Journal of Health, Wellness and Community Research
ISSN: 3007, 0570

OPEN ACCESS

JHWCR

Type: Original Article
Published: 08 November 2025
Volume: III, **Issue**: XVI
DOI: https://doi.org/10.61919/pe778006

Correspondence
✉ Asim Raza, asimrazathakur@gmail.com

Received 24, 08, 25 **Accepted** 02, 10, 2025

Authors' Contributions
Concept: HA, AR; Design: FI, WP; Data Collection: FA, RA; Analysis: AR, UI; Drafting: SA, HA.

Declarations
No funding was received for this study. The authors declare no conflict of interest. The study received ethical approval. All participants provided informed consent.

"Click to Cite"

Knowledge, Attitude and Practices Related to Physical Ergonomics Among Non-Medical Undergraduate University Students

Hina Irshad[1], Faryal[1], Asim Raza[2], Farooq Islam[1], Razia Aslam[1], Wajida Perveen[2], Umer Ilyas[2], Sahreen Anwar[3]

1 Faculty of Allied Health Sciences, University of Chenab, Gujrat, Pakistan
2 School of Allied Health Sciences, CMH Lahore Medical College & Institute of Dentistry (NUMS), Lahore, Pakistan
3 University Institute of Physical Therapy, University of Lahore, Lahore, Pakistan

ABSTRACT

Background: *Musculoskeletal disorders (MSDs) are among the most common functional impairments linked to poor posture, prolonged static positions, and lack of ergonomic awareness. While ergonomic training is emphasized in clinical disciplines, non-medical university students—who also engage in prolonged computer and device use—remain understudied. Understanding their ergonomic awareness and behavior is essential for early prevention of posture-related problems and promoting musculoskeletal health.* ***Objective****: To assess the knowledge, attitude, and practices (KAP) related to physical ergonomics among non-medical undergraduate university students.* ***Methods****: A cross-sectional KAP survey was conducted among 384 non-medical undergraduate students from the University of Chenab, Gujrat, and the University of Punjab, Gujranwala Campus, Pakistan. Data were collected using a self-structured, validated questionnaire comprising four sections: demographics, knowledge (14 items), attitude (6 items), and practice (8 items). Reliability was confirmed with Cronbach's* $\alpha = 0.783$*. Descriptive statistics were computed, and associations among KAP components were tested using Pearson's correlation. Analyses were performed using SPSS version 23 with significance set at* $p \leq 0.05$*.* ***Results****: The mean age of participants was 20.27* $\pm$ *1.99 years, and 54.9% were females. More than half (55.2%) had good knowledge, 64.1% demonstrated a positive attitude, and 59.9% reported moderate ergonomic practice. Weak but statistically significant positive correlations were found among knowledge, attitude, and practice: knowledge–attitude (*$r = 0.188$*,* $p < 0.001$*), knowledge–practice (*$r = 0.199$*,* $p < 0.001$*), and attitude–practice (*$r = 0.112$*,* $p = 0.028$*).* ***Conclusion****: Non-medical students exhibited good ergonomic knowledge and favorable attitudes but only moderate practical application. The weak correlations among KAP dimensions suggest that awareness alone does not guarantee behavioral adherence. Integrating ergonomic education and posture training into non-medical curricula is essential to bridge this knowledge–practice gap and prevent future musculoskeletal complications.*

Keywords
Physical ergonomics; knowledge; attitude; practice; musculoskeletal disorders; university students

INTRODUCTION

The study of ergonomics, derived from the Greek words "ergo" (work) and "nomos" (natural laws), examines the relationship between humans and their working environments, emphasizing adaptation of tools and surroundings to optimize health, safety, and productivity (1). Physical ergonomics, a major subdivision, focuses on physiological, anatomical, and biomechanical characteristics that influence human movement and postural performance (2). In recent years, musculoskeletal disorders (MSDs) have emerged as one of the most prevalent health issues among students and professionals due to poor ergonomic awareness, sedentary behavior, and improper postural habits (3). The increasing use of mobile devices, prolonged sitting during academic tasks, and inadequate workstation designs have exacerbated these problems, particularly among young adults whose musculoskeletal systems are still developing (4).

