

Summary

Idiopathic scoliosis (SI) is a severe disease of the musculoskeletal system. If left untreated, it can lead to deformities in the trunk and changes in the body shape. The main problem accompanying SI is the lack of acceptance of their own bodies by patients and their relatives. Deformations in the form of a rib hump or muscle shaft as well as asymmetry of the torso and chest negatively affect the sense of body aesthetics, the appearance of many complexes, depressed mood or lower QOL of patients. Due to the fact that most patients with SI are children and adolescents, the presence of the family in the treatment process becomes essential. Both the patient and parents (guardians) are committed to treating SI and preventing its effects. It is known that the conservative treatment of SI is still symptomatic, long and sometimes controversial in the medical community as to its effects. FQOL covers many different areas of life, it is systemic in nature, as it focuses attention on the experiences of individual family members, as well as the family as a whole. From the moment an adolescent is diagnosed with SI, his whole family experiences a new, often highly stressful situation, resulting in many changes in the current lifestyle of the whole family. In Poland, FQOL research mainly concerns families of children with disabilities other than SI.

The aim of this dissertation was:

1. Determining the FQOL level in the group of families of children and adolescents with SI and making appropriate comparisons with the families of children and adolescents without SI.
2. Determining the type of factors differentiating the level of FQOL in families of children and adolescents with and without SI.
3. Determining the role of factors differentiating the level of FQOL in families of children and adolescents with and without SI.
4. Comparison of the dimension of family cohesion and adaptability in the comparative and basic groups.
5. Comparing the types of strategies for coping with crisis situations occurring in the family system in the comparative and basic groups.

Material and method. 200 families were included in the study. The main group consisted of 100 families of children and adolescents with SI, while the control group consisted of 100 families of peers without SI. In both groups, the age of children and adolescents was 9-18 years. The research was carried out at the County Clinical Hospital No. 2 in Rzeszów, the Trauma and Orthopedic Clinic for Children, the Clinical Physiotherapy Laboratory with the Movement Analysis at the KSW Regional Clinical Rehabilitation and

Educational Center No. 2 in Rzeszów, Barbara Cyran-Grzebyk's Private Physiotherapy Clinic and at the Secondary School Complex No. 4 in Rzeszów in the 2018/2019 and 2019/2020 academic years.

In order to carry out the research, the following research tools were used: the proprietary personal and physical examination card created for the purpose of the study, the Trunk Appearance Perception Scale, the Bad Sobernheim Stress Questionnaire-Deformity (BSSQ), the Family Quality of Life Scale (FQOL), the Family Adaptability and Cohesion Scales (FACES III), Family Crisis Oriented Evaluation Scales and F-COPES. Children and adolescents with and without SI and their parents / guardians (mother and father) participated in the study only once.

The statistical analysis of the results was developed using the R program, version 3.6.2.

Results. Significant differences in the FQOL level were found in all analyzed areas based on the assessments of individual family members. The level of FQOL assessed by children and adolescents as well as mothers and fathers from the control group was significantly higher, both in relation to the general index and in all examined areas.

The analysis of the results of selected parameters of the history and physical examination between the groups showed that the ATR of the thoracic and lumbar spine was significantly higher in the main group ($p < 0.001$). The result of flexibility assessment (toe-floor test) was significantly higher in the main group (15.4 ± 9.14 cm), which proves that children and adolescents with SI are less flexible than their healthy peers ($p < 0.001$). The corrective corset ($p < 0.001$) and the lower limb length insole ($p = 0.007$) were used only by children and adolescents with SI. In the case of the remaining variables, no statistically significant differences were found.

A comparative analysis of the results of the F-COPES scale assessing the strategy of coping with a family crisis between children and adolescents from both groups showed that adolescents from the main group more often sought spiritual support ($p = 0.012$), while children and adolescents from the control group more often used the following family crisis coping strategies: transforming the situation ($p < 0.001$), passive assessment of the situation ($p < 0.001$), gaining social support ($p < 0.001$) and relying on formal structures ($p = 0.001$). Mothers of children and adolescents from the control group obtained higher scores in all the tested subscales of the FACES III scale compared to the mothers from the main group. On the other hand, the fathers of children and adolescents from the control group obtained higher results in some of the subscales, and therefore more often used the following coping

strategies: transforming the situation ($p < 0.001$), passive assessment of the situation, gaining social support ($p < 0.001$) and relying on formal structures.

Family cohesion and family adaptability were significantly more pronounced in children and adolescents families without SI ($p < 0.001$).

