

PREVENTION OF POSTURAL DEFECTS IN CHILDREN AND ADOLESCENTS IN PUBLIC HEALTH CARE ON THE EXAMPLE OF SELECTED EUROPEAN COUNTRIES

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Abstract

Correct body posture is one of the determinants of health and fitness. It promotes the proper functioning of the musculoskeletal system and internal organs. It is also correlated with mental well-being. Attention to so-called postural hygiene, which consists of correct posture, i.e. the ergonomic positioning of the body in static positions (standing, sitting) and during movement (walking, running, bending over to lift weights and any other everyday activity), should be a habit formed from early youth and even childhood. It seems that the school environment can play a key role here. This is all the more important because it is school-age children who are most often diagnosed with poor posture. Meanwhile, according to research conducted by scientists from Spain, Malta, Poland, Turkey and Romania, there is still much to be done in this area. Primary school teachers are often not adequately prepared and do not provide optimal education on postural hygiene. Children are not taught, using methods adapted to their cognitive abilities, the knowledge and skills that could become the basis for lifelong habits of correct posture and physical activity. In each of the countries covered by the project, the national healthcare system includes an assessment of the posture of children and young people, but the solutions adopted are not producing the expected results. Postural defects are mainly diagnosed by a family doctor, but sometimes also by a school nurse. Unfortunately, although school is the best place to provide education on postural hygiene and exercises to prevent posture defects, none of the countries surveyed has a formal (or informal) channel for communicating information between health centres, schools and parents. There is no such thing as a team focused on the well-being of children in this area. Another disadvantage is that no standardised posture assessment form has yet been developed that is clear and understandable to parents and children. The research yielded a set of recommendations to increase public awareness of the importance of correct posture for health and psychophysical well-being, with the most significant being promoting closer cooperation among families, healthcare providers, and schools. One way to improve postural hygiene among school children is to train teachers to recognize postural defects, share knowledge about the importance of proper posture for health, and conduct in-class exercises to prevent postural defects and promote physical activity. One such project is "Spine-Friendly Teacher, Spine-Friendly School" (2025-1-PL01-KA220-SCH-000350791).

Keywords: *Children's health, body posture, faulty body posture prevention, posture hygiene, health care.*

1. Introduction

The assessment of the ability to maintain correct posture should be an integral part of clinical examination, especially among children and adolescents, who are particularly vulnerable to the development of posture defects due to the plasticity of the musculoskeletal system (Griegel-Morris et al., 1992). Postural defects are a common phenomenon – in Poland, their prevalence is estimated at 50–70% of the population in their developmental years (Górecki et al., 2009). Similar observations have been reported in other European countries (Jorgić et al., 2023). This phenomenon is associated, among other things, with a decrease in physical activity and prolonged sitting (Salsali et al., 2023). The literature also emphasises the link between spinal deformities and depression, especially in adolescent girls (Dehcheshmeh et al., 2024). The implementation of screening tests may therefore be important not only for physical health, but also for supporting mental well-being.

2. Design

The project was proposed by researchers from Poland, who sent invitations to researchers from 14 European countries whose work on body posture in children and adolescents from the last 5 years was found in the Scopus, PubMed or Web of Science databases. Seven of the invited researchers responded to the invitation, but researchers from Finland, Germany and the United Kingdom withdrew due to a lack of consent from their university authorities or a lack of external funding. Researchers from Malta, Romania, Spain and Turkey joined the project and, together with researchers from Poland, agreed on the detailed research objectives and procedures. All authors are professionals actively involved in conducting research on posture prevention and improving physical fitness and psychophysical functioning in children and adolescents. Approval was obtained from the Ethics Committee in the country of the first author. The data was collected in a specially designed template in Microsoft Excel.

3. Objectives

The aim of the research was to compare legal regulations and measures taken within institutionalised healthcare aimed at the prevention and early diagnosis of posture defects in children and adolescents in selected European countries, to compile a list of good practices and to prepare recommendations that could increase the effectiveness of current posture care programmes for children and adolescents.