While substantial literature has explored ergonomics among medical, dental, and rehabilitation students, limited attention has been paid to non-medical undergraduates who spend prolonged hours using computers and mobile devices in suboptimal physical environments. Studies have consistently shown that poor posture, repetitive strain, and lack of ergonomic education contribute to back, neck, and wrist pain among students (5). For instance, Meisha et al. (6) reported that 70% of dentists in Jeddah experienced work-related musculoskeletal disorders, predominantly in the neck and lower back, primarily due to insufficient ergonomic practice. Although this evidence highlights the occupational burden in clinical populations, similar ergonomic neglect exists in non-medical settings, where prevention and awareness initiatives are often minimal.

Ergonomics is integral not only to occupational safety but also to academic performance and psychological well-being. Inadequate workstation design and posture lead to discomfort, fatigue, and reduced attention span during learning activities (7). Moreover, the rise of digital learning has transformed ergonomic challenges, with long hours of laptop and mobile usage contributing to visual strain, carpal tunnel syndrome, and upper limb discomfort (8). The relationship between psychological stress and musculoskeletal strain is also well established. Gulzar et al. (9) demonstrated a significant association between temporomandibular joint (TMJ) pain and stress among undergraduate students, underscoring the

psychosomatic components of ergonomic dysfunction. Similarly, John et al. (10) found a strong link between body mass index (BMI) and carpal tunnel syndrome (CTS) among university students, suggesting that physical ergonomics is influenced not only by postural factors but also by individual anthropometric characteristics.

Despite this evidence, few studies have systematically evaluated the knowledge, attitude, and practice (KAP) of physical ergonomics among non-medical university students. The KAP framework offers a valuable lens to understand how awareness translates—or fails to translate—into behavioral compliance. Prior investigations in Egypt, Saudi Arabia, and Pakistan revealed that while participants often exhibit moderate knowledge and positive attitudes, ergonomic practices remain inadequate due to behavioral inertia and limited institutional support (11,12). This disparity between cognition and behavior highlights the need for targeted educational interventions promoting ergonomically safe habits early in academic life.

In Pakistan, non-medical students constitute a large proportion of the university population, yet ergonomic health promotion is rarely integrated into general education curricula. Most existing research focuses on healthcare or engineering students, leaving a gap in understanding the ergonomic awareness and behavioral patterns among those outside clinical disciplines. Identifying these gaps is crucial for developing preventive strategies that mitigate long-term musculoskeletal risk, improve learning efficiency, and promote well-being in this demographic.

The present study therefore aims to assess the knowledge, attitude, and practices related to physical ergonomics among non-medical undergraduate university students from two major institutions in Punjab, Pakistan. It hypothesizes that while students may demonstrate moderate to good knowledge and a generally positive attitude toward ergonomics, their practical adherence to ergonomic principles remains insufficient. By quantifying KAP levels and examining interrelationships among these domains, the study seeks to provide evidence-based recommendations for incorporating ergonomic education into non-medical academic programs.

MATERIAL AND METHODS

This cross-sectional observational study was designed to evaluate the knowledge, attitude, and practices (KAP) related to physical ergonomics among non-medical undergraduate university students in Punjab, Pakistan. The study was conducted at two academic settings—University of Chenab, Gujrat, and the University of Punjab, Gujranwala Campus—between September and November 2023. These institutions were selected to represent diverse academic disciplines outside the medical field, allowing a broader understanding of ergonomic awareness among general student populations. The study was approved by the Institutional Review Board of the University of Chenab (Ref. No. REG/GRT/23/AHS/-123, dated 05-09-2023), and all participants provided informed consent before inclusion.

Participants were recruited through a non-probability convenience sampling method. Eligibility criteria included enrollment as a non-medical undergraduate student aged 18 years or above and voluntary consent to participate. Students with incomplete responses, those belonging to medical or allied health programs, and individuals unwilling to participate were excluded. The minimum required sample size was calculated based on a 95% confidence level, a 5% margin of error, and an expected moderate prevalence of ergonomic awareness, yielding a target of 384 participants.

Data were collected using a pretested, self-administered questionnaire structured into four sections. Section I included demographic information such as age, gender, marital status, and year of study. Section II assessed knowledge using 14 items evaluating understanding of ergonomic concepts, workstation setup, and posture awareness. Section III measured attitude through six items exploring beliefs, motivation, and perceived importance of ergonomics in daily activities. Section IV examined practices via eight items capturing behavioral compliance with ergonomic recommendations, such as maintaining neutral posture, adjusting workstation height, and using breaks effectively. All responses were recorded on a three-point Likert scale ranging from “Yes” to “No” or “Sometimes,” with total scores converted to percentage categories. Based on established thresholds, knowledge, attitude, and practice levels were classified as poor (0–33%), moderate (34–66%), and good (67–100%).

