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RISK FACTORS AND INTERVENTION MEASURES FOR POSTURAL CHANGES AND THE IMPACT ON QUALITY OF LIFE: A LITERATURE REVIEW

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ABSTRACT: **Objective:** This study investigated risk factors and the impact of intervention measures for postural alterations on quality of life. A literature review was conducted to answer the guiding problem of this study: what are the risk factors for postural alterations and the impact of interventions on quality of life? **Materials and methods:** The search procedure was carried out in the following databases: MedLine via PubMed, Scopus, Web of Science, Cochrane Library, Embase and Lilacs. Of the 527 articles initially found, 14 met the eligibility criteria for this study. **Results:** Seven articles were identified which investigated risk factors associated with postural alterations, such as: musculoskeletal symptoms, pregnancy, overweight and obesity, inadequate sitting posture, axial spondyloarthritis, smoking, low back pain and neck pain. Seven articles evaluated interventions used to improve the quality of life of patients with postural alterations, including: lumbar mobility and stretching exercises + unilateral PA mobilization + hot compress, Schroth exercises, RPG ('frog on the floor' posture) / cranio-cervical flexion test, McKenzie approach and spinal stabilization exercises, evidence-based physiotherapy treatment and thoracic muscle strengthening exercises. **Conclusions:** The findings indicate that postural alterations have a multifactorial etiology and that clinical interventions can be effective. It is suggested that research be carried out into the early identification of risk factors and interventions tailored to the needs of each patient to promote health and improve quality of life.

Keywords: Postural alteration. Risk factors. Treatment. Quality of life.

INTRODUCTION

Postural alterations are conditions characterized by an increase or decrease in physiological curvatures (cervical lordosis, dorsal kyphosis and lumbar lordosis). These morphological changes can lead to compression of the intervertebral discs which, depending on the duration and severity, can cause upward or downward inaptitude (1). Maintaining the biodynamic harmony of human posture depends on the intrinsic and contiguous relationship

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between the spine, ribs and mandible, since these structures develop maintenance and adjustment mechanisms according to the needs of the human body during locomotion, ventilation, chewing and swallowing (1-6).

Associated with the presence of postural alterations, spinal pain is one of the main causes of disability in people all over the world (7). Evidence has shown that back pain is extremely disabling and can be acquired due to inappropriate ergonomics at work and inadequate sitting posture for prolonged periods, causing stress, inflammation, wear and tear on soft tissues, severe or chronic lateral and/or anteroposterior alterations such as scoliosis, herniated discs, hyperkyphosis, hyperlordosis, headaches and chronic low back pain (1,2,8).

These harmful effects can lead to functional incapacity, psychological disorders and have been associated with increased demand and costs for health systems. (8) Epidemiological estimates indicate that the prevalence of back pain increases with age, with rates varying from 1% to 6% in children aged 7 to 10, 18% in adolescents with a peak prevalence of 28% to 42% in people aged 40 to 69 (9,10).

Some factors such as age, sedentary lifestyle, parafunctional habits, degenerative processes, traumatic injuries, predisposing, triggering and perpetuating factors such as anxiety, obesity, psychological problems, malocclusion and temporomandibular dysfunction (TMD) have been related to structural misalignment of the body, which are considered factors associated with postural alterations (1,3,8). In addition, occupational problems can lead to work- related musculoskeletal disorders (WMSDs), generating spinal pain, deformities or premature disability, highlighting that postural disorders require prior diagnosis to reduce discomfort, improve physical function and improve patients' quality of life (3,12).

In this context, the aim of this literature review was to identify the risk factors for postural alterations and evaluate intervention measures with a positive impact on the quality of life of these patients.

METHODOLOGY

In order to identify the risk factors that cause postural alterations and the impact of interventions on patients quality of life, a bibliographic survey was carried out independently by two evaluators in the following databases: MedLine via PubMed https://pubmed.ncbi.nlm.nih.gov/, Scopus - https://www.scopus.com/home.uri Web of Science - https://www.webofscience.com/wos/woscc/basic-search, Cochrane Library

- https://www.cochranelibrary.com/ Embase - https://www.embase.com/search/quick Lilacs - https://lilacs.bvsalud.org/.We included observational and intervention studies with samples of individuals of both sexes, free age range, diagnosis of postural alterations, risk factors for postural alterations, quality of life of patients with postural alterations, without restrictions on year of publication, and in English, Portuguese and Spanish. Editorial letters, books/book chapters, personal opinions, patents and conference abstracts were excluded. The articles were collected and selected blindly/independently by the reviewers. Disagreements in the data collected were resolved by a third reviewer.