4. Methods

The project was carried out in several stages, which aimed to: (1) analyse the prevalence of postural abnormalities in children and adolescents in the countries covered by the project on the basis of publications from recent years; (2) collect information on legal regulations concerning guaranteed services in the field of postural screening in children and adolescents; (3) estimating the waiting time for therapy in a public health centre for a child diagnosed with a posture defect; (4) summarising the information collected – strengths and weaknesses of the measures implemented in individual countries; (5) developing recommendations for good practices related to the prevention of posture defects.

5. Results

5.1. Prevalence of postural abnormalities in children and adolescents

Research by Sacco and Catania (2019), one of the few studies conducted on the Maltese population, showed that scoliosis occurs in 5.3% of 13- to 15-year-olds, with girls being 2.25 times more likely to be affected.

Research conducted on a population of 2,680 Polish children (aged 6–18) showed lateral banding of the spine in 14.6–25.7% of the participants, depending on the assessment method (Maciałczyk-Paprocka et al., 2018). In the 11-13 age group, scoliosis was found in 51.94% of the participants (Wilczyński et al., 2020). Assessment of trunk stability showed that changing from a standing to a sitting position leads to significant changes in spinal curvature (Drzał-Grabie et al., 2015). Lower limb defects are strongly correlated with body weight (Brzeziński et al., 2019), and hindfoot valgus in younger children is observed in the vast majority of them (Jankowicz-Szymańska & Mikołajczyk, 2016).

Studies conducted in Spain have shown an increase in the frequency of hiperkyphosis with age (Sainz de Baranda et al., 2020a). In a sitting position, hiperkyphosis was found in more than half of the students (Sainz de Baranda et al., 2020b). Physical exercise has a beneficial effect on the alignment of body segments (Molina-Garcia et al., 2020), and in children between the ages of 5 and 11, there is an improvement in foot alignment (confirmed by the FPI-6 test) (Martínez-Nova et al., 2018).

Researchers from Romania have determined that the most common posture defects in children are forward head posture, and hiperkyphosis (Vlad et al., 2025). Lifestyle and incorrect sitting habits are significant risk factors for the development of posture defects (Dop et al., 2024). In 11-16-year-olds, the most commonly diagnosed conditions are hiperlordosis and hiperkyphosis, as well as lateral banding of the spine (Serseniuc et al., 2025). Education and physiotherapy bring about a significant improvement in spinal alignment (Cristuță, 2016).

In Turkish children, the incidence of scoliosis is, depending on the study, 25/1000 (Ugras et al., 2010), 23/1000 (Yılmaz et al., 2020) or 12/1000 (Sağlam et al., 2024) cases. Poor posture and low physical activity are associated with back pain (Ozdemir et al., 2021). A corrective exercise programme improves posture and can also be carried out in pre-school children (Kayapinar et al., 2012).

5.2. Legal regulations and benefits guaranteed by the public healthcare system

In each of the project countries, the Ministry of Health or other relevant authority introduces provisions regulating the scope of guaranteed health care services, including posture health care for children and adolescents. The regulations cover periodic health examinations, which are carried out at designated points in a child's development from birth to the age of 18. In each country, these check-ups also include an assessment of body posture, with particular attention paid to the presence of scoliosis. The assessment is carried out by a family doctor or paediatrician (in Poland, the examination is also carried out by a school nurse). In none of the countries do the regulations introduce a standardised form of posture assessment protocol, nor do they oblige health centres to equip the doctor conducting the posture assessment with measuring equipment (often the doctor does not even have a scoliometer and the assessment is based solely on visual assessment) nor is there an established path for cooperation with the school environment, which should be involved with the doctor and parents in the process of prevention and treatment of children's posture defects. In some countries, e.g. Poland, the diagnosis of a posture defect by a doctor does not automatically result in the child being referred for rehabilitation. Such a referral must be issued by an orthopaedic or a rehabilitation doctor.

5.3. Waiting time for treatment

The time needed to start rehabilitation varies from country to country.

