

EDU WORLD 2022**Edu World International Conference Education Facing Contemporary World Issues****STUDY ON THE CHARACTERISTICS OF VERTEBRAL STATIC
DISORDERS IN CHILDREN**

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Abstract

This study aimed to validate a questionnaire to identify the need for physiotherapy intervention in children with chronic pain caused by vertebral static disorders. A cross-sectional observational (cohort) descriptive study was conducted on a sample of 60 volunteer subjects (38 girls and 22 boys), aged 8 to 12 years, clients of a physical therapy/rehabilitation centre. The applied questionnaire demonstrated good psychometric properties (Cronbach's alpha coefficient 0.85), which reflects a good internal consistency. These results prove that the instrument is feasible, valid in content, and a well-understood questionnaire for use in studies on children aged 8 to 12 years. Starting from this questionnaire, which proved its reliability and usefulness in a representative group of children with vertebral static disorders, we can design a future experimental design for evaluation, diagnosis, and intervention through physical therapy, according to a methodology based on scientific evidence, and is geared to the needs and preferences of the patient.

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Keywords: Back pain, children, posture, spinal deformity, survey

1. Introduction

Static postural changes in children are considered a public health problem, especially those that affect the spine, as they may be a predisposing factor for degenerative spinal disorders in adulthood. Also, this pathology has a negative impact on the activities of the daily life of the child during the school period, which is characterized by profound changes in physical and mental levels (Sedrez et al., 2015).

The issue of vertebral static disorders in children is very current, given the current epidemiological situation and the risks of deconditioning induced by the sedentary lifestyle of the vast majority of students in Romania. Such a diagnosis is perceived by the child's parents as a tragedy, with long-term repercussions on the quality of family life. Thus, these conditions require a very long, boring treatment, including plastering, wearing a corset, physical therapy, and finally a laborious surgery or even more.

The risks of progression and their significant repercussions in adulthood make screening and monitoring spinal deformities in children two imperatives that should not be underestimated. Preventive school medicine is the first screening. But the specialist's medical diagnosis and especially the complete, precise, repetitive, and comparative medical and physical therapeutic control will make possible the option for the best available therapy and the evaluation of the prognosis specific to each case. The therapeutic team (medical doctor, surgeon, physical therapist, and orthopedic surgeon) must be united to allow a close collaboration to provide the appropriate treatment and monitoring for each child.

Most vertebral static disorders in children are manifested by recurrent spinal pain, which causes analgesic positions and attitudes, which aggravate the pathophysiological vicious circle of the disease. Chronic pain is often associated with functional disability. In the pediatric population, this painful clinical syndrome is often accompanied by school deficiencies, difficulties in maintaining social contacts, decreased participation in leisure/recreational activities, impaired quality of life, and increased access to health care, which leads to high costs for the health system. The main cost factor in these situations is direct medical costs, followed by lost productivity. Due to this economic impact, policymakers should propose health policies and invest resources in the prevention, diagnosis, and treatment of pediatric chronic spinal pain (Groenewald et al., 2014).

The application of therapeutic procedures in this context, for the improvement of clinical symptoms, is characterized by the lack of clear scientific evidence, which is a limitation in this area (Kordi & Rostami, 2011). There are controversial data on the role of health/therapeutic education and physical therapy techniques and methods in the prevention, treatment, and rehabilitation of low back pain (LBP) in children. However, appropriate biopsychosocial education for patients and families should be considered, which is a modern way of initiating a larger, longer-term therapeutic project (Jackson et al., 2011).

Therefore, an observational study on the characteristics of vertebral static disorders in young school children is of real use for rehabilitation specialists, given the practical importance of the results to be obtained. These can be the starting point for the development of integrated and tailored therapeutic intervention projects according to the individual characteristics of the patients, framed on reasoned models of physical development, which circumscribe the age range 8-12 years.

2. Problem Statement

Vertebral static disorders in children are heterogeneous, but at the same time often treatable and, if corrected properly, can be a completely reversible process. However, the main condition is that these pathologies should be detected in time. Therefore, regular clinical examination of children, as well as monitoring of their lifestyle and personal habits, is important. If any form of abnormality is suspected, the child should be referred to an orthopedic surgeon or physical therapist as soon as possible to establish the diagnosis and initiate therapeutic intervention.

Early-onset spinal disorders occur in children in a vulnerable ontogenetic stage and are a unique and challenging dilemma, as the spine, thorax, and lungs are still developing, and it is essential to allow proper development of the viscera. Managing scoliosis or kyphosis with early-onset is a major challenge, as the child is still growing, and any intervention is only temporary. Treatment in these cases is an interprofessional care approach based on a multidisciplinary team (LeFever & Menger, 2022).

