



Development and Acceptability of an Ergonomic Armchair Attachment for Posture Correction Among College Students

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Abstract

Poor posture among college students has become a growing health concern due to prolonged sitting and the widespread use of conventional classroom armchairs that provide inadequate ergonomic support. Extended exposure to poor sitting posture may contribute to musculoskeletal discomfort, spinal misalignment, fatigue, and reduced functional performance. Although ergonomic furniture has been recommended to address these issues, replacing existing classroom furniture is often financially impractical for many educational institutions. This study aimed to develop and evaluate the acceptability of an innovative ergonomic armchair attachment designed to enhance posture correction among college students while utilizing existing classroom armchairs. A descriptive developmental research design was employed involving sixty (60) respondents, consisting of thirty (30) licensed physical therapists with at least three years of clinical experience and thirty (30) Physical Therapy students. The prototype was evaluated using a modified Cornell Ergonomic Seating Evaluation Questionnaire, which assessed design and appearance, ease of use, chair adjustability, seat comfort, and overall acceptability. Data were analyzed using frequency, percentage, and weighted mean. Results revealed that the ergonomic armchair attachment achieved an overall Highly Acceptable rating. Seat comfort received the highest evaluation, followed by design and appearance and ease of use, whereas chair adjustability received a Moderately Acceptable rating, indicating areas for further improvement. The findings suggest that the ergonomic armchair attachment is a practical, user-friendly, and cost-effective innovation that may promote proper sitting posture and reduce posture-related musculoskeletal discomfort among college students.

Keywords: College Students; Ergonomic Armchair Attachment; Ergonomics; Musculoskeletal Health; Physical Therapy; Posture Correction

Introduction

Poor posture has become an increasingly prevalent health concern among college students due to prolonged sitting and sedentary academic activities. Students often spend several hours each day seated in classrooms, studying, or using digital devices, resulting in sustained static postures that may contribute to musculoskeletal discomfort, spinal misalignment, neck pain, and reduced physical performance. Adolescence and early adulthood are critical stages of musculoskeletal development; therefore, prolonged exposure to poor sitting posture may increase the risk of longterm postural abnormalities and other musculoskeletal disorders.

One of the primary factors associated with poor sitting posture is the mismatch between classroom furniture and the anthropometric characteristics of students. Conventional school armchairs are generally designed using standardized dimensions and often fail to accommodate differences in body size, limb length, and spinal alignment. This mismatch may lead students to adopt awkward sitting positions that reduce comfort, increase fatigue, and negatively affect concentration and academic performance. Ergonomic principles emphasize that seating should support natural spinal alignment while accommodating variations in users' anthropometric measurements.

Several studies have highlighted the benefits of ergonomic furniture in reducing musculoskeletal strain and improving posture. However, most existing interventions focus on replacing entire classroom chairs or introducing specialized ergonomic furniture, which may not be economically feasible for many educational institutions. Furthermore, many available designs are based on foreign anthropometric data and provide limited adjustability, reducing their suitability for Filipino college

students. These gaps emphasize the need for an ergonomic solution that is practical, affordable, and compatible with existing classroom furniture.

To address these limitations, the present study developed an innovative ergonomic armchair attachment that can be integrated into conventional school armchairs. The prototype was designed using ergonomic principles and anthropometric considerations to improve sitting posture while maintaining user comfort and functionality. Unlike replacing existing classroom furniture, the proposed attachment offers a more cost-effective approach to enhancing ergonomic support in educational settings.

This study aimed to develop and evaluate the acceptability of the ergonomic armchair attachment among licensed physical therapists and Physical Therapy students. Specifically, the study assessed the prototype in terms of design and appearance, ease of use, chair adjustability, seat comfort, and overall acceptability. The findings are intended to contribute to the development of practical ergonomic interventions that promote healthy posture and reduce posture-related musculoskeletal problems among college students.

Materials and Methods

Study design

This study employed a descriptive-developmental research design to develop and evaluate an innovative ergonomic armchair attachment intended to enhance posture correction among college students. The developmental component involved designing and refining the ergonomic attachment based on ergonomic principles, anthropometric measurements, and expert recommendations, while the descriptive component focused on evaluating its level of acceptability.

