

# STUDY OF TRANSPLANTED ADOLESCENTS WITH A FOCUS ON RESILIENCE

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„*Mens sana in corpore sano*” (Satires 10)

## Abstract

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Transplantation is a life-saving intervention for both children and adults, providing survivors with the possibility of a „new” life. During a strictly regulated procedure, patients reach transplantation, and the subsequent recovery phase also takes place according to the path determined by the medical protocol. Psychological changes are by no means this predictable and planned. After a life-saving operation, both the child and the family must accept the status of a chronic patient in parallel with the recovery. The aim of the research, which started in the fall of 2020, is to identify the psychological characteristics of transplanted children and adolescents with focus being on resilience potential. The data of 51 transplanted children and age- and sex-matched control subjects treated at the Pediatric Clinic of Semmelweis University are processed in the pilot study. Based on our primary results, it can be concluded that there is no significant difference between the groups in terms of resilience, but it should be noted that the resilience value of the transplanted group is at the lower limit. Transplanted adolescents are more characterized by maladaptive coping strategies, lack of prosocial behavior and higher levels of depression, anxiety and stress. The resilience value of the transplanted group is in the normal range, which is encouraging for the future regarding management of changes. The results provide guidelines for psychological support designed for transplanted adolescents and for the consideration of resilience-based screening.

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**Key words:** transplantation ▪ resilience ▪ coping ▪ depression ▪ anxiety ▪ stress

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## INTRODUCTION

Protective factors play a significant role in dealing with life-threatening conditions and chronic diseases as well as achieving the optimal quality of life. Anxiety states and high stress levels that occur as a result of the disease are characteristics of the psychological state of both children and their parents (Cousino 2017). In our case, the interpretation of the statement ‘a sound mind in a sound body’ refers to the interaction of body and soul which contributes to well-being and the optimal quality of life (Kövesdi, 2016). The special situation of transplanted children is striking compared to other chronically ill conditions. In their case, a life-threatening condition is eliminated first by the transplant,

which is then followed by the stabilization of the chronically ill condition and the establishment of a new lifestyle. With regard to transplants, child and adult population is significantly different based on the size of the organs, but, within this, there are also differences in various organs as for the condition before the transplant, the surgical intervention itself, the recovery period, the chances of rejection, possible complications and the risk aspects (Dezsófi et al., 2018). In 2013 our country joined the cooperation between seven countries called Eurotransplant, so the number of transplants increased by 40%. In Hungary kidney transplantations have been performed in the study sample since 2018 previous surgeries were performed abroad. In addition to the physical treatment - surgical background - we wish to contribute to the care of mental condition in Hungary with the ongoing research. We consider it particularly important to identify the protective and vulnerable factors of transplanted children and adolescents as well as their parents, and to formulate indications and effective support aspects taking them into account.

## THEORETICAL BACKGROUND

### *The roots and importance of positive psychology*

The objective of positive psychology, in addition to the factors of pathology (weakness, and lack) is to learn about strengths and excellence based on empirical research results (Seligman, Csíkszentmihályi, 2000). The researchers focused on studying the „good” side of people. Positive psychology defines an authentic image of a person with positive feelings and free will, a purposeful person who is able to regulate his negative emotional states and move themselves forward in order to have as many positive experiences as possible. The treatment of the physical and mental wounds of World War II contributed significantly to the upsurge of research formulated in the spirit of positive psychology, to the paradigm shift and to the research of protective factors in addition to vulnerable factors. In the 1960s, the attention of researchers turned to protective factors, Rotter (1966) described the ability to control. Additional protective factors; stubborn personality (Kobasa, 1970), self-awareness (Festinger, 1979), self-efficacy (Bandura, 1982), learned resourcefulness (Rosenbaum, 1990), sense of coherence (Antanovszky, 1979), resilience (Block, 1980), dispositional optimism (Scheier, Carver, 1987), constructive thinking (Epstein, Maier, 1989), emotional intelligence (Mayer, Salovey, 1997) and spiritual intelligence (Zohar, Marshal, 2000). The listed protective factors help the individual prosper as an active participant in the events of their life. However, many life situations may arise (e.g.: trauma, accident, serious illness, transplant) over which we have no control. In these situations maintaining control at all costs - instead of accepting the