It should also be noted that most spinal deformities in children are functionally asymptomatic, and their diagnosis is most often based on systematic screening. Scoliosis, like childhood kyphosis, has a marked risk of worsening the faster the stature increases. Any static spinal disorder in a child is likely to worsen during growth, but the risk is higher during puberty.

The concerns of specialists converge on the idea of developing a clinical database, as support for identifying the specific needs of clinical-therapeutic management of these diseases with significant evolutionary potential. Such data can be collected from the field by various specialists, through systematic observations, aimed at determining contextual factors and representative clinical variants, generating paradigms and reference models in the field.

3. Research Questions

The present scientific approach has proposed as research questions topics extracted from the delimitation and broadening of knowledge in the field of spinal disorders in children. These common clinical typologies in physical therapy practice are manifested from a symptomatic point of view, especially in the form of recurrent back pain. Vertebral static disorders affect a large number of children, for example, it is estimated that up to 33% of students with special needs have such problems and need medical rehabilitation (Suta et al., 2017). Moreover, the consultation of pediatric epidemiological data on the prevalence of spinal pain in children reflects a high heterogeneity, according to the authors, the values vary in the range of 7% -50.8% (Jeffries et al., 2007).

Their early onset has been shown to significantly increase the risk of continuity of the clinical picture in adulthood. Consequently, prevention efforts should be targeted at the young population, but research on the issue of the spine in these age groups is limited. The focus was primarily on the working age population, and therefore specific questionnaires for measuring spinal pain and its consequences, especially for children and adolescents, are virtually absent. The aim of this study was to develop a questionnaire for schoolchildren to fill this gap.

4. Purpose of the Study

The research aimed was to identify through a questionnaire-based analysis the main vertebral static disorders accompanied by pain in school-age children encountered in physical therapy practice and how they were managed from a clinical-therapeutic point of view, in order to propose subsequently for clinical validation an original methodology of rehabilitation intervention for such cases.

5. Research Methods

A descriptive observational (cohort) cross-sectional study was conducted. Thus, a questionnaire was developed to identify the need for physical therapy for chronic pain in children, caused by vertebral statics disorders. The development of the questionnaire involved three phases – conceptualization, development, and field testing (Lauridsen & Hestbaek, 2013). The questionnaire was applied to a sample of 60 volunteer subjects (38 girls and 22 boys), aged between 8 and 12 years. Study participants were clients of a private physical therapy/rehabilitation centre. Their inclusion in the study involved obtaining informed consent, negotiated with the family or legal relatives. The selection criteria were based on the willingness to answer the questions of the questionnaire, the presence of a history of chronic back pain, in the current treatment of rehabilitation and the absence of other neuromotor disorders.

The questionnaire includes a number of 17 items - closed questions, with 3-7 self-reporting answers, which can be completed in about 10 minutes after a minimum training of participants. The questions refer to the type of static vertebral disorder that affects the subject, the time passed since the diagnosis, the clinical characteristics of the spinal pain (duration, character, irradiation, mode of appearance and accentuation, etc.), the presence of other symptoms (breathing difficulties, fatigue), the type treatment followed and the intention to participate in a rehabilitation treatment in the future. The construction of the questionnaire was based on the information gathered from the specialized literature (Bughirica-Georgescu, 2020; Wedderkopp et al., 2001), and on personal experience as a physical therapist involved in working with patients diagnosed with this type of pathology. Each item was carefully designed and adapted to the level of understanding of the children aged 8-12 years, given that addressability was to this target group of respondents (Lauridsen & Hestbaek, 2013).

6. Findings

For the developed questionnaire it was necessary to evaluate the psychometric properties by determining the internal consistency (alpha Cronbach's coefficient) to argue its practical applicability, from a statistical point of view. Thus, we obtained a value of Cronbach's alpha coefficient of 0.85, which reflects a good internal consistency (Monfort-Pañego et al., 2016; Tavakol & Dennick, 2011). These results prove that the instrument is feasible, valid in content, and a well-understood questionnaire for use in studies on children aged 8 to 12 years. Basically, it results that the chosen items are adequate for reporting the clinical symptoms and functional status of children with vertebral static disorders, and can be used in cross-sectional cohort studies for this age range. Other authors obtained similar values of the

Cronbach's alpha coefficient (around 0.80), for this type of instrument, with a variable number of items, of 7-24 questions (Szilágyi et al., 2021).

