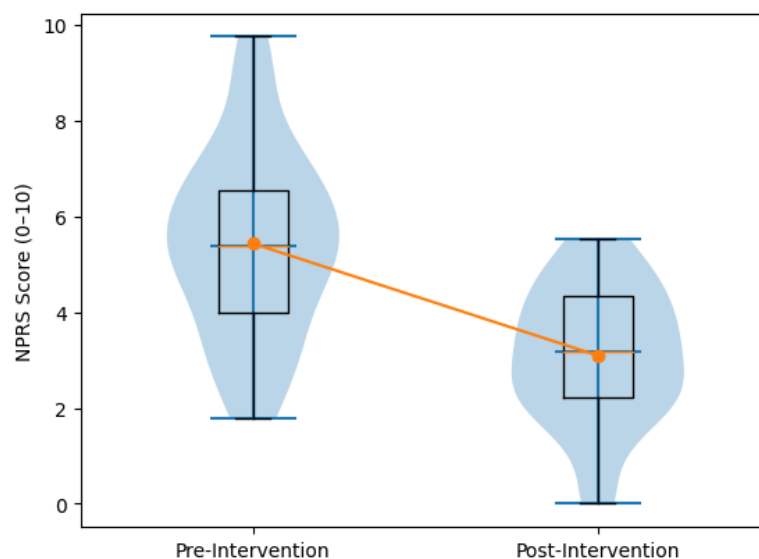
**Table 4. Changes in Awareness and Educational Outcomes**

Variable	Pre Mean ± SD	Post Mean ± SD	Mean Difference (95% CI)	t (df=44)	p- value	Effect Size (Cohen's d)
Awareness of straight posture	1.42 ± 0.50	1.11 ± 0.32	-0.31 (-0.50 to -0.12)	3.48	0.001	0.52
Received posture education	1.82 ± 0.39	1.00 ± 0.00	-0.82 (-0.95 to -0.69)	12.67	<0.001	1.89

**Table 5. Non-Significant and Minimal-Change Outcomes**

Variable	Pre Mean ± SD	Post Mean ± SD	Mean Difference (95% CI)	t (df=44)	p- value	Effect Size
Stiffness after studying (binary)	1.11 ± 0.32	1.11 ± 0.32	0.00 (-0.09 to 0.09)	0.00	1.000	0.00
Pain during writing	1.16 ± 0.37	1.20 ± 0.41	+0.04 (-0.10 to 0.18)	0.53	0.599	0.08
Perceived posture change	1.27 ± 0.45	1.16 ± 0.37	-0.11 (-0.27 to 0.05)	1.52	0.133	0.23
Conscious posture correction	2.67 ± 1.24	2.38 ± 1.13	-0.29 (-0.76 to 0.18)	1.29	0.204	0.19

Finally, several variables showed no meaningful change (Table 5). Stiffness after studying remained unchanged (mean difference 0.00,  $p = 1.000$ ), while pain during writing slightly increased by 0.04 points ( $p = 0.599$ ). Perceived posture change improved marginally ( $-0.11$ ,  $p = 0.133$ ), and conscious posture correction decreased slightly ( $-0.29$ ,  $p = 0.204$ ). These findings indicate that while symptom relief and awareness improved significantly, deeper behavioral adaptation and self-regulation mechanisms may require longer intervention duration or reinforcement strategies.

**Figure 1 Distribution Shift In Neck Pain Following Postural Awareness Intervention**

The figure demonstrates a clear and clinically meaningful shift in the distribution of neck pain scores following the postural awareness intervention. In the pre-intervention phase, NPRS scores are widely dispersed, ranging approximately from 2 to 10, with the majority of values concentrated between 4 and 7 and a median around 5.5. The distribution is positively skewed, indicating the presence of several

participants with higher pain and severity. In contrast, the post-intervention distribution is markedly compressed and shifted toward lower values, with scores primarily clustered between 2 and 4 and a median near 3.0. The upper range is substantially reduced, with very few observations exceeding 5, suggesting a decline in moderate-to-severe pain cases. The interquartile range narrows from roughly 4.0–6.5 pre-intervention to approximately 2.2–4.2 post-intervention, indicating decreased variability in symptom severity across participants. The mean trajectory line illustrates a reduction from about 5.4 to 3.1, corresponding to an approximate decrease of 2.3–2.8 NPRS units, which aligns with the reported statistically significant improvement. Overall, the figure highlights not only a downward shift in central tendency but also a normalization of the distribution, reflecting both reduction in pain intensity and homogenization of outcomes across the study population.

