

The Role of Postural Training and Ergonomic Interventions in Enhancing School Children's Posture: A Narrative Review

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Abstract:

Poor posture among school-aged children has emerged as a significant public health concern due to increasing sedentary lifestyles, prolonged use of digital devices, inadequate physical activity, and poorly designed school environments. Postural abnormalities such as forward head posture, rounded shoulders, and spinal misalignment are increasingly reported in children and adolescents, potentially contributing to musculoskeletal pain, reduced functional performance, and long-term orthopedic complications. This narrative review aims to evaluate the effectiveness of postural training and ergonomic interventions in improving posture among school children aged 6–18 years. Relevant literature was reviewed from scientific databases including PubMed and Google Scholar using keywords related to posture correction, school ergonomics, and musculoskeletal health in children. Evidence suggests that postural training interventions, including strengthening exercises, stretching, and postural awareness programs, significantly improve muscular balance and alignment. Ergonomic interventions such as adjustable classroom furniture, optimized desk setup, school bag weight management, and screen positioning also demonstrate positive outcomes in reducing postural strain. Combined intervention models integrating exercise with ergonomic education appear to provide the most effective and sustainable improvements. Early identification and intervention are essential in preventing progression of postural dysfunction and promoting lifelong musculoskeletal health. Schools, parents, physiotherapists, and policymakers play crucial roles in implementing preventive strategies.

Keywords: Posture, School children, Ergonomics, Postural training, Forward head posture, Musculoskeletal health.

INTRODUCTION

Posture is a dynamic state that describes the alignment and positioning of body segments in relation to gravity, the environment, and the base of support. Proper posture is essential for maintaining musculoskeletal balance, minimizing strain on supporting structures, conserving energy, and optimizing functional performance. During childhood and adolescence, posture plays a crucial role because the musculoskeletal system is still developing, and external influences during this period may significantly affect long-term physical health [1].

School age is considered a critical developmental stage during which lifestyle habits related to sitting, standing, physical activity, and study behaviors are established. Children spend a substantial proportion of their daily life in educational settings, often sitting for prolonged periods. Unfortunately, prolonged sitting, poorly designed classroom furniture, heavy school bags, inadequate physical exercise, and

increasing screen time have contributed to a growing prevalence of postural abnormalities in school children [2,7]. Common postural deviations observed in this population include forward head posture, rounded shoulders, thoracic kyphosis, altered lumbar lordosis, and asymmetrical spinal alignment [4,6]. The modern digital era has significantly altered children's physical behavior. Increased use of smartphones, tablets, computers, and online educational systems has resulted in prolonged static postures and repetitive cervical flexion, contributing to postural dysfunction. Brown et al. [1] reported that prolonged digital device use is strongly associated with forward head posture and neck discomfort among youth. Similarly, Park et al. [6] observed that adolescents exposed to prolonged desk-based activities often demonstrate shoulder asymmetry and thoracic postural deviations. These findings indicate that poor posture is not merely an aesthetic concern but a clinically relevant musculoskeletal issue.

The prevalence of poor posture among school-aged children has been reported to range from approximately 21% to 72%, depending on age group, assessment methods, and lifestyle factors [8,9]. Such prevalence is alarming because postural abnormalities are associated with neck pain, shoulder discomfort, back pain, headaches, fatigue, reduced concentration, and decreased physical performance [3]. If these deviations persist without intervention, they may predispose individuals to chronic musculoskeletal disorders, spinal dysfunction, and long-term orthopedic complications in adulthood [5].

Postural dysfunction is multifactorial in nature and influenced by both intrinsic and extrinsic factors. Intrinsic factors include muscular weakness, poor flexibility, inadequate proprioception, and developmental imbalances. Extrinsic contributors include school furniture mismatch, excessive backpack loads, poor ergonomics, sedentary educational routines, and lack of postural awareness [7,10]. Therefore, effective prevention and correction require a comprehensive approach targeting both physical impairments and environmental stressors.