In Poland, it takes an average of 201 working days from the diagnosis of a posture defect to the start of rehabilitation. This time is similar in large, medium and small cities (calculated on the basis of data from 124 health centres randomly selected from each province in Poland <https://swiatprzychodni.pl/specjalnosci/rehabilitacja/>).

In Romania and Spain, the waiting time for posture defect therapy depends on the region of residence. In Romania, children usually do not wait longer than two weeks to start therapy under the public health service (according to therapists and parents). In Spain, the average waiting time for therapy in 2024 was 94 days (https://www.epdata.es/datos/listas-espera-sanidad-publica/24/espana/106?utm_source=chatgpt.com).

The waiting time for rehabilitation in public health facilities in Turkey is usually between 3 and 6 months and also depends on the region. In larger cities, this time is usually shorter (<https://www.saglik.gov.tr/TR-107086/saglik-istatistikleri-yilligi-2023-yayinlanmistir>).

No confirmed data is available on waiting times for posture defect therapy for children and adolescents in Malta.

6. Discussion

The current paediatric care system is not delivering the expected results. Postural defects in children are still diagnosed in a large number of cases, and the methods of prevention and care are not precisely defined. The high incidence of postural defects in all the countries analysed indicates a need to supplement systemic preventive measures. Despite the existence of screening tests, the lack of standardised assessment protocols and formal channels of cooperation between doctors, physiotherapists and schools limits the effectiveness of interventions. An additional argument for intensifying preventive measures is the documented link between spinal deformities and depression (Dehcheshmeh et al., 2024). In none of the countries covered by the project is the physiotherapist, the person best trained in the

process of education to diagnose posture defects, involved in systemic solutions for postural care for children and young people.

It would be helpful to create a clear examination protocol form focused on specific tests and methods of assessing posture in order to streamline the examination, make the results understandable to parents, and focus the examination on specific, most common and most harmful skeletal deformities in children. The creation of a simple protocol would be a gesture towards parents. Posture assessment results recorded in a simple and legible manner would improve communication between doctors and parents and increase parents' awareness and involvement in shaping healthy behaviours in children.

Attention should also be paid to the equipment in the doctor's office and the school nurse's office. Enriching it with simple tools such as a scoliometer, measuring tape, rear foot valgus-varus gauge and posturographic grid would have a positive impact on the accuracy and reliability of the examination.

7. Conclusions

1. There is no significant difference in the incidence of posture defects in children and adolescents in the countries covered by the observation. The incidence and type of defects were very similar in Poland, Turkey, Spain, Romania and Malta.

2. Systemic care for children and adolescents regarding the diagnosis and prevention of posture defects in Poland and selected European countries differs slightly.

3. The waiting time for posture defect therapy depends on the region of residence. In Poland and Turkey, the waiting time in public health facilities is up to several months, while in Romania it is no more than two weeks. Partners reported that parents often opt for private visits.

4. Analysing the example of Spain, it seems that the best way to promote so-called postural hygiene is to implement preventive and educational programmes in schools, both in theoretical and practical form.

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Acts and regulations available on the following websites:

Malta: chrome-extension://efaidnbmninnibpcapjcgiclfndmkaj/https://socialsecurity.gov.mt/wp-content/uploads/2023/11/Childrens_Policy_Framework_2024-2030_EN.pdf

Polska: <https://isap.sejm.gov.pl/isap.nsf/DocDetails.xsp?id=WDU20230001427>

Rumunia: <https://cnas.ro/pachete-servicii-medicale/>

Hiszpania: <https://www.boe.es/buscar/pdf/2011/BOE-A-2011-15623-consolidado.pdf>

Türkiye: <https://www.mevzuat.gov.tr/mevzuat?MevzuatNo=9352&MevzuatTur=7&MevzuatTertip=5>
<https://www.saglik.gov.tr/TR-10440/ana-cocuk-sagligi-ve-aile-planlamasi-merkezleri-yonetmeligi.html>