The questionnaire’s validity was established through expert review from biostatistics and physical therapy faculty, followed by a pilot test among 30 students not included in the final sample. Internal consistency reliability was confirmed with Cronbach’s alpha of 0.783, indicating acceptable reliability. The instrument was administered in English, the instructional language at both universities. Data collectors were trained to ensure standardized administration and to reduce interviewer bias.

To minimize measurement and response bias, anonymity was maintained throughout, and participants were instructed to answer independently. Data were double-entered into Microsoft Excel and exported to SPSS version 23 for analysis. Descriptive statistics were computed as frequencies and percentages for categorical variables and means with standard deviations for continuous variables. Inferential analysis was conducted using Pearson’s chi-square test to determine associations between categorical variables and Pearson’s correlation coefficient (r) to examine the relationships among knowledge, attitude, and practice scores. Statistical significance was set at $p \leq 0.05$ with 95% confidence intervals.

To address potential confounding, demographic factors such as gender and year of study were examined as covariates. Missing data were handled using listwise deletion since the proportion of incomplete responses was <5%. All statistical procedures followed a prespecified analytic plan to ensure reproducibility and transparency. Ethical principles of voluntary participation, confidentiality, and non-maleficence were strictly observed. Data integrity was ensured by storing anonymized datasets on password-protected institutional drives accessible only to the research team. The methodological rigor of this design allows replication in similar academic settings to evaluate ergonomic awareness in non-medical populations.

RESULTS

A total of 384 non-medical undergraduate students participated in the study, with a mean age of 20.27 ± 1.99 years. Among them, 211 (54.9%) were females and 173 (45.1%) were males. The majority of respondents were unmarried (98.7%) and most were enrolled in their first academic year (54.7%). Regarding the sources of ergonomic information, 16.1% reported media as their main source, 13.5% cited friends and family, 2.3% mentioned newspapers, 1.3% reported doctors, and 66.7% selected other sources.

Table 1 presents the demographic characteristics of the participants, showing that the sample was demographically balanced in gender and age, with representation from all academic years.

Overall, results indicated that although non-medical students generally possessed adequate knowledge and a favorable attitude toward ergonomics, the translation into consistent ergonomic practice remained modest. The highest mean score was observed for attitude, reflecting good awareness but partial behavioral compliance.

The demographic distribution (Table 1) reflects a youthful sample with near-equal gender representation and predominantly first-year participants, suggesting limited formal exposure to ergonomic principles. The diversity in sources of information, with two-thirds relying on unspecified "other" sources, indicates the lack of structured ergonomic education among non-medical programs.

Table 1. Demographic Characteristics of Participants (n = 384)

Variables	Categories	n (%)	Mean ± SD
Age (years)	—	—	20.27 ± 1.99
Gender	Male	173 (45.1)	—
	Female	211 (54.9)	—
Marital Status	Married	5 (1.3)	—
	Unmarried	379 (98.7)	—
Year of Study	Year I	210 (54.7)	—
	Year II	68 (17.7)	—
	Year III	22 (5.7)	—
	Year IV	84 (21.9)	—
Source of Ergonomic Information	Media	62 (16.1)	—
	Newspaper	9 (2.3)	—
	Friends/Family	52 (13.5)	—
	Doctors	5 (1.3)	—
	Others	256 (66.7)	—

Analysis of KAP scores revealed that 55.2% of participants demonstrated good knowledge, 37.8% moderate, and 7.0% poor knowledge of ergonomics. In terms of attitude, 64.1% showed a positive outlook while 35.9% reflected a negative attitude toward ergonomic practices. For the practice domain, 59.9% demonstrated moderate practice, 36.5% good practice, and only 3.6% poor practice. The mean percentage scores for knowledge, attitude, and practice were 66.38 ± 18.25, 67.06 ± 22.89, and 61.36 ± 18.66, respectively, as shown in Table 2.

Table 2. Knowledge, Attitude, and Practice Levels Among Participants

Variable	Category	n (%)	Mean ± SD
Knowledge	Poor (0–33%)	27 (7.0)	66.38 ± 18.25
	Moderate (34–66%)	145 (37.8)	
	Good (67–100%)	212 (55.2)	
Attitude	Negative (0–50%)	138 (35.9)	67.06 ± 22.89
	Positive (51–100%)	246 (64.1)	
Practice	Poor (0–33%)	14 (3.6)	61.36 ± 18.66
	Moderate (34–66%)	230 (59.9)	
	Good (67–100%)	140 (36.5)	

Correlation analysis demonstrated weak but statistically significant positive associations among the three domains. Knowledge was positively correlated with attitude ($r = 0.188$, $p < 0.001$) and practice ($r = 0.199$, $p < 0.001$), whereas attitude showed a smaller but significant correlation with practice ($r = 0.112$, $p = 0.028$), as presented in Table 3.