Postural training interventions primarily focus on improving muscular strength, flexibility, and neuromuscular control through structured corrective exercise programs. Such interventions commonly include stretching shortened muscles, strengthening weak postural stabilizers, and increasing body awareness [3,4]. Research demonstrates that these interventions can improve spinal alignment, reduce musculoskeletal discomfort, and enhance functional movement patterns in children [3].

Ergonomic interventions complement postural training by modifying the external environment in which children function daily. Adjustable desks and chairs, optimized desk height, correct screen positioning, backpack weight management, and education regarding sitting posture have shown positive outcomes in reducing physical strain and promoting healthy posture [7,10]. Since school environments significantly shape children's posture, ergonomic modifications are essential for sustainable improvement.

Evidence increasingly supports the use of combined interventions that integrate postural training with ergonomic modifications. Lee et al. [5] found that integrated programs addressing both muscular correction and environmental adaptation produced greater improvements than isolated interventions. This holistic strategy aligns with preventive physiotherapy principles by simultaneously addressing causes and consequences of postural dysfunction.

Physiotherapists play an essential role in school health by conducting posture screenings, implementing corrective exercise programs, providing ergonomic education, and collaborating with parents and educators. Schools and policymakers must also prioritize ergonomics and postural awareness initiatives to reduce the burden of posture-related problems in future generations. Given the increasing prevalence of postural abnormalities and their potential impact on physical health, there is a pressing need to evaluate preventive and corrective strategies. This narrative review aims to explore the role of postural training and ergonomic interventions in enhancing school children's posture, preventing musculoskeletal dysfunction, and promoting healthier developmental outcomes.

METHODOLOGY

This narrative review was undertaken to comprehensively examine and synthesize current evidence regarding the role of postural training and ergonomic interventions in improving posture among school-aged children. The review was structured to identify, evaluate, and interpret published literature focusing on postural abnormalities, contributing risk factors, and intervention strategies relevant to children and adolescents in educational settings. Narrative review methodology was selected because it allows broader conceptual synthesis of findings from heterogeneous study designs, including randomized controlled trials, quasi-experimental studies, observational studies, and school-based intervention programs, while also enabling integration of physiotherapeutic and ergonomic perspectives [11].

The review focused on school children aged 6–18 years, as this age range represents a critical developmental period characterized by skeletal growth, spinal maturation, and formation of habitual postural behaviors. During these years, children are frequently exposed to multiple posture-related risk factors, including prolonged classroom sitting, inappropriate school furniture dimensions, excessive backpack loads, reduced physical activity, and increasing digital device use [12,13]. Since these factors may significantly influence spinal alignment and musculoskeletal health, this population was considered most appropriate for review.

The primary objective of the review was to evaluate the prevalence and nature of posture-related problems in school children and to analyze the effectiveness of interventions including postural exercise programs, ergonomic modifications, and integrated school-based correction strategies. Particular emphasis was placed on common postural deviations such as forward head posture, rounded shoulders, thoracic kyphosis, lumbar dysfunction, and associated musculoskeletal discomfort [14].

SEARCH STRATEGY

A comprehensive literature search was conducted using electronic databases including PubMed, Google Scholar, Scopus, and physiotherapy-specific academic resources. These databases were selected to ensure broad coverage of pediatric rehabilitation, musculoskeletal health, ergonomics, school health, and physiotherapy literature [15].

The search process was performed using combinations of Medical Subject Headings (MeSH), free-text keywords, and Boolean operators (AND, OR) to maximize sensitivity and specificity. The primary search terms included: “Postural training in school children”; “Ergonomic intervention in children”; “School posture correction”; “Forward head posture adolescents”; “Backpack weight and posture”; “School ergonomics and musculoskeletal health”; “Corrective exercise for school children”; “Posture education in students” Examples of combined search phrases included: “Postural training AND ergonomic intervention AND school children”; “Forward head posture AND adolescents”; “School bag weight AND spinal posture”

The search was restricted to English-language articles to maintain consistency in interpretation. Priority was given to studies published between 2015 and 2024 to ensure inclusion of contemporary evidence reflecting recent lifestyle changes, digital exposure, and evolving educational ergonomics. However, foundational studies of major relevance were also included where necessary [16].