changed situation - worsens physical and mental health (Kulcsár, 2009). Accepting an extreme and uncontrollable situation, adapting to the situation and having a positive attitude can be the way of adaptation because acceptance comes with an experience filled with trust which can correct and recolor the fear accompanying the loss of control as well as tame the emotional experience. Eitel (1995, id. Gy Kiss 2012) proved that letting go of control and being in an extremely vulnerable situation reduces the risk of depression. Gratitude and forgiveness are positive feelings that indicate the ability to process trauma. Positive emotions have a positive physical and mental effect on personal well-being and are associated with the possibility of post-traumatic growth (Kiss, Makó, 2015). Werner and Smith (1992) formulate a complex system of protective factors, which have projections from the individual, family and social environment.

*The concept and importance of resilience in clinical and health psychology*

In the spirit of positive psychology, in a stressful life situation we focus on strengths in addition to difficulties and pathological conditions - a pathogenetic approach - in the research model. Among the protective factors the identification of resilience potential and its correlation with other factors is the central question of the longitudinal research conducted with transplanted adolescents. Defining the concept of resilience is a complex question in itself, however, in the research we think according to Maseten's (2001) definition, which states that resilience is closely related to the ability to adapt and that people are characterized by internal control, empathy, optimism, positive self-image, positive handling of changes and self-effective behavior. In Hungarian, resilience is most often referred to as mental resilience or flexible adaptation (Szokolszky, V. Komlósi, 2015).

**1.table.** Threat - dimensions of adaptation (Masten, 1990, id.Kiss, Makó 2015, pp.357)

<b>Vulnerability/Adaptation</b>	<b>Vulnerability/LOW</b>	<b>Vulnerability/HIGH</b>
<b>Adaptation/SUCCESSFUL</b>	COMPETENCE	<b>RESILIENCE</b>
<b>Adaptation/FAILED</b>	-----	VULNERABILITY

Within the science of psychology, health psychology and clinical psychology have become open to examining the phenomenon of resilience. In mapping the background of individual psychopathological symptoms and risk factors, there is a scientific examination of the vulnerable - e.g. stress, anxiety, depression - and protective factors - e.g. resilience (Hámori, 2013). Based on the results the specialists are working on new intervention procedures aimed at preserving health and improving the quality of life of chronic patients. Based on the results

of research conducted among the adult population (N=438 people), the resilience value of the healthy group is significantly higher than that of the autoimmune patient group. In terms of personality, harm avoidance is negatively correlated, while persistence is positively correlated with resilience. The harm avoidance subscales of worry, pessimism, fear of uncertainty, shyness from strangers, fatigue and asthenia were also negatively correlated with the value of mental resilience. Self-directedness and cooperation were positively correlated with resilience. The authors highlight the subscales of self-direction - sense of responsibility, sense of purpose, effectiveness, resourcefulness, self-acceptance - which, according to them, contributed significantly to the development of resilient responses (Gyöngyösiné Kiss et al., 2008). Depression and anxiety show a significant negative relationship with mental resilience. An important role is attributed to a purposeful life and a positive social attitude in the development and implementation of resilient responses (Kiss, Makó 2015) as well. The recognition and application of resilience potential in healing can imply a change in health behavior in the long term (Kövesdi, 2016).

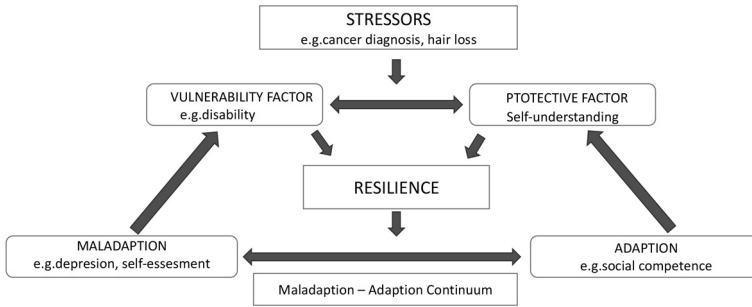
### *Resilience among chronically ill patients*

