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Conservative management strategies and stress level in children and adolescents with idiopathic scoliosis

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Summary

Objective. The objective of the study was to evaluate the stress level in children and adolescents with idiopathic scoliosis (IS) treated conservatively using the Dobosiewicz Method (DoboMed) approach in correlation with the clinical parameters and brace therapy.

Methods. The study group (SG) comprised of 63 patients (54 girls), in mean age 14.7 years. DoboMed approach was used in all studied patients (31 of them had also a brace (orhosis)). The clinical analysis included also body mass index (BMI) z-scores, age at diagnosis, spinal curvature location and the duration of brace correction. The patients completed the Bad Sobernheim Stress Questionnaire Deformity (BSSQ-Deformity) and Bad Sobernheim Stress Questionnaire Brace (BSSQ-Brace) questionnaires twice, i.e., at the beginning and at the end of the hospitalization.

Results. IS patients experienced low or moderate deformity-related stress (58.7% and 36.5% respectively). A significantly higher stress level (BSSQ-Deformity) was revealed in the combination therapy group compared to kinesiotherapy group ($p < 0.05$). In brace wearers, the orthosis-related was higher than the deformity-related stress ($p < 0.0001$). A significant correlation was observed between the BSSQ-Deformity score vs. age, BMI z-score and number of hospitalizations ($p < 0.05$). Deformity stress level was significantly related to the Cobb angle in both analyzing subgroups.

Conclusions. Stress level in IS patients is related to the severity of the disease irrespectively to the method of treatment. Brace wearing is a factor provoking and increasing stress level. Stress level related to bracing is higher than trunk deformity related. Higher stress levels were significantly correlated with age, BMI z-score and number of hospitalizations. Complex therapy should include also psychological support for young patients with IS.

Key words: idiopathic scoliosis, stress level, brace

Introduction

The Scoliosis Research Society (SRS) defines scoliosis as a lateral curvature of the spine greater than or equal to 10° Cobb with vertebral rotation seen on neutral standing AP radiograph [1]. Scoliosis due to an unknown etiology is referred to as idiopathic scoliosis (IS) and comprises 80% of all cases [2]. Scoliosis results in a complex three dimensional deformity (3D) [3]. Lateral deviation is seen in the coronal plane; changes are also observed in the sagittal plane (alterations in physiological thoracic kyphosis and lumbar lordosis), and axial rotation of the vertebrae occurs in the transverse plane. Structural deformities develop simultaneously in all three planes of the spine over time, which is considered the fourth dimension. IS occurs during the period of skeletal development and progresses during growth spurts [1]. If untreated, the disease may lead to major deformities within the trunk, impair the biomechanics of the thorax, decrease physical efficiency, reduce exercise tolerance and quality of life (QoL) [2–4].

The experts of the Society of Scoliosis Orthopaedic and Rehabilitation Treatment (SOSORT) believe that effects of kinesiotherapy on scoliosis mainly depend on exercises targeted at 3D correction of scoliotic deformity [3]. The Dobosiewicz's Method (DoboMed) is a method of active 3-dimensional correction in strictly symmetrical position of the pelvis and shoulder girdle [5].

Stress level of patients with idiopathic scoliosis arouses more and more interest [6–8]. The disease causes physical deformity and is associated with long-term management including hospitalizations, possibly also surgery; all these may lead to psychological distress. The progress in orthopedic appliances and surgical techniques as well as early diagnosis have reduced the occurrence of severe physical deformities. However, bracing may have a considerable impact on several aspects of patient functioning [9]. Scoliosis is a risk factor for impairment of the QoL of children and adolescents, and especially in brace-wearing patients [6, 7, 10]. Other elements influencing stress level in this group of patients are self-discipline, patience and acceptance of used methods of therapy to which effectiveness of treatment is strongly related. Hence the need to extend the research activity in this area and promote stress level assessment which is the important part of QoL. According to Evidence Based Medicine (EBM) principles, stress level assessment should constitute, along with medical examinations, an integral part of treatment planning and evaluation [11, 12]. That is why, the aim of the study was to evaluate the stress level in children and adolescents with idiopathic scoliosis (IS) treated conservatively using the DoboMed approach in correlation with the clinical parameters. Additional influence of Chêneau brace therapy on stress level was also analyzed in a subgroup of patient needed this treatment approach.