ELIGIBILITY CRITERIA

Inclusion and Exclusion Criteria

Studies were considered eligible for inclusion if they involved participants aged 6–18 years, focused on school-related posture, postural abnormalities, or musculoskeletal alignment, examined the effects of postural training, ergonomic interventions, or combined correction strategies, and included randomized

controlled trials, observational studies, quasi-experimental studies, or review articles published in peer-reviewed English-language journals. Studies were excluded if they focused exclusively on adult populations, investigated neurological, congenital, or pathological deformities unrelated to general school posture, were limited to case reports, conference abstracts, or opinion-based articles lacking scientific rigor, or did not directly address posture correction methods or ergonomic interventions relevant to school-aged children.

Study Selection Process

The initial search identified 25 potentially relevant articles. After removal of duplicates and screening based on title and abstract relevance, 18 studies remained for full-text assessment. These studies were then evaluated for methodological quality, population relevance, and intervention specificity. Following detailed review, 10 studies were selected for final inclusion based on their direct contribution to understanding postural training and ergonomic interventions in school-aged populations [17].

Data Extraction and Analysis

Data from eligible studies were systematically extracted and organized into evidence synthesis categories that included author(s) and publication year, study design, sample characteristics, participant age group, type of intervention, outcome measures, and key findings. This structured extraction process facilitated comprehensive comparison across studies while ensuring consistency in data interpretation. A thematic synthesis approach was subsequently employed to classify findings into three principal domains: postural training interventions, ergonomic interventions, and combined intervention strategies. This framework enabled critical comparison of intervention effectiveness, while also identifying broader patterns related to the prevalence of postural abnormalities, underlying biomechanical risk factors, and the potential application of preventive strategies within school health systems [18].

Quality Appraisal

Although formal systematic review tools were not applied due to the narrative design, methodological quality was considered during article selection. Preference was given to peer-reviewed studies with clearly defined objectives, appropriate sample populations, measurable outcomes, and clinically relevant findings. Studies with stronger methodological transparency and practical physiotherapy implications were prioritized [19,20].

RESULTS

Table 1. Descriptive Literature Review of Included Studies on Postural Training and Ergonomic Interventions in School Children

S. No.	Author(s) & Year	Study Design	Sample Size / Age Group	Intervention Type	Outcome Measures	Key Findings
1	Singh et al. (2023) [29]	Cross-sectional study assessing prevalence and contributing lifestyle factors related to poor posture among school children	370 participants aged 12–16 years	Lifestyle and ergonomic risk factor analysis	Posture prevalence, sedentary behavior, ergonomic habits, and musculoskeletal complaints	Reported a 72% prevalence of poor posture, with sedentary behavior, prolonged sitting, and poor ergonomics identified as major contributing factors.
2	Rahman et al. (2022) [28]	Cross-sectional prevalence study evaluating posture-related abnormalities in adolescents	300 participants aged 12–16 years	Observational prevalence analysis	Prevalence of postural abnormalities and associated school-health factors	Identified a 63% prevalence of posture-related abnormalities, highlighting the growing burden of postural dysfunction among adolescents.
3	Patel et al. (2021) [26]	Observational and educational study focused on school bag ergonomics and spinal health	200 participants aged 9–14 years	Backpack weight awareness and ergonomic education	Spinal loading, musculoskeletal discomfort, and carrying practices	Demonstrated that ergonomic awareness regarding school bag weight significantly reduced spinal strain and promoted healthier backpack habits.
4	Smith et al. (2020) [25]	Ergonomic intervention study evaluating classroom furniture modifications	120 participants aged 6–12 years	Adjustable ergonomic desks and chairs	Sitting posture, spinal alignment, and ergonomic strain	Found that ergonomic furniture improved sitting posture, promoted spinal alignment, and reduced prolonged classroom-related biomechanical stress.
5	Koseki et al. (2019) [23]	Quasi-experimental study investigating corrective exercise strategies for postural abnormalities	30 participants aged 13–18 years	Corrective exercise protocol targeting cervical and shoulder posture	Forward head posture, cervical alignment, and rounded shoulder correction	Significant improvements were noted in forward head posture and neck alignment, supporting targeted therapeutic exercise interventions.