In her meta-analysis (PubMed, PsycINFO, 1993–2003), Fernanda Cal (2015) summarizes the most significant results of resilience research from the point of view of chronic diseases. Chronic diseases are often accompanied by anxiety and depression, which conditions reduce the standard of living and well-being. Resilience affects several chronic diseases, e.g. lupus, diabetes mellitus, rheumatoid arthritis, cancer, hepatitis-C, juvenile arthritis, skin disease, depression, Parkinson's disease, chronic kidney disease. The development and strengthening of symptoms of the disease can be accompanied by psychological problems and stress which also affect the functioning of the immune system. An inverse relationship was found between resilience, anxiety and depression (DeNisco et al., 2011; Gyöngyösiné Kiss et al., 2008; Kiss, Makó, 2015). High resilience protects against the development of psychiatric diseases. The relationship between resilience, reduced work capacity and somatization is negative. Resilience shows a positive correlation with a better quality of life with health-preserving behaviours - e.g.: healthy eating, stress reduction, self-realization, appropriate sports (Rutten et al. 2013; Wagnild, 2009). DeNisco et al. (2011) found an inverse relationship between chronic diabetes, resilience and glycohemoglobin (HbA<sub>1c</sub>). An inverse relationship with depression was also found among hepatitis C patients. There is an inverse relationship between mental resilience and active states of Bechterew's disease as well. Overall, the authors concluded that patients with low resilience potential are less able to cope with stress and challenges that arise from the disease. There are individual

differences in social relationships, family functioning, self-esteem and emotion regulation which can increase the risk of physical diseases and death (Cal et al., 2015). In our study, taking these into account, we check stress, mood factors, coping style, well-being and resilience.

### *Resilience among chronically ill adolescents*

Chronic diseases are often accompanied by a decrease in the standard of living, anxiety or even depression that threatens well-being. In several previous studies, they came to the conclusion that the phenomenon of resilience affects several chronic diseases (Edward, 2013; Zautra, Johnson, Davis, 2005). Patients with low resilience are less able to deal with stress and challenges arising from their illness (DeNisco et al., 2011; Erim et al., 2010, Wingo et al., 2010). Yi-Frazier and Mstai (2015) analyzed the relationship between resilience and diabetes-related stress, coping mechanisms and diabetes outcomes among adolescents diagnosed with type I diabetes (T1D). Adolescents between the ages of 13 and 18 who had been diagnosed with diabetes for at least 1 year were included in the research conducted at the Seattle Children's Hospital. The researchers hypothesized the correlation of a high resilience value with low distress associated with diabetes, improved diabetes indicators, self-care, quality of life, and more adaptive coping strategies. According to their results, the relationship between distress and quality of life is affected by resilience, in such a way that those with a higher value of resilience have a lower distress score and a higher value of quality of life. Their results are consistent with the results of other research (e.g. cancer, spinal cord injury, and adult-onset diabetes)(DeNisco, 2011; Cal és mtsai, 2015, Yi-Frazier, 2015). In the analysis, three smaller groups (low, medium, high) were formed based on resilience values. During the analysis of coping among the maladaptive subscales, „desire” (unrealized fantasy) showed an inverse correlation with the low resilience value. The group with high resilience scores achieved higher values in adaptive coping. The results support that changing maladaptive coping to a positive direction can influence resilience. The authors state that the need for interventions aimed at developing resilience (Yi-Frazier et al., 2015). The filtering function of the resilience potential among anorexic adolescent girls undergoing hospital treatment (low BMI, ward treatment) has been confirmed, indicating the chances of recovery (Kövesdi, 2018).



**1.figure.** Woodgate's adaptation model (Woodgate, 1999 pp.:38. own editing)

### *The supportive role of mentalization and relationship quality*

Above we also referred to the importance of psychological conditions accompanying chronic diseases in the context of recovery. The role of hope has been linked to health and adaptation to cancer (Hinds, Gattuso, 1991; Peterman et al., 2002). Researchers consider the ability to transcend oneself and a spiritual attitude to be one of the central elements of resilience (Coward, 1990; Haase et al., 1992). Part of the experience of self-transcendence is the feeling of healing, the realization that life has meaning, which leads to the experience of unity with nature and God.