Material and methods

The study group comprised of 63 IS patients (54 girls, 9 boys) aged 14.7±2.2 years, who volunteered to participate in the study and whose parents or guardians signed

an informed consent form. The study was conducted from 3rd September 2013 until 27th February 2014. Patients selected for the study had been treated in the Department of Pediatric Rehabilitation for at least 3 weeks. Two subgroups were formed depending on the type of rehabilitation. The first group consisted of 32 participants treated with the DoboMed approach without the use of the Chêneau brace. The other group comprised of 31 patients in whom the DoboMed approach was combined with the Chêneau scoliosis brace.

Scoliotic curve was assessed by Cobb angle and angle vertebra rotation (AVR) based on A-P X-ray scans in the standing position in every studied patients. In the case of double or triple scoliosis curve, to the statistical analysis the maximum of Cobb angle was included. The Cobb angle was classified according to the guidelines produced by the International Scientific Society on Scoliosis Orthopedic and Rehabilitation Treatment (SOSORT) in 2011 [13].

Based on medical documentation the following data were obtained: current age, age at diagnosis, frequency of hospitalizations, bracing duration. Standard anthropometrical parameters were measured in every patient from the study group twice. Height was measured with 0.1 cm precision, and results were corrected according to the Bjure and Nachemson's formula [14]. Weight was assessed in lightly dressed children, without shoes with the 0.1 kg precision. Body mass index (BMI) was calculated in the all studied persons, according to the following formula: body weight [kg] divided by the square of height [m]. To adjust the nutritional status from the sex and age of the patients, BMI Z-score, expressed as a number of standard deviations (SD) from the value of the 50th percentile, was calculated according to the formula published by Nawarycz et al. [15].

To assess the stress level we used the Bad Sobernheim Stress Questionnaire Deformity (BSSQ-Deformity) and the Bad Sobernheim Stress Questionnaire Brace (BSSQ-Brace). Linguistic and cultural adaptation of these questionnaires was approved in 2009; it complies with the commonly accepted social and medical science criteria [16]. The questionnaires enable examiners to monitor stress level of patients treated either with kinesiotherapy (BSSQ-Deformity) or brace (BSSQ-Brace) [6]. Both questionnaires comprise eight closed-ended questions with a choice of four possible answers; the response to each question is scored 0 to 3. Questions 3. and 5. test the credibility [17]. A maximum score of 24 can be achieved, and the minimum score is 0. Score values of 0–8 indicate high stress, 9–16 medium stress and 17–24 little stress [16, 18]. All study participants completed the BSSQ-Deformity; the group treated with the DoboMed approach and the Chêneau brace additionally filled in the BSSQ-Brace (31 out of 63 patients). The questionnaires were completed twice, i.e., on admission to and discharge from hospital [18]. The hospitalization period duration was 3 weeks in every patient. The reliability of BSSQ-Deformity and BSSQ-Brace was determined using Cronbach's alpha coefficient. The values of the coefficient were 0.75 and 0.92 for the BSSQ-Brace, 0.83 and 0.74 for the BSSQ-Deformity, at the beginning and the end of the hospitalization respectively; the values higher than 0.7 indicate good reliability.

Between subgroups comparison based on the Mann-Whitney U and the Kruskal-Wallis tests (dependent to the number of subgroups). Stress level differences in the longitudinal analysis were assessed by the Wilcoxon matched pairs test. The Spearman's Rank correlation coefficient was used to measure correlations between deformity-related stress (BSSQ-Deformity score), brace-related stress (BSSQ-Brace score), and the variables evaluated based on patient's history and medical records (separately for pre – and post-therapy results). Data analysis was carried out using Statistica 8.0 (StatSoft). *P* value less than 0.05 was considered as statistically significant.