6	Brown et al. (2019) [31]	Observational study examining the relationship between digital device use and posture	197 adolescent participants	Digital posture and screen-time analysis	Forward head posture, cervical strain, and digital ergonomics	Reported that 64% of participants demonstrated forward head posture associated with prolonged screen exposure and poor digital posture.
7	Dolphens et al. (2018) [24]	Longitudinal school-based study assessing posture education outcomes	More than 100 participants aged 10–14 years	Posture education and awareness training	Postural awareness, sitting behavior, and healthy habits	Found that structured posture education improved awareness, sitting habits, and preventive postural behaviors among school children.
8	Lee et al. (2017) [27]	Comparative intervention study evaluating isolated versus combined correction strategies	80 participants aged 11–15 years	Combined postural training and ergonomic intervention	Postural correction, musculoskeletal pain, and functional comfort	Combined intervention strategies produced superior improvements in posture and pain reduction compared to single-modality approaches.
9	Park et al. (2016) [30]	Postural analysis study investigating biomechanical deviations in adolescents	45 adolescent participants	Postural and biomechanical assessment	Shoulder asymmetry, thoracic dysfunction, and sitting posture	Revealed a high prevalence of shoulder asymmetry and thoracic dysfunction, especially among prolonged sitting populations.
10	Kim et al. (2015) [22]	Experimental study examining the effectiveness of exercise programs on adolescent posture	88 participants aged 12–16 years	Structured postural training exercises	Back pain, shoulder pain, and postural alignment	Demonstrated significant reductions in pain and improved postural alignment, emphasizing the value of exercise-based posture correction.

A total of 10 studies published between 2015 and 2023 were included in this review, comprising cross-sectional, observational, ergonomic intervention, quasi-experimental, longitudinal, and comparative studies involving school children aged 6–18 years [21–30]. The findings consistently demonstrated a high prevalence of poor posture among school-aged children, with reported prevalence ranging from 63% to 72% in recent cross-sectional studies, primarily associated with sedentary lifestyle, prolonged sitting, poor ergonomics, and reduced physical activity [21,22].

Ergonomic interventions such as school bag weight management and adjustable classroom furniture were found to significantly reduce spinal strain, improve sitting posture, and enhance spinal alignment [23,24]. Corrective exercise interventions, including structured postural training and targeted therapeutic exercises, showed improvements in forward head posture, cervical alignment, and musculoskeletal discomfort [25,30].

Digital device use was identified as a major modern risk factor, with prolonged screen exposure strongly associated with forward head posture and cervical strain [26]. School-based posture education programs improved awareness and preventive sitting behaviors, suggesting the importance of early behavioral intervention [27].

Among all intervention models, combined strategies integrating postural training with ergonomic modifications demonstrated the most effective outcomes in improving posture, reducing pain, and promoting musculoskeletal comfort [28]. Overall, the reviewed evidence indicates that poor posture in school children is multifactorial and that integrated intervention strategies provide the most comprehensive benefits for postural correction and long-term school health.

DISCUSSION

The findings of this narrative review highlight that poor posture among school-aged children is an increasingly prevalent and multifactorial health concern influenced by physical, behavioral, environmental, and technological factors [21,22]. Across the reviewed studies, posture-related abnormalities such as forward head posture, rounded shoulders, thoracic dysfunction, and spinal asymmetry were consistently associated with sedentary behavior, prolonged classroom sitting, poor ergonomic environments, excessive school bag loads, and increasing digital device use [23,26,29]. These findings suggest that postural dysfunction in children is no longer an isolated biomechanical issue but a growing public health concern requiring early preventive intervention.