In the development of emotional life, the ability to delay appears as a positive product - following the maturation of the nervous system - and helps children and adolescents to manage intense emotions (Kulcsár, 1996; Földi, 2005; Kökönyei, 2008; Csenki, 2012). Mentalized emotions are the ultimate form of regulation, which includes understanding the emotions of others and the meaningfulness of emotions optimally (Fonagy et al., 2002). According to the authors, the ability to mentalize is particularly important from an evolutionary point of view as it ensures that we can influence and understand our own and other people's emotions. The ability to mentalize greatly contributes to being able to emotionally understand, experience, regulate and adapt to difficult situations. It also supports the recognition of the state of self-transcendence. In terms of regulation and prevention mechanisms, we do not discuss the topic further in the study. We move on to the pathological correlations of maladaptive regulation and the relationship of resilience potential.

The secure attachment that develops in a sensitive caregiver environment creates the possibility of optimal stress regulation and adaptation (Eisenberg, Spinrad, Eggum, 2010). Aupperle et al. (2016) identified the critical behavior of the mother in the case of a child showing significant symptoms of depression and anxiety, which were supported by changes in the nervous system - right amygdala intensity. Based on the results of our clinical psychology measuring instruments

(anamnesis, interview, projective tests) of a pair of twins who have experienced severe trauma, the experts conclude that there is no evidence of genetic origin of resilience. The possibility of a real, interactive, authentic relationship (a living person with whom an authentic relationship can be established) with a real adult person is considered a significant factor in terms of the potential development of resilience in adolescence, even if that person is not a biological parent (Tychev et al., 2012).

### *Coping with stress for health and well-being*

We separate two forms of adaptive regulation for dealing with stress, reframing and problem-focused solutions. However, the maladaptive solutions increase the chances of anxiety and depression (Gross, 1998). The lack of problem solving further increases the chances of substance abuse and eating disorders. A low level of acceptance increases the incidence of generalized anxiety, panic disorder and borderline personality disorder (Aldao, Nolen-Hoeksema, Schwartz, 2010). Studies analyzing coping found reframing, problem solving and acceptance to be the most protective mechanisms against pathological conditions. Suppression and avoidance are the most vulnerable solutions (Aldao, Nolen-Hoeksema, Schwartz, 2010). Rumination is a maladaptive form of problem solving. Maladaptive problem solving both in chronic diseases and independently can contribute to the development and maintenance of anxiety and depressive states. Major depression occurs two to three times more often among adolescents diagnosed with type I diabetes than among their healthy peers (Grey, 2002). Especially in cases where self-care ability is low. A higher resilience score predicted a lower A1C score 1 year later (Yi-Frazier, 2008). Among the maladaptive coping strategies, „idle daydreaming” (passive longing without action) was associated with low resilience values. Those young people who lived with this solution did not act under stress but thought about the problem (ruminated). Resilience is related to distress and quality of life as higher resilience is associated with higher quality of life and lower distress (Jaser, Withe 2011, Yi-Frazier et al. 2012). High resilience protects against depression (Birmahe et al. 1996, Kövesdi, 2018).

Psychological well-being is not achieved by the absence of maladaptive factors but by the presence of protective factors. Ryff and Singer (1996) found pharmacotherapy and psychotherapy (primarily behavioral therapies) of patients with affective disorders to be successful at the symptomatic level, but their psychological well-being did not change. The predominance of positive emotions contributes to resilient functioning, which reduces the dominance of anxious and depressive states and negative affects. Resilience reduces the pain associated with chronic illness, contributes to recovery from acute illness, optimal health behavior in chronic illness and increases well-being.