Results

General characteristics of the study population are presented in Table 1. For the further analysis of the study group was divided according to the Cobb angle [13], and qualified to the subgroups as follows: low degree scoliosis (5–15°) – 16, low to moderate scoliosis (16–24°) – 20, moderate scoliosis (25–34°) – 15 and moderate to severe scoliosis (35–44°) – 11 study participants. Severe scoliosis (45–59°) was diagnosed in one patient.

Table 1. **Characteristics of the study population**

Total study population (n = 63)				
Variable	Mean	SD	Minimum	Maximum
Age (years)	14.7	2.2	9	17
Age at diagnosis (years)	10.3	3.3	2.9	17
Time of disease duration (years)	4.5	3.5	0	13
Cobb angle (°)	24.2	10.1	10	49
AVR (°)	11.4	8.5	0	29
Height (m)	1.64	0.1	1.37	1.84
Body mass (kg)	54	11.4	30	91
BMI (kg/m²)	20.1	3.4	13.7	33.3
BMI Z-score (SD)	0.06	1.31	-1.53	1.46
Variable	Median	25%–75%	Minimum	Maximum
Number of hospitalizations	2	1–3	1	10
BSSQ-Deformity (pts)	18	13–19	5	25
Group (kinesiotherapy + brace) (n = 31)				
Variable	Mean	SD	Minimum	Maximum
Brace-wearing time per day (hrs/day)	11.96	15.13	4	23
Total brace-wearing time (months)	18.8	15.12	2	54
Variable	Median	25%–75%	Minimum	Maximum
BSSQ-Brace (pts)	9.5	5–15	0	22

The obtained data were used to determine the anatomical site of the spinal deformity. The topography of the deformity was as follows: cervicothoracic scoliosis – 1, thoracic scoliosis – 25, thoracolumbar scoliosis – 13 and lumbar scoliosis – 24 study participants.

Daily brace-wearing time was 4 to 23 hours/day (mean 11.96 hours, median 15.13 hours).The duration of trunk orthosis use varied from 2 to 54 months (mean 18.8 months, median 15.12 months). Of the braced patients, 3 were classified as full-time braced (20 hours per day), 17 as part-time braced (12–16 hours per day), and 11 as night-time braced (8 hours per day).

The majority of patients exhibited low levels of deformity-related stress both before and after the therapy. High stress experienced by brace wearers before the therapy went down to medium levels upon therapy completion. However, the differences were not statistically significant (Table 2). Stress level difference observed after 3 weeks of hospitalization was not statistically significant neither for BSSQ-Brace nor BSSQ-Deformity (in general studied population as in both therapeutic subgroups) (Table 3).

Table 2. **Stress level in BSSQ-Deformity and BSSQ-Brace questionnaires before and after hospitalization**

Stress level	Number/percentage					
	BSSQ-Deformity before therapy	BSSQ-Deformity after therapy	p (χ^2 test)	BSSQ-Brace before therapy	BSSQ-Brace after therapy	p (χ^2 test)
Low	37 (58.7%)	40 (63.5%)	0.687	7 (22.6%)	6 (19.4%)	0.217
Medium	23 (36.5%)	19 (30.2%)		10 (32.3%)	14 (45.3%)	
High	3 (4.8%)	4 (6.3%)		14 (45.1%)	11 (35.5%)	

Table 3. **Stress level change before and after hospitalization in total study group and in every therapeutic supgroups**

Variable	Median	25%–75%	Minimum	Maximum	Wilcoxon test
Total study population (n = 63)					
BSSQ-Deformity (pts) before hospitalization	18	13–20	5	24	P = 0.758
BSSQ-Deformity (pts) after hospitalization	18	14–20	6	24	
Group (kinesiotherapy) (n = 32)					
BSSQ-Deformity (pts) before hospitalization	19	16–20.5	8	24	P = 0.988
BSSQ-Deformity (pts) after hospitalization	19	17–20	10	24	

table continued on the next page

Group (kinesiotherapy + brace) (n = 31)					
BSSQ-Deformity (pts) before hospitalization	18	12–19	5	24	P = 0.619
BSSQ-Deformity (pts) after hospitalization	18	13–20	6	23	
BSSQ-Brace (pts) before hospitalization	9.5	5–15	0	22	P = 0.217
BSSQ-Brace (pts) after hospitalization	12	7–16	2	22	