The results for each item, in the form of a distribution of answers, are presented in Tables 1-17.

Table 1. Item 1

Question	Possible answers	Number of responses	Percent
Have you been diagnosed with vertebral static disorders?	Yes	40	66.6%
	No	10	16.7%
	I don't know	10	16.7%

Table 2. Item 2

Question	Possible answers	Number of responses	Percent
Describe the type of vertebral static disorder	Kyphosis	12	20%
	Lordosis	5	8.3%
	Scoliosis	30	50%
	Kypholordosis	1	1.7%
	Kyphoscoliosis	12	20%

Table 3. Item 3

Question	Possible answers	Number of responses	Percent
Since when do you have a vertebral static disorder?	Recently	21	35%
	Less than one year	9	15%
	More than one year	22	36.7%
	More than two years	8	13.3

Table 4. Item 4

Question	Possible answers	Number of responses	Percent
Did you have pain?	Yes	46	76.7%
	No	13	21.6%
	I don't know	1	1.7%

Table 5. Item 5

Question	Possible answers	Number of responses	Percent
How intense was the pain?	Severe	17	28.3%
	Moderate	33	55%
	Minimal	6	10%
	None	4	6.7%

Table 6. Item 6

Question	Possible answers	Number of responses	Percent
What is the nature of the pain?	Localized	40	66.7%
	Widespread	3	5%
	With irradiation	17	28.3%

Table 7. Item 7

Question	Possible answers	Number of responses	Percent
When does the pain appear?	At rest	29	48.3%
	During the effort	9	15%
	After the effort	7	11.7%
	In the morning	4	6.7%
	During the day	9	15%
	During the night	2	3.3%

Table 8. Item 8

Question	Possible answers	Number of responses	Percent
The pain is:	At present	42	70%
	In the past	7	11.7%
	Older than 1 year	11	18.3%

Table 9. Item 9

Question	Possible answers	Number of responses	Percent
Is the pain persistent?	Yes	51	85%
	No	8	13.3%
	I don't know	1	1.7%

Table 10. Item 10

Question	Possible answers	Number of responses	Percent
The pain intensifies:	During movement	22	36.7%
	When jumping	9	15%
	When going up the stairs	8	13.3%
	When going down the stairs	7	11.7%
	In standing position	14	23.3%

Table 11. Item 11

Question	Possible answers	Number of responses	Percent
In what position does the pain persist?	Dorsal decubitus (lying on the back)	2	3.3%
	Ventral decubitus	5	8.4%
	Right lateral decubitus (lying on the right side)	2	3.3%
	Left lateral decubitus (lying on the left side)	3	5%
	In sitting position	33	55%
	In orthostatic position (standing)	15	25%

Table 12. Item 12

Question	Possible answers	Number of responses	Percent
The duration of the pain is:	A few seconds	10	16.7%
	A few minutes	8	13.3%
	A few tens of minutes	28	46.7%
	Several hours	10	16.7%
	Several days	4	6.6%

Table 13. Item 13

Question	Possible answers	Number of responses	Percent
Do you have difficulty breathing?	Yes	37	61.7%
	No	18	30%
	I don't know	5	8.3%

Table 14. Item 14

Question	Possible answers	Number of responses	Percent
Do you get tired during effort?	Yes	44	73.3%
	No	16	26.7%
	I don't know	0	0%

Table 15. Item 15

Question	Possible answers	Number of responses	Percent
Did you follow any treatment?	Yes	39	65%
	No	11	18.3%
	I don't know	10	16.7%

Table 16. Item 16

Question	Possible answers	Number of responses	Percent
What type of treatment did you follow?	Pharmacological	3	5%
	Surgical	13	21.7%
	Orthopedic	24	40%
	Physical therapy	20	33.3%

Table 17. Item 17

Question	Possible answers	Number of responses	Percent
Would you agree to participate in a physical therapy/kinetoprophyllaxy program?	Yes	51	85%
	No	0	0%
	I don't know	9	15%

From the analysis of the results, we can conclude that only 66.6% of the subjects were medically diagnosed with vertebral static disorders, inducers of chronic back pain, although all subjects went to the rehabilitation centre for specialized physical therapy treatment for pain symptoms. Also, the most common clinical form highlighted was scoliosis, being present in 50% of subjects. In fact, scoliosis is the most common disorder of the spine in children and adolescents. It is known that idiopathic scoliosis affects between 0.47-5.2% of adolescents, the data being variable in relation to the cohorts taken in epidemiological studies and the considered diagnostic criteria (Konieczny et al., 2013).