*Characteristics of transplanted children and adolescent resilience*

The psychological changes of transplanted person and their families are particularly multifaceted, as an initially healthy person first undergoes a life-saving operation and then continues to live as a chronic patient after recovering from the operation. Resilience potential is a particularly relevant topic in the case of transplant recipients as it takes time and it is necessary to adapt to changes realized in several steps along the criteria of life and death. It is important to note that there is a relatively small number of published research results on the topic of the resilience potential of transplanted persons. Resilient functioning after transplantation can be grouped according to 3 different risk factors (Haavisto et al., 2013; Taylor et al., 2009): 1) medical risk factors (e.g.: side effects, rejection episodes, drug therapy adherence), 2) personal factors (e.g.: elapsed time, age, medical history, low self-esteem and emotional state) and 3) family factors (e.g.: family conflicts, income, parent's mental state, parent's level of distress, physical functioning). The resilience of transplanted adolescent shows a correlation with a positive improvement from a medical point of view. The following psychosocial factors have been identified in the context of resilience; mental health, neurocognitive and study support, multidisciplinary treatment team, positive adherence, parents' mental health, supportive parent-peer relationships, consideration of cultural aspects in treatment planning, preparation for adult care (Amatya, Monnin, Christofferson 2021).

*Test hypotheses*

According to the first hypothesis, self-efficacy shows a positive association with resilience in both groups.

According to the second hypothesis, the resilience value of both groups falls within the average range, but the value of the transplanted group is lower.

According to the third hypothesis, the anxiety and stress value of the transplanted youth exceeds that of the control group.

According to the fourth hypothesis, the control group is characterized by more mature coping methods than the transplanted young people.

According to the fifth hypothesis, transplanted young people report difficulties in more dimensions than members of the control group.

According to the sixth hypothesis, in terms of personality characteristics, transplanted youth differ from the control group in terms of openness. According to the seventh hypothesis, the well-being indicators of the transplanted group are significantly lower compared to the control group.

## PRESENTATION OF THE STUDY

We conduct our research among transplanted children and adolescents undergoing treatment and/or follow-up care at the Semmelweis University Pediatric Clinic No. I. The data collection began in October 2020 and the three-year data collection is currently ongoing. In this study, we report on a pilot analysis of the cross-sectional data recorded until the end of June 2022. More complex results will be presented later. The study sample contains the data of 91 people (50 transplanted people and 41 control people). The control was matched for gender and age. Test subjects can be at least 11 and at most 18 years old. In the transplanted group, there is a mix of teenagers with kidney, liver and lung transplants. An examination criterion is that the transplantation took place more than 1 year ago. Ethics permit number for the study: SE RKEB 213/2020.

**Table 2.** Descriptive characteristics of the test sample

	Item number	Average age	Age SD	Girl	Boy
<b>Transplant group</b>	51	14,0	2,2	32	21
<b>Control group</b>	40	14,4	2,4	24	16

*Measuring devices used in the study*

*Connor-Davidson Resilience Scale, CD-RISK* (Connor, Davidson, 2003). The original version of the gauge was developed by Connor and Davidson. The measuring instrument we are currently using is a 10-item, shortened version of the original 25-item English-language measuring instrument translated into Hungarian which is used by researchers with the permission of the authors. The version we use is currently being adapted for children and adolescents. Cronbach's alpha values for our research sample can be considered reliable: 0.84 for the parent group and 0.80 for the group of transplanted children.

*Depression, Anxiety and Stress Scales, DASS-21*, (Lovibond, Lovibond, 2005). The questionnaire is for measuring negative feelings caused by depression, anxiety and stress. The abbreviated 21-item version can be used reliably among both adults and adolescents (Szabó, 2010, Lee et al., 2019). In the domestic sample the measuring instrument has excellent psychometric properties (Rózsa et al., in preparation). It has adequate reliability on the research sample, the Cronbach-alpha value on the sample is Depression: 0.80, Anxiety 0.85, Stress 0.84, Total: 0.94.

*Public Health Surveillance Well-Being Scale* (Bann et al., 2012). The questionnaire was developed to assess general well-being. The domestic version of the measuring instrument has already been used in several researches, the psychometric indicators of the questionnaire are excellent, Cronbach's alpha value is mental well-being 0.76, physical well-being 0.64, social well-being 0.64, general well-being 0.83, based on which the test is good has internal consistency.