A statistically significant difference (p = 0.041) was observed between the pre-treatment BSSQ-Deformity scores in the kinesiotherapy group (median = 19, low stress level) and kinesiotherapy + brace group (median =16, medium stress level) (Figure 1). We also compared stress levels determined with BSSQ-Deformity and BSSQ-Brace completed at admission to hospital. In brace wearers, the stress related to the use of Chêneau scoliosis brace (median = 9.5 – medium stress) was significantly higher than the deformity-related discomfort (median = 18 – low stress) ($p < 0.0001$) (Figure 2).

The Kruskal-Wallis rank sum test revealed that the patients with a greater Cobb angle (moderate to severe scoliosis, median = 15, medium stress level) experienced higher stress compared to those with low (median = 17, low stress level) or low to moderate scoliosis (median = 19, low stress level) (p = 0.029) (Figure 3). The patient with severe scoliosis (45–59°) was excluded from analyses.

A comparison of BSSQ-Brace scores and the Cobb angles (SOSORT 2011 classification) [13] did not reveal statistically significant differences between brace-wearers (Kruskal-Wallis test, p = 0.397) while the differences between BSSQ-deformity scores in relation to the Cobb angles was statistically significant in this group of patients. Patients with moderate to severe scoliosis (35–44°) exhibited significantly greater stress level (p = 0.038) compared to those with low to moderate scoliosis (16–24°) (Figure 4). One study participant with low degree scoliosis was not included in analyses.

Spearman's Rank correlation analysis revealed the significant negative correlations (higher stress level) between BSSQ-Deformity scores at admission and BMI z-score, number of hospitalizations at admission, and patient's age at the time of questionnaire completion (at admission and discharge from hospital). The correlations between BSSQ-Deformity with other parameters did not reach the level of statistical significance. The BSSQ-Brace score was not significantly correlated with the evaluated clinical parameters, but the highest correlation was found with BMI Z-score (Table 4).

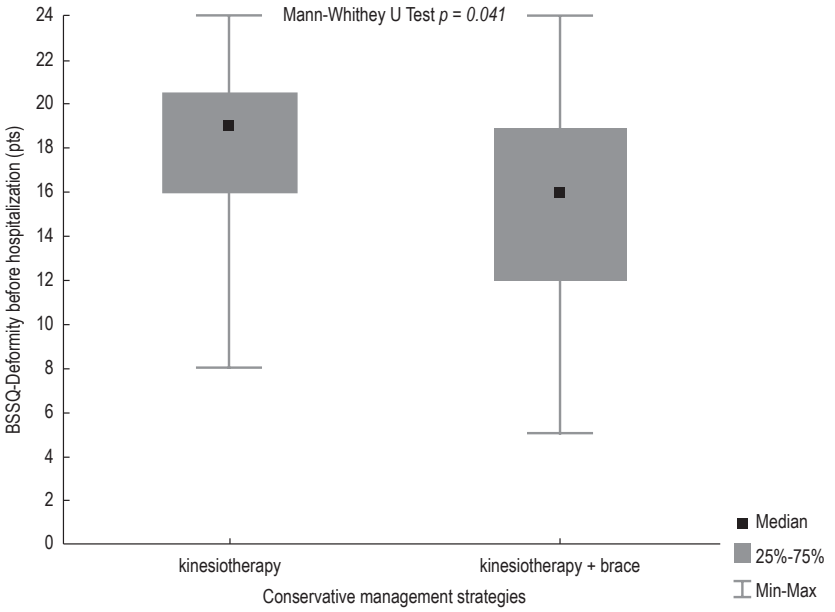

Figure 1. **Stress level in BSSQ-Deformity at the beginning of therapy depending on the conservative management strategy in patients with IS**