The pain was present in the antecedents in 76.7% of the subjects, largely of moderate intensity (55% of the subjects). The localized nature of spinal pain is noted in 66.7% of subjects, 48.3% of whom were reported even at rest. Other noteworthy characteristics of the pain, resulting from the application of the questionnaire, were: continuity (pain currently existing in 70% of subjects), persistence (in 85% of subjects), intensified during movement (in 36.7% of subjects), persistence in sitting (in 55% of subjects), duration of tens of minutes (in 46.7% of subjects). The rest of the subjects reported polymorphic forms of

the clinical typology of vertebral damage and consequent painful symptoms. These results should be interpreted in accordance with the opinion of specialists that chronic back pain in children is nonspecific and therefore, in most cases, can be managed in the short term by simple conservative treatments (Kordi & Rostami, 2011). It seems that the latest studies have shown higher prevalence rates of chronic back pain in children than in the oldest (Calvo-Muñoz et al., 2013a). This finding suggests the intensification of risk factors for pediatric postural pathology, given the increase in sedentary behaviours and the negative influences of the new requirements of modern schooling. The age range investigated (8-12 years) in our study is relevant in relation to the clinical significance of spinal pain symptoms, being proven that its prevalence increases with age, and the onset is placed around the age of 10 years (Miñana-Signes et al., 2021).

Regarding the presence of other clinical manifestations in the underlying conditions, the respiratory impairment of 61.7% of the subjects and the fatigue at exertion in the case of 73.3% of the subjects should be mentioned. The link between spinal deformities in children and lung function is known, for example, simple idiopathic scoliosis has direct negative effects on many respiratory parameters. Thus, there is a correlation between respiratory function and spinal and thoracic deformity in children with mild scoliosis (Szopa & Domagalska-Szopa, 2017). Basically, scoliosis reduces the amplitude of the respiratory tract of the chest wall, compliance of the lungs, and causes an increase in respiratory labour at rest, during exercise, and during sleep (Tsiligiannis & Grivas, 2012). Starting from the respiratory changes, we can also understand the association of other clinical manifestations, which ultimately have repercussions on the quality of life of the child with spinal deformities. Deterioration of vertebral physiological curves can cause a syndrome of chronic fatigue that is difficult to manage from a therapeutic point of view (Sud & Tsirikos, 2013).

Surprisingly, only 65% of the subjects confirmed the follow-up of targeted therapy for the underlying disease, although all received various forms of treatment, probably often symptomatic, especially analgesic. However, respondents stated that 40% of them underwent orthopedic interventions and 33.3% physical therapy. And in this case, the results are superimposable with the data in the literature. At present, in addition to the widely used conservative treatment methods for progressive kyphosis/scoliosis (including physical therapy techniques and methods, wearing plaster casts and corsets), many clinical cases usually require early surgery (Newton et al., 2019; Ridderbusch et al., 2018).

In any case, the vast majority of study participants (85%) were motivated to follow a form of physical therapy treatment of prophylactic or rehabilitation type, which is practically confirmed by the addressability to the respective medical centre, from where they were selected as study participants. Neurophysiological rehabilitation through physical therapy in children with postural defects is the cornerstone of conservative treatments, but also preoperative and postoperative, through the multiple positive effects of amelioration of spinal deviations (Zmyślina et al., 2019). These types of treatments are generally based on back education, the use of exercise, manual therapies, and fitness programs (Ahlqwist et al., 2008; Fanucchi et al., 2009). These interventions are primarily aimed at reducing the prevalence and intensity of spinal pain and disability, but there is still controversy over the real clinical evidence of the effectiveness of such rehabilitation programs (Calvo-Muñoz et al., 2013b). Hence the usefulness of conducting questionnaire-based surveys, which should be a starting point for the validation of

personalized strategies for therapeutic treatment of vertebral static disorders in children, depending on various categorical variables.

7. Conclusions

The results obtained through the research approach are consistent and therefore offer the premise of continuing the study in an applied, interventional variant. The applied questionnaire demonstrated very good psychometric properties and was therefore validated, despite the technical limitations inherent in the case of such tools for the child population. Starting from this questionnaire, which proved its reliability and usefulness in a representative group of children with vertebral static disorders, we can design a future experimental design for evaluation, diagnosis, and intervention through physical therapy, according to a methodology based on scientific evidence, and is geared to the needs and preferences of the patient.

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