*Coping Inventory for Stressful Situations*, CISS-21 (Endler, Parker, James 1994). The Coping in Stressful Situations questionnaire was developed by Endler and Parker (1994). The abbreviated version consists of 21 items, which assess the individual's coping strategy along 3 subscales: problem-focused coping, emotion-focused coping, and avoidance. In a domestic sample (N=6272) it proved to be reliable on all three scales (Kövi et al., 2015). In the present study, Cronbach's alpha values are: 0.78 for problem-focused coping, 0.76 for emotion-focused coping, and 0.77 for avoidance.

*Strength and Difficulties Questionnaires*, SDQ, (Goodman, 1997). The Abilities and Difficulties Questionnaire has 25 items and is one of the most popular, internationally recognized screening methods for behavioral and emotional problems in childhood. The items of the measuring instrument form the following five scales: Emotional symptoms, Behavioral problems, Hyperactivity, Peer relationship problems and Prosocial characteristics, each of which contains 5 items. Cronbach's alpha values for the present research sample are between 0.62 and 0.71. An exception is the behavior problems scale, whose alpha is 0.45. However, this is not surprising because international and domestic results generally indicate similarly low reliability for this scale.

*General Self-Efficacy Scale* was developed by GSE Schwarzer and Jerusalem (1995). The Hungarian version of the 10-item questionnaire developed to measure general self-efficacy was adapted into Hungarian by Mária Kopp et al. The scale's reliability and validity were supported by domestic research. The value of Cronbach's alpha for the present research sample is 0.83.

The short, 10-item version of the *Big Five Inventory*, BFI (John, Srivastava, 1999) is a measurement tool developed to assess general personality characteristics, which includes the following scales: Extraversion, Friendliness, Conscientiousness, Emotional Instability and Openness. The items can be evaluated on a 5-point Likert scale. The domestic tests carried out with the measuring device supported the validity and reliability of the questionnaire (Rózsa et al., 2013). In the present research sample, we did not calculate Cronbach's alphas for the two-item scales, but the correlations between the answers to the items were acceptable.

## RESULTS

According to the first hypothesis, self-efficacy shows a positive association with resilience in both groups. The rank correlation coefficient for the entire sample is 0.74 ( $p < 0.001$ ) which shows a rather close correlation between the two constructs. The degree of correlation coefficients did not differ significantly in the two groups (transplanted: 0.73; control: 0.75). According to the second hypothesis, the resilience value of both groups falls within the average range, however, the resilience value of the transplanted group is lower. Based on the results obtained, it was confirmed that the resilience value of both groups is in the average zone and the value of the transplanted young people is slightly lower, however, this difference is not significant ( $p = 0.27$ ). Overall, the value of the transplanted group is at the lower end of the average range (Table 3).

**Table 3.** The value of resilience (CD-RISK) in the group breakdown

<b>Goup</b>	<b>N</b>	<b>M</b>	<b>SD</b>	<b>t (p)</b>
transplant	51	25,67	6,59	-1,09 (0,27)
control	40	27,20	6,62	

According to the third hypothesis, the anxiety and stress values of transplanted youth are higher than those of the control group. According to the sub-hypothesis, the depression value of the transplanted group does not differ significantly from the value of the control group. Based on the results obtained, the average of all three dimensions (depression, anxiety, stress) and the total score in the transplanted group was significantly higher than the results of the control group (Table 4).

**Table 4.** Comparison of depression, anxiety, stress and total score

	<b>Group</b>	<b>N</b>	<b>M</b>	<b>SD</b>	<b>t (p)</b>
Depression	transplant	51	1,67	0,75	4,73 (<0,001)
	control	39	0,95	0,68	
Anxiety	transplant	51	1,48	0,62	4,33 (<0,001)
	control	39	0,88	0,67	
Stress	transplant	51	1,85	0,68	3,47 (<0,001)
	control	39	1,33	0,72	
Total score	transplant	51	1,66	0,63	4,62 (<0,001)
	control	39	1,05	0,61	

According to the fourth hypothesis, the control group is characterized by better coping than the transplanted young people. The obtained results show that problem-focused coping was indeed significantly higher in the control group than in the case of the transplanted, but, at the same time, no significant differences were found in the other two coping strategies. It is worth noting that the control group scored higher on all three scales (Table 5).