Table 3. Correlation Among Knowledge, Attitude, and Practice

Association	Pearson's r	95% CI	p-value	Interpretation
Knowledge vs Attitude	0.188	0.09–0.28	<0.001	Weak positive, significant
Knowledge vs Practice	0.199	0.10–0.30	<0.001	Weak positive, significant
Attitude vs Practice	0.112	0.01–0.21	0.028	Weak positive, significant

Table 2 illustrates that over half of the respondents achieved good knowledge scores (mean = 66.38 ± 18.25), while nearly two-thirds demonstrated positive attitudes (mean = 67.06 ± 22.89). Despite this, only one-third achieved good practice scores (mean = 61.36 ± 18.66), underscoring a notable gap between knowledge acquisition and behavioral implementation.

Table 3 further highlights this discrepancy by showing that although all KAP domains were positively correlated, the strength of association was weak ($r = 0.112$–0.199). This suggests that improved knowledge does not linearly translate into improved practice without active reinforcement through ergonomic training and institutional awareness initiatives. The statistically significant associations ($p < 0.05$) nevertheless confirm the interdependence among cognitive, affective, and behavioral dimensions of ergonomic compliance.

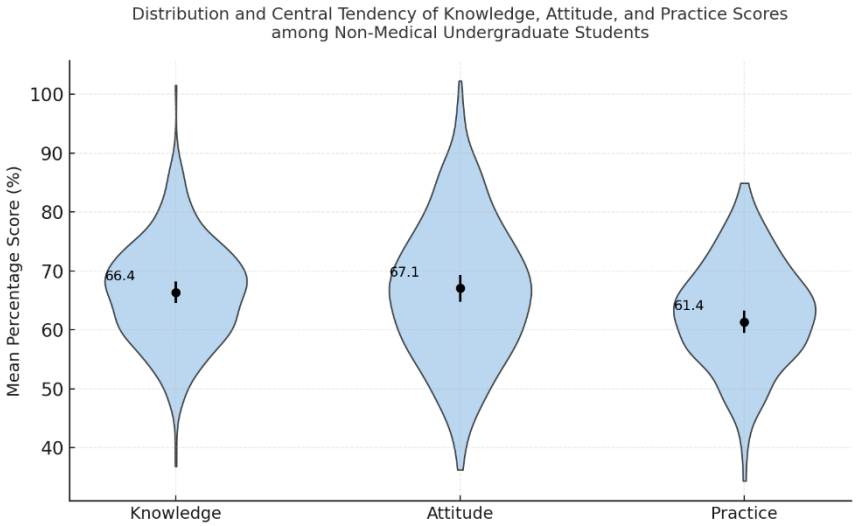

Figure 1 Distribution and Central Tendency of Knowledge, Attitude, and Practice Scores among Non-Medical Undergraduate Students

The violin distribution figure illustrates the variability and central tendency of knowledge, attitude, and practice (KAP) scores among non-medical undergraduate students. The median lines and 95% confidence intervals reveal a modest clustering of scores between 60–70%, with attitude demonstrating the highest central value (67.1%) and the widest distribution, indicating variability in perception. Knowledge displays a comparable mean (66.4%) but tighter dispersion, suggesting relatively consistent cognitive awareness. In contrast, practice scores exhibit both a lower mean (61.4%) and narrower density, highlighting limited behavioral translation of ergonomic knowledge. These patterns emphasize that although cognitive and attitudinal awareness of ergonomics is moderate to high, practical implementation remains constrained—underscoring a key intervention point for educational programs promoting ergonomic behavior.

DISCUSSION

The present study evaluated the knowledge, attitude, and practice related to physical ergonomics among non-medical undergraduate university students—a population often overlooked in ergonomics research. The findings revealed that over half of the participants demonstrated good knowledge, approximately two-thirds held a positive attitude, and more than half exhibited moderate ergonomic practice. Although the mean scores for knowledge and attitude were relatively high, the practice domain lagged, indicating a gap between awareness and behavioral application. The weak yet statistically significant correlations among knowledge, attitude, and practice suggest that awareness and positive perception alone are insufficient to ensure consistent ergonomic behavior among students.