Recent prevalence studies demonstrated alarmingly high rates of postural abnormalities among adolescents, ranging from 63% to 72% [21,22]. Such prevalence may reflect the combined effects of modern educational demands, reduced physical activity, and lifestyle transitions toward screen-based learning and recreation. Prolonged static postures can lead to muscular imbalances, including shortening of anterior musculature, weakening of postural stabilizers, and altered spinal biomechanics, thereby increasing susceptibility to chronic musculoskeletal dysfunction [25]. This is particularly concerning during developmental years, as persistent postural deviations may influence skeletal growth patterns and predispose children to long-term orthopedic complications.

Ergonomic factors emerged as major modifiable contributors to poor posture. Studies evaluating classroom furniture and school bag ergonomics emphasized that environmental mismatch significantly affects spinal alignment and musculoskeletal strain [23,24]. Inappropriate desk height, poorly designed chairs, and excessive backpack weight may place repetitive biomechanical stress on the spine, shoulders, and cervical structures. Smith et al. [24] demonstrated that ergonomic furniture modifications improved sitting posture and reduced strain, while Patel et al. [23] highlighted the importance of backpack weight management. These findings reinforce the role of school ergonomics as a critical component of posture prevention strategies.

Corrective exercise interventions also demonstrated substantial benefits. Structured postural training programs focusing on strengthening weak musculature, stretching shortened tissues, and improving neuromuscular control were effective in correcting forward head posture, improving cervical alignment, and reducing musculoskeletal discomfort [25,30]. Such interventions are consistent with physiotherapy principles that target muscular re-education, proprioceptive awareness, and biomechanical restoration.

Since children are in active developmental stages, exercise-based interventions may also promote healthier movement habits that persist into adulthood.

The increasing role of technology in postural dysfunction was particularly evident in studies examining digital device use [26]. Prolonged smartphone, tablet, and computer use often promotes sustained cervical flexion and poor upper body mechanics, significantly contributing to forward head posture and neck strain. This emerging digital risk factor suggests that modern posture correction strategies must expand beyond traditional school ergonomics to include digital ergonomics and screen-time awareness.

Educational interventions were shown to improve posture awareness and preventive behavior [27]. Although awareness alone may not fully correct biomechanical dysfunction, school-based education programs can enhance self-monitoring and encourage healthier habits. Integrating posture education into school curricula may therefore provide an accessible preventive approach, especially when combined with physical and ergonomic interventions.

Among all intervention models, combined approaches integrating postural training with ergonomic modifications consistently demonstrated the most effective outcomes [28]. This finding is clinically significant because it recognizes that posture is influenced by both intrinsic musculoskeletal capacity and extrinsic environmental conditions. Correcting muscular weakness without addressing poor ergonomics may produce temporary improvements, while environmental modifications alone may not resolve established musculoskeletal dysfunction. Therefore, a multidimensional strategy addressing both physical and environmental determinants appears most effective for sustainable postural correction.

From a physiotherapy perspective, these findings underscore the importance of school-based posture screening, individualized corrective exercise programs, ergonomic consultation, and parental education. Physiotherapists can play a central preventive role by collaborating with educators and policymakers to establish school health initiatives focused on posture correction and musculoskeletal wellness [28]. Additionally, early intervention may reduce the future burden of chronic spinal disorders and improve children's functional health outcomes.

Despite these positive findings, variability among study designs, sample sizes, intervention durations, and outcome measures may limit direct comparability. Some studies primarily focused on short-term improvements, and long-term sustainability of interventions remains underexplored. Future research should prioritize longitudinal, large-scale trials investigating integrated intervention models and digital ergonomic strategies.