The result of the BSSQ-Deformity scale indicated a significantly higher level of stress due to body deformation, and simultaneously a higher TAPS score for perceiving one's own body as more distorted in children and adolescents with SI ($p < 0.001$). SI children and adolescents living in rural areas rated the FQOL level higher in the area of physical and material well-being compared to those ones living in urban areas ($p = 0.031$).

The results of the research, taking into account individual family members, proved that there are many factors significantly affecting individual areas of the FQOL level in children and adolescents with SI. In the assessment of children and adolescents, the results in the area of physical / material well-being of families were statistically significantly higher in children and adolescents with SI living in rural areas ($p = 0.031$) than in urban ones. The females in the main group experienced a lower ($p = 0.019$) level of FQOL regarding problems with disability. In their assessment the age factor and the amount of monthly income per family member had no influence on the level of any of the FQOL subscales. Lumbar ATR significantly and negatively correlated with their assessment in the following aspects: general FQOL level ($p = 0.017$), parental function ($p = 0.002$) and emotional well-being ($p = 0.047$). On the other hand, ATR in the thoracic segment decreased the level of FQOL only in the area of physical and material well-being ($R = -0.212$, $p = 0.034$). It was shown that the general level of FQOL ($p = 0.032$) and the level of physical / material well-being were significantly higher among families of SI children and adolescents who did not wear a corrective corset ($p = 0.019$). Lower flexibility of children and adolescents with SI negatively affected the level of: general FQOL ($R = -0.215$, $p = 0.032$), parental function ($R = -0.222$, $p = 0.026$) and physical/material well-being ($R = -0.203$, $p = 0.043$). Patients with SI without additional orthosis experienced a higher level of material and physical well-being ($p = 0.002$) compared to patients using this type of orthopedic equipment.

The FQOL level assessed by children and adolescents with SI in the areas of parental function and disability problems was higher in families of children using a shoe insole compensating the shortening of the lower limb ($p < 0.01$), while in terms of physical/material well-being it was lower ($p = 0.001$). Patients with SI assessed that the intensity of stress associated with trunk deformity (BSSQ-Deformity) differentiated the level of overall FQOL ($p < 0.001$), parental function ($p = 0.006$) and emotional well-being ($p < 0.001$). Children with

low and medium levels of stress in these areas showed a higher FQOL level, but in children and adolescents with high levels of stress the level of FQOL was significantly lower in problems with disability area ($p=0.004$). Children and adolescents with SI who perceived more severe trunk deformity (TABS) assessed that the level of FQOL in three of the six areas was significantly lower in the areas of overall FQOL ($R=-0.284$, $p=0.004$), parental function ($R=0.203$, $p=0.043$) and emotional well-being ($R=-0.259$, $p=0.009$). According to SI patients, acquiring social support (F-COPES) correlated statistically significantly and negatively with physical / material well-being (FQOL) ($R = -0.254$, $p = 0.01$). Children and adolescents with SI from the main group assessed that the use of other coping strategies did not have a significant effect on the level of FQOL in the remaining areas ($p \geq 0.05$). Family adaptability (FACES III) negatively correlated with the level of general FQOL ($R=-0.231$, $p=0.021$), parental function ($R=-0.248$, $p=0.013$) and emotional well-being ($R=-0.31$, $p=0.002$), while family cohesion was not statistically significantly correlated. Based on the multifactorial analysis, many positive and negative predictors of the FQOL level in all areas for children and adolescents with SI were demonstrated.

In the assessment of children and adolescents from the control group, the FQOL level in the area of parental functions was significantly higher in children and adolescents living in rural areas ($p=0.03$), while in urban areas, the FQOL level concerning problems with disability was statistically significantly lower ($p=0.007$). In the control group the levels of both general and parental function FQOL were higher in girls than in boys ($p=0.002$). The chronological age of children and adolescents from the control group decreased the level of general FQOL ($R=0.24$, $p=0.016$), family interactions ($R=-0.201$, $p=0.045$) and problems with disability ($R=-0.205$, $p=0.041$). The surveyed children and adolescents without SI assessed that the FQOL level in the area of disability problems was significantly higher in children living in families with a monthly income above 1000 PLN / person ($p=0.004$). In the same control group both the ATR value in the lumbar and thoracic spine measured with Bunnel's scoliometer and the use of shoe insoles correcting foot misalignment did not significantly affect the FQOL level ($p \geq 0.05$) in the statistical analysis. Peers (without SI), despite experiencing low and medium stress (BSSQ-Deformity), did not observe its influence on the level of FQOL ($p \geq 0.05$).