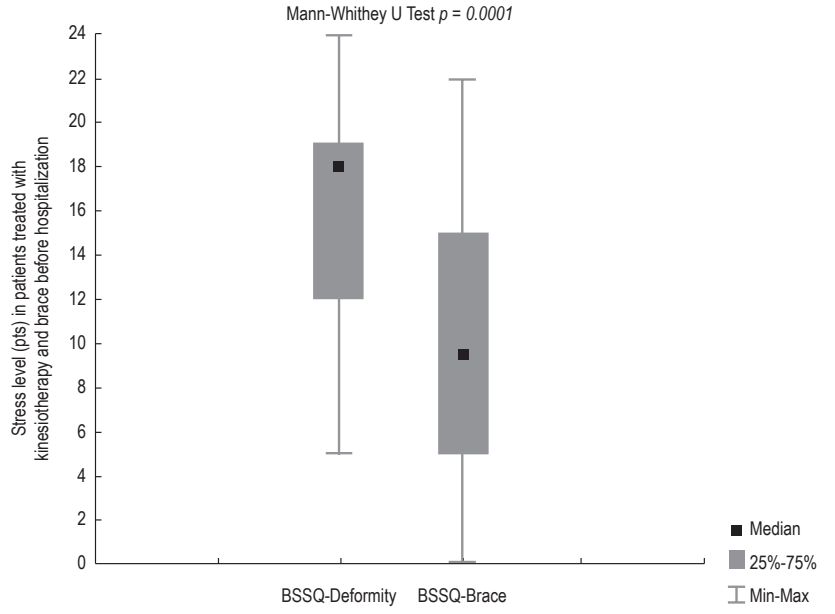

Figure 2. **Stress level in BSSQ-Deformity and BSSQ-Brace in patients treated by kinesiotherapy and brace at the beginning of hospitalization**

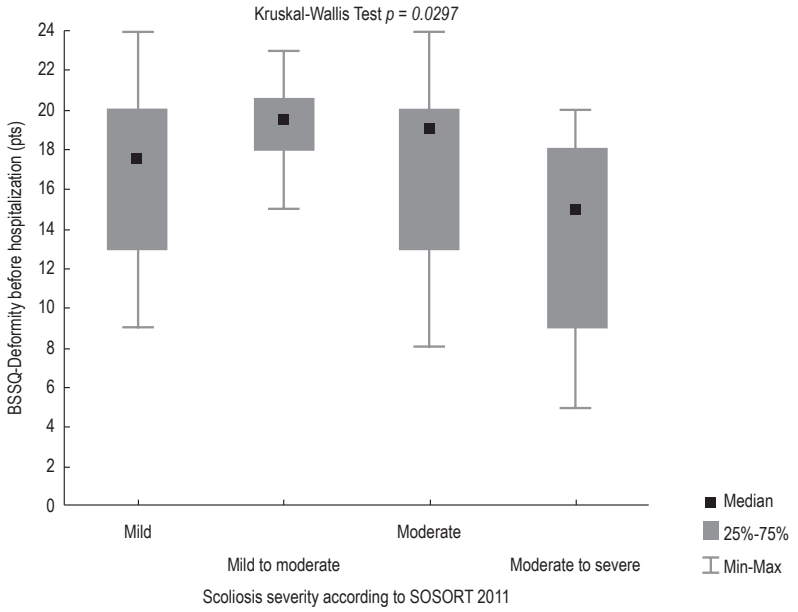

Figure 3. **Deformity-related stress level (kinesiotherapy subgroup n = 32) depending on the Cobb angle according to SOSORT 2011 [14]**