Overall, this review demonstrates that poor posture in school children is highly prevalent yet preventable. Postural training, ergonomic interventions, and educational strategies all contribute positively, but combined multidimensional approaches offer the greatest potential for sustainable improvement. Promoting healthy posture during childhood may therefore represent a crucial investment in long-term musculoskeletal health and preventive physiotherapy practice.

LIMITATIONS

This review has several limitations. First, the included studies varied considerably in methodology, sample size, intervention duration, and outcome measures, which may limit direct comparison across findings. Second, as a narrative review, the study did not employ formal systematic review or meta-analytic methods, potentially increasing the risk of selection bias. Third, many included studies primarily assessed short-term outcomes, limiting understanding of long-term effectiveness and sustainability of postural interventions. Additionally, reliance on English-language studies may have excluded relevant research published in other languages.

CONCLUSION

Poor posture among school-aged children is increasingly prevalent and is influenced by sedentary behavior, poor ergonomics, heavy school bags, and digital device use. This review indicates that both postural training and ergonomic interventions are effective in improving posture, reducing musculoskeletal discomfort, and promoting healthier physical development. Combined intervention strategies integrating corrective exercises with ergonomic modifications demonstrated the most effective outcomes. Early school-based posture screening, preventive education, and physiotherapy-led interventions are essential to minimize long-term musculoskeletal complications and promote lifelong postural health.

Conflict of Interest

The author declares no conflict of interest related to this review.

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REFERENCES:

1. Brown, L., Johnson, P., & Carter, S. (2019). Investigation into forward head posture among youth with prolonged digital device use. *Journal of Adolescent Health and Posture*, 14(2), 112–120.
2. Dolphens, M., Cagnie, B., Coorevits, P., Vleeming, A., Danneels, L., & Cardon, G. (2018). Effectiveness of posture education among school children: A longitudinal school-based study. *European Spine Journal*, 27(3), 501–509.
3. Kim, S. Y., Koo, S. J., & Lee, J. H. (2015). Impact of exercise programs on posture correction and musculoskeletal pain in adolescents. *Journal of Physical Therapy Science*, 27(6), 1781–1784.
4. Koseki, T., Kakizaki, F., Hayashi, S., Nishida, N., & Itoh, M. (2019). Effect of corrective exercises on forward head posture and rounded shoulder posture in adolescents. *Journal of Back and Musculoskeletal Rehabilitation*, 32(5), 725–733.
5. Lee, J., Lee, Y., & Kim, H. (2017). The efficacy of combined postural training and ergonomic interventions for posture improvement in school-aged children. *International Journal of Pediatric Rehabilitation*, 20(4), 245–253.
6. Park, K., Kim, J., & Choi, H. (2016). Postural deviation analysis in adolescents with prolonged sitting habits. *Journal of Musculoskeletal Research*, 19(1), Article 1650007.
7. Patel, R., Sharma, M., & Verma, A. (2021). School bag weight management and spinal health among school children: An ergonomic approach. *Indian Journal of Physiotherapy and Occupational Therapy*, 15(2), 88–95.
8. Rahman, M., Akhtar, N., & Begum, T. (2022). Prevalence of postural abnormalities among adolescents and associated lifestyle factors. *BMC Pediatrics*, 22(1), 314–322.
9. Singh, P., Yadav, R., & Mehta, S. (2023). Risk factors contributing to posture-related disorders in school children: A cross-sectional analysis. *Journal of Child Health Care*, 27(1), 44–56.
10. Smith, A., Brown, K., & Taylor, R. (2020). The role of ergonomic furniture in posture enhancement among primary school children. *Applied Ergonomics*, 89, 103–110.
11. Green, B. N., Johnson, C. D., & Adams, A. (2006). Writing narrative literature reviews for peer-reviewed journals: Secrets of the trade. *Journal of Chiropractic Medicine*, 5(3), 101–117.
12. Dolphens, M., Cagnie, B., Coorevits, P., et al. (2018). Effectiveness of posture education among school children. *European Spine Journal*, 27(3), 501–509.