The results of this study align partially with earlier research conducted among medical and dental students, reinforcing the general observation that ergonomic awareness does not always translate into practical compliance. Salah et al. (11) found that Egyptian dental practitioners displayed good knowledge and attitudes but poor practical adherence to ergonomic principles, mirroring the current findings among non-medical students. Similarly, Saivarshine and Khandelwal (12) reported that despite favorable attitudes toward ergonomics, a considerable proportion of dental students lacked correct posture and workstation habits during clinical work. This indicates a pervasive attitudinal-behavioral gap across academic disciplines, potentially stemming from limited institutional emphasis on ergonomics in educational environments.

The moderate mean score of ergonomic practice observed in this study may be attributed to several contextual factors. The majority of participants were first-year students with minimal formal exposure to ergonomic education, and their reliance on informal information sources such as peers and media (66.7%) suggests that their ergonomic behaviors are self-taught rather than institutionally guided. Prior evidence from Gulzar et al. (9) supports the link between academic stress and musculoskeletal pain, particularly temporomandibular joint dysfunction, emphasizing that psychosocial stressors compound physical ergonomic deficits. In parallel, John et al. (10) demonstrated that body mass index (BMI) plays a significant role in the development of carpal tunnel syndrome among university students, implying that anthropometric factors further influence ergonomic vulnerability. Together, these findings underscore the multifactorial nature of ergonomic health, shaped by behavioral, physiological, and environmental determinants.

The weak positive correlations between KAP domains observed in this study are consistent with findings from previous ergonomics-related surveys. For example, Meisha et al. (6) and Legan and Zupan (4) both reported that ergonomic training and practice adherence are seldom influenced by knowledge alone, reinforcing the necessity of integrating experiential learning into student curricula. Such interventions might include hands-on posture training, workstation assessments, and health awareness workshops focusing on musculoskeletal self-care. Moreover, academic institutions should incorporate ergonomics into orientation modules for all students, regardless of discipline, to promote early preventive habits.

From a public health perspective, the results highlight the broader implications of ergonomic neglect among young adults. Prolonged exposure to suboptimal postures and workstation setups can predispose students to chronic musculoskeletal conditions later in life, thereby increasing the burden on healthcare systems. Integrating ergonomic principles into university infrastructure and policy could therefore serve as an effective preventive measure. Beyond individual awareness, institutional responsibility—through ergonomic classroom design, adjustable seating, and periodic posture assessments—plays a pivotal role in bridging the gap between attitude and practice.

This study adds to the growing body of evidence calling for educational ergonomics interventions in non-clinical settings. However, certain limitations must be acknowledged. The use of convenience sampling may have introduced selection bias, and the reliance on self-reported responses could have inflated knowledge and attitude scores due to social desirability bias. The cross-sectional nature of the study also precludes

causal inference. Future longitudinal or interventional studies should aim to determine whether structured ergonomic training programs lead to measurable improvements in behavioral practice and reduction in musculoskeletal symptoms among non-medical students.

Overall, this research underscores that while non-medical undergraduates possess adequate knowledge and positive attitudes toward ergonomics, their practical adherence remains inconsistent. The weak yet significant correlations among KAP dimensions reinforce the necessity of experiential and behaviorally oriented ergonomic education. A curriculum-level integration of ergonomics—complemented by periodic workshops and environmental modifications—may effectively enhance musculoskeletal health literacy and foster long-term preventive habits within this vulnerable academic population.

CONCLUSION

In conclusion, the study demonstrated that non-medical undergraduate university students generally possess good knowledge and a positive attitude toward physical ergonomics; however, their practical implementation of ergonomic principles remains only moderate. The weak yet statistically significant positive correlations among knowledge, attitude, and practice highlight that awareness and favorable perception do not necessarily translate into consistent ergonomic behavior without targeted intervention. These findings emphasize the urgent need for universities to integrate structured ergonomic education and awareness campaigns into general curricula, promoting healthier postural habits and reducing the long-term risk of musculoskeletal disorders. Institutional measures—such as ergonomic classroom design, posture training workshops, and regular health awareness programs—should be prioritized to bridge the knowledge–practice gap and foster sustainable behavioral change among students.