Lower flexibility in children and adolescents from the control group negatively correlated with the level of: general FQOL ($R=-0.288$, $p=0.004$), family interactions ($R=0.265$, $p=0.008$) and problems with disability ($R=-0.301$, $p=0.002$). The children and adolescents from the control group assessed that they had a lower FQOL level in the area of

general FQOL ($R=-0.236$, $p=0.018$) and family interactions ($R=-0.283$, $p=0.004$) due to torso deformities. Assessment of children and adolescents without SI showed that the more often the strategy of gaining social support (F-COPES) was used, the higher the level of problems with disability ($p=0.005$) occurred, and respectively, the more frequently spiritual support was used, the higher the level of FQOL in the area of emotional well-being ($p=0.039$) was observed. The remaining strategies of coping with the family crisis in the assessment of children and adolescents without SI had no effect on the level of FQOL. According to children and adolescents without SI, the higher the family cohesion, the higher the FQOL level in the area of problems with disability ($R=0.234$, $p=0.019$). Family adaptability in the assessment of children and adolescents from the control group did not affect the FQOL level. Based on the multifactorial analysis, many positive and negative predictors of the FQOL level were shown in all areas for children and adolescents without SI.

According to the assessment of mothers of children and adolescents with SI from an urban environment, the FQOL level in the area of family interactions ($p=0.011$) was higher than in families from a rural one. Gender and age of their children with SI, as assessed by mothers from the main group, did not differentiate the FQOL level. However, in their opinion, the age of mothers positively correlated with FQOL disability problem. Older age of the mother increased the level of FQOL in this area ($R=0.246$, $p=0.014$). As assessed by mothers of children and adolescents with SI from families with an income above 1000 PLN / person ($p<0.001$), the FQOL level in terms of family interactions was higher. The higher the ATR in the thoracic segment in children and adolescents with SI, the higher the FQOL level in family interactions area ($R=0.242$, $p=0.016$) and parental function ($R=0.29$, $p=0.004$), and respectively, the higher the ATR in the lumbar spine of their children, the lower the FQOL level in the area of problems with disability ($R=0.396$, $p<0.001$). According to mothers, wearing a corrective corset by SI patients increased the level of FQOL in the area of emotional well-being ($p=0.003$), while the level of FQOL problems with disability area ($p=0.004$) was significantly higher in SI patients who do not wear a corrective corset. The flexibility of children and adolescents, as assessed by mothers from the main group, did not differentiate the FQOL level.

According to mothers, wearing the insoles correcting foot misalignment in children with SI increased the level of FQOL only in terms of physical / material well-being ($p=0.011$). Analysis of the results showed that according to the mothers, wearing an insole to compensate for the shortening of the lower limb by a child with SI increased the level of overall FQOL ($p=0.024$) and the level of FQOL in the area of family interactions ($p=0.006$).

In the assessment of mothers from the main group, the level of FQOL in the area of problems with disability ($p < 0.001$) and the level of overall FQOL in SI patients ($p = 0.019$) were significantly higher in mothers of children with low levels of stress due to deformation of the trunk (BSSQ- Deformity) than in mothers of children with high and medium stress. The perception of the severity of trunk deformation (TAPS) by children and adolescents with SI, as assessed by their mothers, did not differentiate the FQOL level. The more often passive assessment of the situation was used by mothers from the main group (F-COPES) in solving a family crisis, the higher the level of FQOL in the area of emotional well-being ($R = 0.219$, $p = 0.029$) was occurring. On the contrary, more frequent use of gaining social support lowered the level of FQOL in the area of physical and material well-being of FQOL ($R = -0.31$, $p = 0.001$). Seeking spiritual support (F-COPES) resulted in a higher level of overall FQOL ($R = 0.235$, $p = 0.019$) and family interactions ($r = 0.218$, $p = 0.03$) as assessed by mothers. The use of other strategies of coping with family crisis (F-COPES) in the assessment of mothers of children and adolescents with SI does not differentiate the FQOL level. Greater family cohesion (FACES III), in the assessment of mothers from the main group, increased the level of: overall FQOL ($R = 0.27$, $p = 0.007$) as well as the parental function ($R = 0.257$, $p = 0.01$). Family adaptability positively correlated only with the level of FQOL in the area of family interactions ($R = 0.332$, $p = 0.001$). Based on the multifactorial analysis, many positive and negative predictors of the FQOL level in all areas for mothers of children and adolescents with SI were demonstrated.