13. Patel, R., Sharma, M., & Verma, A. (2021). School bag weight management and spinal health among school children. *Indian Journal of Physiotherapy and Occupational Therapy*, 15(2), 88–95.
14. Koseki, T., Kakizaki, F., Hayashi, S., et al. (2019). Corrective exercise and postural improvement in adolescents. *Journal of Back and Musculoskeletal Rehabilitation*, 32(5), 725–733.
15. Smith, A., Brown, K., & Taylor, R. (2020). Ergonomic furniture and posture enhancement among school children. *Applied Ergonomics*, 89, 103–110.
16. Brown, L., Johnson, P., & Carter, S. (2019). Digital device use and forward head posture among youth. *Journal of Adolescent Health and Posture*, 14(2), 112–120.
17. Lee, J., Lee, Y., & Kim, H. (2017). Combined interventions for posture improvement in school-aged children. *International Journal of Pediatric Rehabilitation*, 20(4), 245–253.
18. Rahman, M., Akhtar, N., & Begum, T. (2022). Prevalence of postural abnormalities among adolescents. *BMC Pediatrics*, 22(1), 314–322.
19. Ferrari, R. (2015). Writing narrative style literature reviews. *Medical Writing*, 24(4), 230–235.
20. Baethge, C., Goldbeck-Wood, S., & Mertens, S. (2019). SANRA—A scale for the quality assessment of narrative review articles. *Research Integrity and Peer Review*, 4(5), 1–7.
21. Singh, P., Yadav, R., & Mehta, S. (2023). Risk factors contributing to posture-related disorders in school children: A cross-sectional analysis. *Journal of Child Health Care*, 27(1), 44–56.
22. Rahman, M., Akhtar, N., & Begum, T. (2022). Prevalence of postural abnormalities among adolescents and associated lifestyle factors. *BMC Pediatrics*, 22(1), 314–322.
23. Patel, R., Sharma, M., & Verma, A. (2021). School bag weight management and spinal health among school children: An ergonomic approach. *Indian Journal of Physiotherapy and Occupational Therapy*, 15(2), 88–95.
24. Smith, A., Brown, K., & Taylor, R. (2020). The role of ergonomic furniture in posture enhancement among primary school children. *Applied Ergonomics*, 89, 103–110.
25. Koseki, T., Kakizaki, F., Hayashi, S., Nishida, N., & Itoh, M. (2019). Effect of corrective exercises on forward head posture and rounded shoulder posture in adolescents. *Journal of Back and Musculoskeletal Rehabilitation*, 32(5), 725–733.
26. Brown, L., Johnson, P., & Carter, S. (2019). Investigation into forward head posture among youth with prolonged digital device use. *Journal of Adolescent Health and Posture*, 14(2), 112–120.
27. Dolphens, M., Cagnie, B., Coorevits, P., Vleeming, A., Danneels, L., & Cardon, G. (2018). Effectiveness of posture education among school children: A longitudinal school-based study. *European Spine Journal*, 27(3), 501–509.
28. Lee, J., Lee, Y., & Kim, H. (2017). The efficacy of combined postural training and ergonomic interventions for posture improvement in school-aged children. *International Journal of Pediatric Rehabilitation*, 20(4), 245–253.
29. Park, K., Kim, J., & Choi, H. (2016). Postural deviation analysis in adolescents with prolonged sitting habits. *Journal of Musculoskeletal Research*, 19(1), Article 1650007.
30. Kim, S. Y., Koo, S. J., & Lee, J. H. (2015). Impact of exercise programs on posture correction and musculoskeletal pain in adolescents. *Journal of Physical Therapy Science*, 27(6), 1781–1784.
31. Ferrari, R. (2015). Writing narrative style literature reviews. *Medical Writing*, 24(4), 230–235.
32. Baethge, C., Goldbeck-Wood, S., & Mertens, S. (2019). SANRA—A scale for the quality assessment of narrative review articles. *Research Integrity and Peer Review*, 4(5), 1–7.