RESULTS

A total of 527 articles were selected, of which 513 were excluded, 506 for not answering the guiding question and seven for being review studies. Only seven studies on risk factors for postural alterations and seven studies on the therapeutic impact of postural alterations were eligible (3,5-7,11-16,17,18,19,21). The main characteristics and findings of the studies are summarized in Tables 1 and 2.

The articles selected had heterogeneous samples, including teachers, pregnant women, children, adolescents and adults. The risk factors identified were musculoskeletal symptoms, pregnancy, overweight and obesity, inadequate sitting posture, axial spondyloarthritis, smoking, neck pain and low back pain in (Table 1), (11-16,19). The postural alterations assessed in the studies were low back pain, scoliosis, cervical misalignment, psychosomatic symptoms of functional scoliosis, neck pain, lumbosacral transitional vertebra and chest pain. The interventions investigated in the included studies were lumbar mobility and stretching exercises + unilateral PA mobilization + hot compress, Schroth exercises, RPG ('frog on the floor' posture) / cranio-cervical flexion test, McKenzie approach and spinal stabilization exercises, evidence-based physiotherapy treatment and thoracic muscle strengthening exercises in (Table 2), (3,5-7,17,18,21).

Table 1. Characteristics of studies on risk factors associated with postural alterations.

Author/year	Target Audience	Risk factors	Main findings
Fernandes *et al.* 2009 (11)	Teachers	Musculoskeletal Symptoms	Complaints in the upper and lower back and neck.

Betsch *et al.* 2015 (12)	Pregnant women	Pregnancy	Lower back pain.
Maciałczyk-Paprocka *et. al.* 2017 (13)	Children and teenagers	Overweight and obesity	Prevalence of postural alterations.
Noll *et al.* 2017 (14)	Teenagers	Poor sitting posture	The prevalence of poor posture when sitting down to write, to use the computer and during leisure time.
Oliveira *et. al.* 2022 (15)	Adults	Spondyloarthritis Axial	Chronic low back pain
Massah *et al.* 2023 (16)	Adults	Smoking	Forward head, thoracic hyperkyphosis, neck pain and neck disability.
Karaman *et al.* 2023 (19)	Adults	Lumbar and cervical pain	Emotional exhaustion, desensitization and decreasing quality of life

Table 2. Characteristics of studies on intervention measures for postural alterations and the impact on quality of life.

Author/year	Postural changes	Intervention	Main findings on the impact of intervention measures on quality of life
Angmo *et al.* 2016 (17)	Low back pain	Lumbar mobility and stretching exercises + unilateral PA mobilization + hot compress. Exercises Schroth	It reduced back pain and improved quality of life.
Weiss *et al* 2016 (5)	Scoliosis		Improved quality of life for patients with scoliosis.
Santos *et al.* 2017 (3)	Alignment of the head and cervical spine	RPG ('frog on the ground' posture) /	Decreased recruitment of the superficial cervical flexor muscles, favorably affecting

		cranio-cervical flexion test	head alignment in the standing position.
Gera *et al.* 2023 (18)	Psychosomatic symptoms of functional scoliosis	Exercises Schroth	Significantly reduce psychosomatic symptoms in functional scoliosis.
Avaghade *et al.* 2023 (6)	Cervicalgia - cervical postural syndrome	McKenzie Approach and Spinal Stabilization Exercises	Improved quality of life for patients with neck pain.
Ali *et al.* 2023 (7)	Lumbosacral transitional vertebra (LTSV)	Evidence-based physiotherapy treatment	Improving the quality of life of patients with lumbosacral transitional vertebra (LTSV).
Waqas *et al.* 2023 (21)	Pain in the thoracic spine	Exercises to strengthen the thoracic muscles	Improvement in chest pain and better quality of life for patients.