The assessment of mothers from the control group showed that the living environment influenced the FQOL level only in the area of family interactions ($p = 0.008$) and physical / material well-being ($p = 0.006$), and it was significantly higher in mothers living in urban areas. Mothers of girls from the control group have a slightly higher level of FQOL in the area of parental function ($p < 0.001$). In their opinion the age of children and adolescents without SI and the age of the mothers from the control group did not differentiate the FQOL level. The amount of monthly income per family member differentiated the FQOL level. Higher monthly income per family member increased the level of FQOL in the area of family interactions and the level of overall FQOL ($p = 0.049$, $p = 0.002$) as assessed by mothers from the control group. The higher the ATR value in the thoracic segment in children and adolescents without SI, the higher the FQOL level in the area of problems with disability ($R = -0.213$, $p = 0.033$). On the other hand, an increase in the ATR value in the lumbar section decreased the level of FQOL in terms of emotional well-being ($R = -0.207$, $p = 0.039$). Low flexibility also reduced the level of FQOL, in as many as three areas: general FQOL ($R = -0.286$, $p = 0.004$), family interactions

($R=-0.433$, $p<0.001$) and physical / material well-being ($R=-0.222$, $p=0.027$) as assessed by mothers from the control group.

The FQOL level in the area of disability problems was significantly higher in families of children and adolescents without SI, who did not use insoles for shoes that correct the foot position ($p=0.003$). In the assessment of their mothers, the intensity of stress experienced by children and adolescents in the control group due to the torso deformation did not differentiate the FQOL level. Perception of trunk deformity as more severe by adolescents without SI, as assessed by mothers (higher TAPS score), resulted in lower FQOL levels in the following areas: general FQOL ($R=-0.288$, $p=0.004$), family interactions ($R=-0.243$, $p=0.015$) and physical / material well-being ($R=-0.229$, $p=0.022$). According to the mothers from the control group more frequent use of converting the meaning of the circumstances as a way of coping (F-COPES) with stressful situations in the family correlated significantly and positively with the level of: general FQOL ($R=0.254$, $p=0.011$), family interactions ($R=0.277$, $p=0.005$), physical/material well-being ($R=0.198$, $p=0.049$) and problems with disability ($R=0.285$, $p=0.004$).

Moreover, the more frequently social support was used (F-COPES), the higher the level of FQOL occurred in the terms of: general FQOL ($R=0.397$, $p<0.001$), parental function ($R=0.403$, $p<0.001$) and physical/material well-being ($R=0.265$, $p=0.008$). The more frequent spiritual support, the higher the level of: general FQOL ($R=0.263$, $p=0.008$), physical/material well-being ($R=0.314$, $p=0.001$). Relying on formal structures increased the level of overall FQOL ($R=0.226$, $p=0.024$) and the level of FQOL in the area of parental function ($R=0.224$, $p=0.025$) and emotional well-being ($R=0.209$, $p=0.037$). Greater family cohesion was responsible for a higher level of overall FQOL ($R=0.539$, $p<0.001$) and family interactions ($R=0.322$, $p=0.001$), parental function ($R=0.375$, $p<0.001$), physical / material well-being ($R=0.462$, $p<0.001$) and problems with disability ($R=0.23$, $p=0.021$). Higher family adaptability, in the assessment of mothers from the control group, increased the level of general FQOL ($p=0.009$, $R=0.259$), parental functions ($p=0.007$, $R=0.266$) and disability problems ($p=0.001$, $R=0.341$). Multifactorial analysis based on the linear regression model showed, in the assessment of mothers of children and adolescents without SI, many positive and negative predictors of the FQOL level in all areas.

The fathers of children and adolescents with SI assessed that the living environment, gender of children and adolescents, age of fathers and the amount of monthly income per family member did not differentiate the FQOL level. On the other hand, in the fathers' opinion, the chronological age of a child / adolescent with SI correlated significantly