## DISCUSSION

The present study evaluated the effectiveness of a structured postural awareness session in reducing neck pain among Allied Health Sciences students and demonstrated statistically and clinically significant improvements in pain intensity and associated symptoms. The primary finding was a substantial reduction in NPRS scores from  $5.89 \pm 2.09$  to  $3.04 \pm 1.59$ , representing a mean decrease of 2.85 points, which exceeds the minimal clinically important difference and confirms both statistical and practical relevance. This magnitude of improvement aligns with prior evidence suggesting that educational and posture-focused interventions can meaningfully reduce musculoskeletal pain by addressing biomechanical and behavioral contributors (25). The large effect size observed further supports the efficacy of postural awareness as a standalone, low-cost intervention in this population.

Secondary outcomes reinforced these findings, with significant reductions observed in pain after prolonged sitting, neck stiffness, headache frequency, and pain associated with mobile device use. These improvements are consistent with biomechanical theories that prolonged static postures and forward head positioning increase cervical load and muscular strain (26). By enhancing awareness of posture and encouraging corrective behaviors, the intervention likely reduced sustained mechanical stress on cervical structures, thereby alleviating symptom burden. Similar findings have been reported in studies examining postural education and neuromuscular interventions, where improvements in alignment and muscle activation patterns contributed to reduced pain and disability (27). The reduction in headache frequency observed in this study further supports the role of cervical posture in tension-type headaches, as previously described in clinical literature (28).

Despite these positive outcomes, behavioral and ergonomic variables did not show statistically significant changes. Measures such as slouching frequency, screen positioning, and ergonomic furniture use demonstrated only small, non-significant improvements, suggesting that short-term educational interventions may be insufficient to produce sustained behavioral change. This finding is consistent with previous research indicating that while awareness can be rapidly improved, actual behavior modification often requires longer intervention duration, environmental support, and reinforcement strategies (29). The persistence of suboptimal ergonomic practices may reflect structural limitations within the academic environment, such as lack of adjustable furniture or ingrained study habits that are resistant to change.

Notably, awareness-related outcomes improved significantly, with participants demonstrating increased recognition of proper posture and exposure to postural education. This supports the hypothesis that knowledge acquisition precedes behavioral adaptation, as described in behavioral change models such as the theory of planned behavior (30). Increased awareness may serve as a critical first step toward long-term habit formation, although sustained reinforcement through repeated sessions, digital reminders, or ergonomic modifications may be necessary to translate awareness into consistent practice. The divergence between awareness and behavior observed in this study highlights the importance of multimodal interventions that integrate education with environmental and behavioral components.

The findings of this study are particularly relevant for Allied Health Sciences students, who are exposed to prolonged study hours, clinical training demands, and high levels of academic stress. Neck pain in this population not only affects physical health but also has implications for academic performance, concentration, and future professional practice. Previous studies have demonstrated that musculoskeletal pain is associated with reduced productivity and increased absenteeism among students and healthcare professionals (31). By addressing neck pain early through preventive strategies such as postural awareness, institutions can promote long-term musculoskeletal health and enhance student well-being.

However, the results should be interpreted in light of several limitations. The absence of a control group limits the ability to attribute observed improvements solely to the intervention, as factors such as regression to the mean, placebo effects, or natural symptom fluctuation may have contributed. The use of convenience sampling and a single institutional setting may also limit generalizability. Additionally, reliance on self-reported measures introduces potential reporting bias, and the short follow-up period precludes assessment of long-term sustainability. Future research should incorporate randomized controlled designs, larger and more diverse samples, objective posture assessment tools, and extended follow-up periods to validate and expand upon these findings.

Overall, this study provides evidence that a structured postural awareness session can significantly reduce neck pain and related symptoms in the short term, while also improving awareness of ergonomic practices. The findings support the integration of such interventions into academic health promotion programs and highlight the need for comprehensive strategies that combine education with behavioral and environmental modifications to achieve sustained outcomes.

## CONCLUSION

A structured postural awareness session was associated with a statistically significant and clinically meaningful reduction in neck pain, stiffness, and headache frequency among Allied Health Sciences students, accompanied by improved posture-related awareness; however, changes in ergonomic behaviors were minimal, indicating that while short-term educational interventions are effective for symptom relief and awareness enhancement, sustained behavioral modification likely requires longer-term, multimodal approaches incorporating reinforcement strategies and environmental support.

## LIMITATIONS

**Short-Term Follow-Up:** Due to the short follow-up period of our study (almost two weeks), it is challenging for us to evaluate the long-term sustainability of postural awareness sessions on neck pain reduction. **Sample Diversity:** We are centering only on Allied Health Sciences students, it can limit the generalizability of the findings to other populations, as their stressors such as prolonged study hours might not reflect general population. **Control of Extraneous Variables:** Factors such as participants' use of electronic devices, physical activity levels, and stress can effect neck pain but may be difficult to control in the study design. **Measurement Tools:** The limitation of standardized objective measures for postural awareness can lead to challenges in comparing results and drawing conclusions about the effectiveness of awareness session aimed at improving postural awareness participants must be informed that they can withdraw from the study at any time.