Participants

The study included a total of sixty (60) respondents, comprising thirty (30) licensed Physical Therapists with at least three years of clinical experience and thirty (30) Physical Therapy students from the University of Perpetual Help – Dr. Jose G. Tamayo Medical University. Participants were selected through purposive sampling based on predefined inclusion criteria to ensure that respondents possessed sufficient knowledge and experience to evaluate the ergonomic armchair attachment.

Development of the Ergonomic Armchair Attachment

The ergonomic armchair attachment was developed using established ergonomic, anthropometric, and biomechanical principles. The prototype was designed to fit existing classroom armchairs while improving lumbar support, sitting comfort, and posture alignment. Prior to evaluation, recommendations from experts in physical therapy, engineering, and design were incorporated to refine the prototype's structure, adjustability, comfort, and overall functionality.

Research instrument

The prototype was evaluated using a modified Cornell Ergonomic Seating Evaluation Questionnaire, employing a five-point Likert scale. The questionnaire assessed five domains: design and appearance, ease of use, chair adjustability, seat comfort, and overall acceptability.

Higher scores indicated greater acceptability of the ergonomic armchair attachment.

Data collection procedure

Following informed consent, respondents were introduced to the ergonomic armchair attachment and were given sufficient time to examine and evaluate its features. They subsequently completed the evaluation questionnaire independently. All responses were collected, checked for completeness, and encoded for statistical analysis while maintaining participant confidentiality throughout the study.

Statistical analysis

The collected data were analyzed using frequency, percentage, weighted mean, and standard deviation to summarize respondents' evaluations of each domain. Weighted mean values were used to determine the level of acceptability of the ergonomic armchair attachment based on the predetermined verbal interpretation scale.

Ethical considerations

Ethical principles were observed throughout the conduct of the study. Participation was voluntary, informed consent was obtained from all respondents prior to data collection, and all information was treated with strict confidentiality. Participants were informed that they could withdraw from the study at any time without consequence, and all collected data were used solely for research purposes.

Results and Discussion

The study evaluated the acceptability of the innovative ergonomic armchair attachment among 60 respondents, comprising 30 licensed Physical Therapists and 30 Physical Therapy students. The prototype was assessed in terms of ease of use, chair adjustment, seat comfort, design and appearance, and overall acceptability using a five-point Likert scale.

The ergonomic armchair attachment obtained an overall weighted mean of 4.30, corresponding to a Highly Acceptable rating. Among the evaluated domains, seat comfort received the highest rating (WM=4.64), followed by ease of use (WM=4.23) and design and appearance (WM=4.23). Chair adjustment received the lowest score (WM=4.10), although it still fell within the acceptable range, indicating opportunities for further refinement of the adjustment mechanism.

The high-rating for-seat comfort suggests that the ergonomic armchair attachment effectively enhanced sitting comfort during prolonged use. Respondents particularly appreciated the chair cushion and backrest support, indicating that these features may help reduce pressure on the lower back and improve postural alignment. These findings are consistent with previous ergonomic studies reporting that adequate cushioning and lumbar support contribute to reduced musculoskeletal strain during extended sitting.

Both ease of use and design and appearance received Highly Acceptable ratings, indicating that respondents found the prototype practical, durable, and visually appropriate for classroom use. The positive evaluation suggests that the attachment can be integrated into conventional school armchairs without substantially affecting usability. These findings support previous research emphasizing that ergonomic interventions should be functional, user-friendly, and compatible with existing educational environments.

Although chair adjustment obtained the lowest domain score, it was still rated positively overall. Respondents indicated that independent adjustment of the seat and backrest was satisfactory, whereas adjusting the backrest angle was comparatively more difficult.

This suggests that improving the adjustment mechanism could further increase user convenience and adaptability for individuals with different body dimensions.

Overall, the findings demonstrate that the innovative ergonomic armchair attachment successfully met its objective of providing a practical and acceptable ergonomic solution for posture correction. The consistently favorable evaluations across all domains indicate that the prototype has the potential to improve sitting posture, increase comfort, and promote musculoskeletal health among college students while utilizing existing classroom furniture. The respondents' recommendations - such as reducing the attachment's weight, improving height adjustment, and increasing compatibility with different armchair designs - provide valuable direction for future refinement and wider implementation.

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Conflict of Interest

The authors declare no conflict of interest.

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