REFERENCES

1. El-Sallamy RM, Atlam SA, Kabbash I, El-Fatah SA, El-Flaky A. Knowledge, attitude, and practice towards ergonomics among undergraduates of Faculty of Dentistry, Tanta University, Egypt. Environmental Science and Pollution Research. 2018;25:30793–801.
2. Zia W, Arshad MU, Iqbal A, Jamshaid G, Shahid A. Knowledge, attitude and practice about laptop ergonomics among university students. Pakistan Biomedical Journal. 2021;4(3):112–7.
3. Sarfaraz S, Gore MH, Askari MA, Imran S, Khurshid Z, Adnan S. Assessing insights and practices among graduates to signify the need for dental ergonomics within the dental curriculum: A cross-sectional survey. European Dental Research and Biomaterials Journal. 2020;1(2):51–6.
4. Legan M, Zupan K. Prevalence of mobile device-related musculoskeletal pain among working university students: A cross-sectional study. International Journal of Occupational Safety and Ergonomics. 2022;28(2):734–42.
5. Cabugawan R, Laguador H, Lim KA, Gumasing MJJ. Ergonomic design of computer workstation for college students studying at home. Proceedings of the International Conference on Industrial Engineering and Operations Management. Rome, Italy; 2021. p. 2–5.
6. Meisha DE, Alsharqawi NS, Samarah AA, Al-Ghamdi MY. Prevalence of work-related musculoskeletal disorders and ergonomic practice among dentists in Jeddah, Saudi Arabia. Clinical, Cosmetic and Investigational Dentistry. 2019;11:171–9.
7. Gumasing MJJ, Castro FMF. Determining ergonomic appraisal factors affecting the learning motivation and academic performance of students during online classes. Sustainability. 2023;15(3):1970.
8. Boadi-Kusi SB, Adueming PO-W, Hammond FA, Antiri EO. Computer vision syndrome and its associated ergonomic factors among bank workers. International Journal of Occupational Safety and Ergonomics. 2022;28(2):1219–26.
9. Gulzar K, Islam F, Thakur AR, Shahzad S, Haider S, Tanveer H. Prevalence of TMJ pain associated with stress in undergraduate university students—a cross-sectional study. Pakistan BioMedical Journal. 2022;5(4):37–40.
10. John N, Zia M, Zahoor R, Raza A. Association of carpal tunnel syndrome with body mass index among university students: Carpal tunnel syndrome & BMI among females. The Healer Journal of Physiotherapy and Rehabilitation Sciences. 2024;4(2):958–64.
11. Salah D, Khattab N, Ahmed W. Dental ergonomics knowledge, practice, and attitude assessment of dentists in Upper Egypt: A cross-sectional study. Egyptian Dental Journal. 2021;67(2):1009–16.
12. Saivarshine S, Khandelwal A. Assessment of knowledge, attitude & practice of dental students towards ergonomics in dentistry. Journal of Emerging Technologies and Trends. 2022;13(6):243–52.
13. Montuori P, Cennamo LM, Sorrentino M, et al. Assessment on practicing correct body posture and determinant analyses in a large population of a metropolitan area. Behavioral Sciences. 2023;13(2):144.
14. Tadikonda K-CP, Mysore N-K. Dental practitioners' knowledge, attitudes, and practices of ergonomics—a cross-sectional web-based survey. Acta Biomedica. 2022;93(2):e2022022.
15. Edwar M, Moch BN, Muslim E. Ergonomics and workstyle risk factors analysis of musculoskeletal disorders in students conducting distance learning. Proceedings of the 2021 International Conference on Engineering and Information Technology for Sustainable Industry. 2020; p. 1–5.
16. Zahra H, Hanan A, Raza A, Islam F, Zahra T. Knowledge, attitude and practice survey related to ergonomic principles among physiotherapists. Journal of Health and Rehabilitation Research. 2021;3(1):65–72.
17. Zia W, Arshad MU, Iqbal A, Jamshaid G, Shahid A. Knowledge, attitude and practice about laptop ergonomics among university students. Pakistan Biomedical Journal. 2021;4(3):112–7.
18. Meisha DE, Alsharqawi NS, Samarah AA, Al-Ghamdi MY. Prevalence of work-related musculoskeletal disorders and ergonomic practice among dentists in Jeddah, Saudi Arabia. Clinical, Cosmetic and Investigational Dentistry. 2019;11:171–9.
19. Gumasing MJJ, Castro FMF. Determining ergonomic appraisal factors affecting the learning motivation and academic performance of students during online classes. Sustainability. 2023;15(3):1970.
20. Boadi-Kusi SB, Adueming PO-W, Hammond FA, Antiri EO. Computer vision syndrome and its associated ergonomic factors among bank workers. International Journal of Occupational Safety and Ergonomics. 2022;28(2):1219–26.