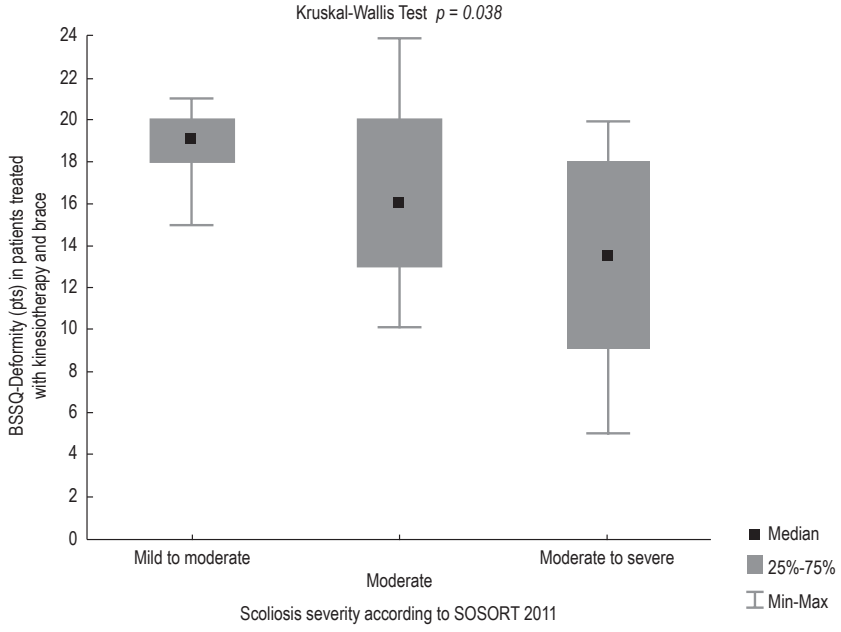

Figure 4. **Deformity-related stress level (kinesiotherapy + brace subgroup n = 31) depending on the Cobb angle according to SOSORT 2011 [14]**

Table 4. **Correlations between stress level in BSSQ-Deformity and BSSQ-Brace before and after hospitalization versus clinical parameters. Correlation coefficient (*r*S) and statistical significance (*p*) were respectively presented**

Parameter	BSSQ-Deformity before hospitalization	BSSQ-Deformity after hospitalization	BSSQ-Brace before hospitalization	BSSQ-Brace after hospitalization
Age (years)	**rS = – 0.279 p = 0.026**	**rS = – 0.307 p = 0.018**	rS = – 0.059 p = 0.753	rS = – 0.100 p = 0.617
Scoliosis duration time (years)	rS = – 0.194 p = 0.128	rS = – 0.036 p = 0.784	rS = 0.062 p = 0.743	rS = – 0.106 p = 0.596
Cobb angle (°)	rS = – 0.215 p = 0.091	rS = – 0.149 p = 0.261	rS = 0.017 p = 0.927	rS = 0.003 p = 0.984
Angle of vertebral rotation – AVR (°)	rS = – 0.036 p = 0.777	rS = – 0.203 p = 0.124	rS = – 0.159 p = 0.400	rS = – 0.096 p = 0.631
BMI Z-score (SD)	**rS = – 0.292 p = 0.02**	rS = – 0.091 p = 0.48	rS = 0.284 p = 0.151	rS = 0.225 p = 0.223
Number of hospitalizations	**rS = – 0.385 p = 0.001**	rS = – 0.293 p = 0.053	rS = – 0.078 p = 0.680	rS = – 0.301 p = 0.125
Brace-wearing time per day (hrs/day)	-	-	rS = 0.038 p = 0.856	rS = – 0.103 p = 0.628
Total brace-wearing time (months)	-	-	rS = 0.246 p = 0.225	rS = – 0.173 p = 0.407

Based on analysis of divided subgroups, no statistically significant differences were noted between BSSQ-Brace scores and patient's age at diagnosis ($p = 0.848$; Mann-Whitney U test), sex ($p = 0.189$; Mann-Whitney U test), deformity topography according to Ponseti ($p = 0.201$; Kruskal-Wallis test) and bracing duration ($p = 0.650$; Kruskal-Wallis test). Irrespective of daily brace-wearing time, BSSQ-Brace scores mainly revealed medium stress levels.

Discussion

Idiopathic scoliosis (IS) may considerably affect stress level and have negative impact on QoL in pediatric and adolescent patients [6, 19]. In our study stress level in IS children and adolescent was assessed with respect to the methods of the conservative treatment. All participants were treated conservatively using the DoboMed approach, and almost half of them wore Chêneau brace as the additional mode of therapy. We have not found any study reports on stress level of patients treated with this approach. There are several reports discussing stress level and QoL of patients with idiopathic scoliosis mainly in the group treated with bracing [7, 18, 20–22].