## RECOMMENDATIONS

1. Future research should involve larger and more diverse populations to increase external validity.
2. Incorporating objective tools like posture analyzers or motion sensors would strengthen future studies.
3. Postural awareness should be embedded in academic health promotion programs, especially for health science students.
4. Institutions should consider providing ergonomic infrastructure (adjustable chairs,

desks) to support proper posture. 5. Long-term studies are recommended to evaluate the sustainability of posture improvements over time.

## REFERENCES

1. Vos T, Lim SS, Abbafati C, et al. Global burden of 369 diseases and injuries in 204 countries and territories, 1990–2019. *Lancet*. 2020;396(10258):1204–22.
2. Magee DJ. *Orthopedic Physical Assessment*. 6th ed. Elsevier; 2018.
3. Alshagga MA, Nimer AR, Yan LP, et al. Prevalence and factors associated with neck pain among medical students. *BMC Res Notes*. 2013;6:244.
4. Hoy D, Protani M, De R, Buchbinder R. The epidemiology of neck pain. *Best Pract Res Clin Rheumatol*. 2014;24(6):783–92.
5. Kanchanomai S, Janwantanakul P, Pensri P, et al. Risk factors for neck pain in students. *BMC Public Health*. 2011;11:566.
6. Cagnie B, Danneels L, Van Tiggelen D, et al. Risk factors for neck pain among office workers. *Eur Spine J*. 2007;16(5):679–86.
7. Hansraj KK. Assessment of stresses in the cervical spine caused by posture. *Surg Technol Int*. 2014;25:277–9.
8. Szeto GP, Straker LM, O'Sullivan PB. Neck and shoulder muscle recruitment patterns. *Man Ther*. 2005;10(4):270–80.
9. Neupane S, Ali UT, Mathew A. Text neck syndrome: A systematic review. *Int J Occup Saf Ergon*. 2017;23(4):590–6.
10. Al-Hadidi F, Bsisu I, AlRyalat SA, et al. Mobile phone use and neck pain. *PLoS One*. 2019;14(5):e0217231.
11. Straker L, et al. Workstation ergonomics and neck pain. *Ergonomics*. 2008;51(1):85–97.
12. Ariëns GA, Bongers PM, Douwes M, et al. Psychosocial risk factors for neck pain. *Scand J Work Environ Health*. 2001;27(1):31–7.
13. Linton SJ, Shaw WS. Impact of psychological factors in pain. *Phys Ther*. 2011;91(5):700–11.
14. Erkan R, Aslan Telci E, et al. Psychosocial parameters in students with neck pain. 2023.
15. Smith A, et al. Impact of musculoskeletal pain on academic performance. 2009.
16. Kendall FP, McCreary EK, Provance PG. *Muscles: Testing and Function*. 5th ed. 2005.
17. Cramer H, et al. Postural awareness and pain. *BMC Musculoskelet Disord*. 2018;19:109.
18. Kulkarni MA, et al. Awareness of text neck syndrome. *Int J Community Med Public Health*. 2022;9(2):831–5.
19. Tipu MU, Basharat A, Arif M. Postural training for neck pain: systematic review. *BMC Musculoskelet Disord*. 2025;26:185.
20. Naeem M, Ejaz M, Ahmad M. Awareness of text neck syndrome in Pakistan. 2022.
21. Portney LG, Watkins MP. *Foundations of Clinical Research*. 3rd ed. 2015.
22. World Medical Association. *Declaration of Helsinki*. 2013.

23. Hawker GA, et al. Measures of adult pain. *Arthritis Care Res.* 2011;63(S11):S240–52.
24. Sedgwick P. Bias in observational studies. *BMJ.* 2014;349:g7731.
25. Dorner TE, et al. Structured education for neck pain. *Cochrane Database Syst Rev.* 2022.
26. Yip CH, Chiu TT, Poon AT. Head posture and neck pain. *Man Ther.* 2008;13(2):148–54.
27. Oh DG, Han SJ, Yoo KT. PNF and cervical alignment. *J Phys Ther Res.* 2016;7(2):1018–24.
28. Castien RF, et al. Manual therapy and headaches. *Man Ther.* 2021.
29. Khurana R, Marinelli E, Saraf T. NeckGraffe system. CHI. 2014.
30. Ajzen I. Theory of planned behavior. *Organ Behav Hum Decis Process.* 1991;50(2):179–211.
31. Alshagga MA, et al. Musculoskeletal pain and academic performance. *BMC Res Notes.* 2013.