($p=0.017$) and negatively ($R=-0.238$) with the level of FQOL in problems with disability area. In their assessment, the higher the ATR value in the thoracic segment, the higher the level of FQOL in the area of emotional well-being ($R=0.224$, $p=0.025$), while the ATR in the lumbar region does not differentiate the FQOL level. Wearing a corrective corset or the value of the toes to floor test did not differentiate the FQOL level as well. The use of insoles correcting foot positioning in children and adolescents with SI, as assessed by their fathers, increased the overall FQOL level ($p=0.015$). The use of a shoe insert to compensate the shortening of the lower limb in SI patients increased their fathers' FQOL level in the area of: general quality of life ($p=0.023$) and emotional well-being ($p=0.006$). The fathers assessment showed that the severity of stress associated with trunk deformity (BSQQ-Deformity) and the perception of its severity (TABS) by children and adolescents with SI did not differentiate the FQOL level. The fathers assessed that out of five possible ways of coping with a crisis in a family, seeking spiritual support (F-COPES) was the only one to differentiate the level of FQOL in the area of family interactions ($R=0.25$, $p=0.013$). In the opinion of the fathers from the monthly group, the size of adaptability and coherence did not differentiate the FQOL level. Based on the multifactorial analysis, many positive and negative predictors of the FQOL level in all areas for fathers of children and adolescents with SI were shown.

According to the control group fathers' assessment, the FQOL level in the area of family interactions was statistically significantly higher for families from a rural environment ($p=0.003$). There was also a statistically significant correlation between the gender of children and adolescents from the control group and the general level of FQOL as well as the level of FQOL in the area of emotional and physical/material well-being. The FQOL level was significantly higher in the fathers of girls from the control group. Statistical significance was, respectively, ($p=0.002$, $p=0.007$, $p=0.009$). The assessment of fathers of children and adolescents without SI showed that the older the child, the lower the FQOL level in the area of physical / material well-being ($R=-0.2$, $p=0.046$). The older the fathers, the lower the level of his FQOL in the area of disability problems ($p=0.009$, $R=-0.259$). The amount of monthly income per person in a family did not affect the FQOL level of fathers of children and adolescents without SI. The higher the ATR value in the thoracic segment in children and adolescents without SI, the higher the FQOL level in the area of problems with disability ($R=0.256$, $p=0.01$). The higher the ATR in the lumbar region in children and adolescents without SI, the lower the level of: general FQOL ($R=-0.298$, $p=0.003$), parental functions ($R=-0.203$, $p=0.043$) and physical/material well-being ($R=-0.275$, $p=0.006$). For fathers of children and adolescents without SI, a low toe-floor test score correlated negatively with the

level of: general FQOL ($R=-0.254$, $p=0.011$), emotional well-being ($R=-0.221$, $p=0.027$), physical/material well-being ($R=-0.263$, $p=0.008$) and problems with disability ($R=-0.282$, $p=0.005$).

The fathers of children and adolescents from the control group assessed that the use of shoe insoles correcting foot positioning in children and adolescents without SI significantly differentiated the level of FQOL in the following areas: general FQOL ($p=0.008$), family interactions ($p=0.049$) and emotional well-being ($p=0.001$). The level of stress experienced by the adolescents from the control group due to the deformation of the torso, in the opinion of their fathers, was statistically significantly correlated only with the area of family interactions ($p=0.03$). According to fathers, the perception of the severity of torso deformation by adolescents from the control group negatively correlated with their level of: general FQOL ($R=-0.262$, $p=0.008$), emotional well-being ($R=-0.202$, $p=0.043$) and physical / material well-being ($R=-0.359$, $p<0.001$).

Assessment of fathers of children without SI showed that out of all five strategies of coping with family crisis (F-COPES), only obtaining social support significantly differentiated both the level of overall FQOL ($R=0.387$, $p<0.001$) and the level of FQOL in the areas of: family interactions ($R=0.344$, $p<0.001$) and physical/material well-being ($R=0.223$, $p=0.026$). The other F-COPES strategies did not differentiate the FQOL level. The family cohesion (FACES III) significantly and positively correlated with the general level of FQOL ($R=0.518$, $p<0.001$) as well as with the level of FQOL in the following areas: family interactions ($R=0.22$, $p<0.028$), parental function ($R=0.337$, $p=0.001$), physical / material well-being ($R=0.249$, $p=0.013$) and problems with disability ($R=0.197$, $p=0.049$). The higher the family cohesion, the higher the FQOL level in the, above mentioned areas for the fathers in the control group. The family adaptability (FACES III) significantly and positively correlated with the general level of FQOL ($R=0.211$, $p=0.035$) as well as with the level of FQOL in the following areas: emotional well-being ($R=0.262$, $p=0.008$), physical/material well-being ($R=0.27$, $p=0.008$) and problems with disability ($R=0.279$, $p=0.005$). The fathers from the control group assessed that the higher the family's adaptability to a given random situation, the higher the FQOL level in the presented areas.

Based on the multifactorial analysis, many positive and negative predictors of the FQOL level in all areas for fathers of children and adolescents without SI were shown.