Stress level in this group of patient is influenced also by the proper qualification for this mode of therapy, what was confirmed by Cheung et al. [20]. They revealed that wearing the brace has negative impact on QoL in IS patient especially when Cobb angle was larger than 20°.

The present study showed that, in patient's group treated with bracing, stress level associated with the brace wearing was significantly higher, than this related to deformity only. Similar results were obtained by other researchers using the BSSQ-Brace [6, 8, 16, 18, 23, 24]. Hence, it might be concluded that the deformity itself causes less stress than brace therapy. This negative influence can be significantly reduced by the usage of the appropriate brace model. In the study by Weiss et al. [25] authors have been found that the patients treated with the lighter brace model (Chêneau light® brace), had significantly lower stress level than group wearing the heavier model of brace. However, according to Kotwicki et al. [6], brace-related decrease in QoL might be transient, and, after completion of therapy, one could expect improvement in the patient's emotional state. However, there are no other results confirming these expectations. Ugwonali et al. [26] and Olafsson et al. [27] believe that wearing the brace does not negatively affect the self-image of adolescents with idiopathic scoliosis. Generally, opinions on brace wearing effects are inconsistent. Different results may be due to the differences in the methodology used by other authors [8, 28]. The other cause is the different observation period. Some studies were conducted after treatment completion while others during the treatment process [6, 8, 19, 26, 27].

There were no long time studies to monitor stress level and quality of life of adolescent patients with IS during conservative treatment or prior to and long time after surgery in the literature. Bunge et al. [29] presented the results of studies on quality of life of patients with IS 10 months after treatment completion (brace or surgery)but no information was provided on QoL before or during the treatment. In our study stress level was checked twice, at the beginning and at the end of the rehabilitation. Both before and after therapy patients had in majority low or moderate deformity-related stress level. Hospitalization had no significant effect on the scores obtained in the two questionnaires before and after its completion, regardless of whether patients were additionally brace treated.

In the comparative analysis no statistically significant differences in stress levels were found between the subgroups formed on the basis of daily brace-wearing time. No significant correlations were also noted between BSSQ-brace scores and daily brace-wearing time or brace treatment duration (in months). Similar results were presented by other authors [8, 16]. Pham et al. [22], using different research tool, did not find a correlation between QoL and brace therapy duration. However, they noted that QoL was lower in full-time braced patients compared to night-time braced participants and those who were not using the brace. However, Polish authors [6] described a tendency towards an increase in stress levels in Chêneau-brace wearers and especially in those with shorter brace-wearing time; the results were not statistically significant. These observations may be confirmed by study conducted by Rivett et

al. [30]. They showed significantly lower QoL in adolescent with poorer compliance in brace therapy.

Present study demonstrated a significant difference in the scores obtained in the BSSQ-Deformity questionnaire at the beginning of hospitalization among a group of patients treated with physiotherapy, vs. group in which additionally brace treatment were conducted. At the beginning of hospitalization, the most of patients from the first subgroup felt a low level of stress in contrast to orthosis and kinesiotherapy treated patients who presented primarily moderate deformity-related stress. The important fact is that people with IS treated only with physiotherapy have lower value of the Cobb angle, relative to those treated by bracing. The results are not confirmed in the literature because other authors in their work, comparing the same group of patients with IS, did not show significant differences in the level of stress [6, 8, 16, 23].

In the comparative analysis of subgroups of patients divided according to the criteria SOSORT from 2011 [13] with respect to the value of the curvature's angle (Cobb angle), there were statistically significant differences indicating that patients with a greater Cobb angle were characterized by higher levels of the deformation-related stress when compared with those of a milder scoliosis. The same relationship was found for the entire studied population and subgroup of patients wearing the Chêneau orthosis. Our observations confirm the results obtained by other authors, who demonstrated a statistically significant negative correlation between the level of stress experienced by persons with IS (BSSQ-Deformity), and the value of the Cobb angle [6, 16, 23]. All authors used the same questionnaire. On the other hand, the results obtained by other researchers using different questionnaires [18, 29] and both BSSQ questionnaires [16] indicate the lack of correlation between the level of stress and scoliosis severity (by Cobb angle).