DISCUSSION

The findings of this scoping review reinforce that the main complaints of osteomyoarticulars alterations are painful sensations (7). With a multifactorial etiopathogenesis, postural alterations can have biomechanical origins, inadequate ergonomics, genetic and individual characteristics and lifestyle, which are considered risk factors that contribute greatly to the acquisition of spinal pathologies, negatively impacting patients' quality of life (8).

Evidence has shown that apparently harmless risk factors, such as inadequate sitting posture, can contribute to the development of postural alterations (5,14). This reality can be changed by educational measures to reinforce the adoption of healthy postural habits. Special attention needs to be paid to the proper ergonomics of chairs used at home, school and work, to reduce the risk of adopting inappropriate sitting postures (5,14). The prevalence of adequate posture was considered low in adolescents for the following sitting positions: sitting to write (15%), sitting to use a computer (22.8%) and sitting during leisure time (13.5%), (14).

Metabolic changes can also be considered risk factors for postural alterations. Obesity can predispose to dysfunction in the stabilizing muscles of the spine, causing pain and instability in this body segment, as well as deformed mechanical action due to excess weight.

The prevalence of postural alterations in children and adolescents was 69.2% in the overweight group and 78.6% in the obese group, with valgus knees and flat feet being the most common postural deviations in obese individuals (13).

Pregnancy is also associated with postural changes. It can lead to osteoarticular changes, due to biomechanical and hormonal alterations, causing low back pain. The relationship between posture and low back pain in pregnant women shows a significant increase in thoracic kyphosis with a decrease in low back pain during the second trimester and in the postpartum period (12).

In addition, the displacement of the center of gravity of the human body can occur due to the osteomyoarticular alterations caused by smoking. Data from a study of opium users suggests that thoracic hyperkyphosis, neck pain and neck disability were more prevalent in opium smokers when compared to the group of non-drug users (16).

These authors indicate that these alterations may be caused by staying in a non-ergonomic cervical position for a long period of time. In addition to anatomical and physiological changes, postural alterations can negatively affect psychosocial aspects. A study of adult caregivers of children and the elderly showed that neck pain and changes in spinal posture were associated with emotional exhaustion and a negative effect on quality of life (19).

Another study of teachers suggested that postural changes, mainly in the upper and lower back and neck impairment, were associated with a negative impact on the quality of life of these professionals (11). In this context, therapeutic interventions have been proposed to improve aspects of quality of life in individuals with postural alterations. The literature included in this study points to some physiotherapeutic interventions that are effective in having a positive impact on patients' quality of life (1,4). The Global Postural Re-education (GPR) method is indicated as an intervention in the rehabilitation of unbalanced cervical mechanics by increasing flexibility through stretching. This method acts on the muscles and muscle chains, producing head/cervical alignment through the 'frog on the ground' posture, favoring body alignment (3).

Schroth exercises, isostretching, the Klapp method, kinesiotherapy and the spinal manipulation technique also have a positive effect on spinal curvatures. These techniques aim to reduce the asymmetrical load of deformities, reduce pain, and provide alignment of the head, spine and limbs (5). The McKenzie approach and segmental spinal stabilization exercises in individuals with cervical postural syndrome have also shown positive results in reducing pain

(6). Therapeutic interventions such as physiotherapy exercises, thermotherapy and thoracic muscle strengthening exercises have been shown to be effective as scoliosis interventions (4), improving the quality of life of patients with lumbosacral transitional vertebrae, reducing pain, providing greater flexibility and stability, improving motor function and preventing further damage (7,21).

It is important to note that the studies adopted different criteria for the clinical diagnosis of postural alterations, which can make it difficult to match up the findings related to etiology and therapeutic interventions (3-7,19,21). It is necessary to plan new studies with robust designs, more precise diagnoses and larger sample sizes. Thus, the lack of early characterization of postural alterations in the first years of life is suggested as a probable "*gap*" in this subject. These findings could help in a more in-depth investigation of early associations and the influence of endogenous and exogenous factors.

CONCLUSION

Postural alterations can have an impact on the quality of life of affected patients. The findings reinforce that due to its multifactorial etiology, interventions should be planned individually to establish a more efficient action on the associated factors and improve patients' quality of life.

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CONFLICT OF INTEREST

None to declare.

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