We did not observe a statistically significant correlation between deformity – and orthosis-related stress and AVR. However, Misterska et al. [16] found a correlation between the angle of vertebral rotation according to Perdriolle and the BSSQ-Brace score, i.e., the higher AVR, the lower the orthosis-related stress. The obtained result was inconsistent with the authors' expectations and they speculated that it could have been caused by defense mechanisms of repression whereby painful experiences, feelings or anxiety-arousing stimuli are banished from awareness [16]. Leszczewska et al. [8] reported that the correlation of the stress level with the AVR was significant but only for the lumbar segment. This was probably due to the fact that the vertebral rotation in the thoracic region was less noticeable to patients themselves and easier to conceal while vertebral rotation in the lumbar region might cause conspicuous hip asymmetry [8]. A marked but moderate correlation between AVR measured using the Bunnell technique and QoL was also revealed by other authors [6, 23].

Our results did not reveal differences between the BSSQ-Brace and BSSQ-Deformity scores with respect to the primary curve. Similar findings were reported by other authors, who in their study also did not show the influence of the primary curve location on the QoL of patients with IS [18, 28]. Misterska et al. [16] found a correla-

tion between QoL and curve location but only with respect to the BSSQ-Brace scores. The authors noted that patients with thoracolumbar and lumbar scoliosis exhibited higher stress levels compared to those with a thoracic deformity [16].

There were no statistically significant differences between stress level in questionnaires completed by boys and girls which may be due to the difference in our female and male subpopulation sizes (52 girls and 9 boys); hence, a similar analysis should be carried out in a larger IS male group. However, Aulisa et al. [28], who used three instruments for stress level determination (including BSSQ), found that boys experienced lower stress level compared to girls. Ugwonali et al. [26], in their study, asked parents of IS patients to assess their child's quality of life. The results also revealed that boys coped with the disease better than girls.

We also observed a significant correlation between our patients' BSSQ-Deformity scores and their age. Younger children had lower stress level, which increased with the age of patients. This finding might result from the fact that females, who tend to pay more attention to their appearance with age, predominate among patients with idiopathic scoliosis. Olafsson et al. [27] emphasized the fact that teenage girls had a more negative self-image of their body than boys, whereas the boys' perception of their body shape improved with age. Misterska et al. [12] found a correlation between QoL and the age at which conservative treatment was initiated. According to them, patients who began treatment at the age of 13 or later experienced significantly higher stress than those whose therapy was started earlier. However, Cheung et al. [20] noted a non-significant tendency to QoL decrease with age both in patients under brace treatment and in an observational group; however, the decrease was not significant. Other authors did not find any relationship between age of IS patients and QoL [6, 22].

In our study, statistically significant correlations were also revealed between our patients' stress level and BMI Z-score and number of hospitalizations. Patients admitted to the department for the first time exhibited lower deformity-related stress compared to those who had stayed in the department before. The number of hospitalization was the equivalent of the disease duration, what can explain this relation. There was also a positive correlation between BMI Z-score and deformity-related stress which seems to confirm a relationship between IS patients' body composition parameters, BMI Z-score and the Cobb angle (especially in overweight or obese individuals) [31].

Cronbach's alpha coefficient, indicating high test reliability, was comparable to values observed by Misterska et al. [16].

The major limitations of our study are cross-sectional design and relatively small study group, especially in male subgroups. Therefore, the main direction of research should involve long-term analyzes of the influence of scoliosis itself in relation to the methods of treatment on both stress and QoL level in patients with IS.

Conclusions

In short, stress level in IS patients is related to the severity of the disease irrespective of the method of treatment. However, brace wearing is the additional factor provoking and increasing stress level. Moreover, stress level related to the bracing is higher than this related to the trunk deformity itself. Other factors affecting stress level in this group include age, nutritional status (BMI Z-score) and number of hospitalizations. Complex therapy should include not only diagnosis and selection of treatment methods but also psychological support for young patients who often require multiple hospitalizations.

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