**Table 5.** Comparison of coping style by group

	<b>Group</b>	<b>N</b>	<b>M</b>	<b>SD</b>	<b>t (p)</b>
Task oriented coping	transplant	51	23,55	4,89	-2,09 (0,039)
	control	40	25,60	4,29	
Emotion oriented coping	transplant	51	20,37	5,68	-1,49 (0,138)
	control	40	22,10	5,17	
Avoidance coping	transplant	51	19,41	5,74	-1,77 (0,080)
	control	40	21,70	6,56	

According to the fifth hypothesis, transplanted young people report more difficulties than those in the control group. Our results do not support these assumptions. Only one scale, the prosocial scale, showed a significant difference in favor of the control (Table 6).

**Table 6.** Group comparison of the scales of the abilities and difficulties questionnaire

	<b>Group</b>	<b>N</b>	<b>M</b>	<b>SD</b>	<b>t (p)</b>
Emotional symptoms	transplant	51	3,37	2,58	-1,32 (0,189)
	control	40	4,08	2,41	
Behavioral problems	transplant	51	2,82	1,81	0,77 (0,439)
	control	40	2,55	1,47	
Hyperactivity scale	transplant	51	4,59	1,95	-0,13 (0,896)
	control	40	4,65	2,55	
Contemporary relationship problems	transplant	51	2,57	2,12	0,39 (0,697)
	control	40	2,40	1,94	
Prosocial scale	transplant	50	7,14	2,03	-2,49 (0,014)
	control	40	8,13	1,62	
Total score	transplant	51	13,35	6,23	-0,26 (0,795)
	control	40	13,68	5,33	

According to the sixth hypothesis, in terms of general personality characteristics, transplanted youth differ from the control group in terms of openness. Based on the obtained results, there were no significant differences between the two groups in any characteristic (Table 7).

**Table 7.** Group comparison of general personality characteristics

	<b>Group</b>	<b>N</b>	<b>M</b>	<b>SD</b>	<b>t (p)</b>
Extraversion	transplant	51	7,84	2,06	-0,85 (0,395)
	control	40	8,20	1,86	
Friendship	transplant	51	6,98	1,67	-0,89 (0,378)
	control	40	7,25	1,08	
Conscientiousness	transplant	51	5,29	1,45	-1,53 (0,129)
	control	40	5,80	1,69	
Neuroticism	transplant	51	6,45	1,96	0,44 (0,662)
	control	40	6,28	1,81	
Openness	transplant	51	7,16	2,18	-0,65 (0,52)
	control	40	7,45	2,07	

According to the seventh hypothesis, the well-being indicators of the transplanted group are significantly lower than those of the control group. Based on the obtained results, there were no significant differences between the two groups (Table 8).

**Table 8.** Group comparison of well-being components and the overall indicator

	<b>Group</b>	<b>N</b>	<b>M</b>	<b>SD</b>	<b>t (p)</b>
Mental well-being	transplant	49	3,85	,793	-0,37 (0,709)
	control	40	3,91	,602	
Social well-being	transplant	50	4,43	,802	0,19 (0,846)
	control	40	4,40	,612	
Physical well-being	transplant	50	4,05	,909	0,89 (0,372)
	control	40	3,88	,872	
General well-being (sum of 3 components)	transplant	49	4,10	,748	0,26 (0,793)
	control	40	4,06	,547	

## DISCUSSION

The presented study analyzes the data of the first 1.5 years of a three-year data collection on a pilot basis. Among the recorded data, we do not go into the results of the parent-child relationship and moderating and mediating relationships. The aim of the study was to support with empirical data the development of interventions and support for the psychological help of transplanted adolescents. We found that SE I no. the resilience value of adolescent transplant recipients treated at a pediatric clinic does not differ significantly from age-matched healthy control individuals. In other words, the transplanted adolescents were able to adapt flexibly to the stress effects caused by the transplantation and the changed living conditions – chronic illness. However, the group's resilience score is at the lower end of the average zone. The increased depression, anxiety and stress values among transplant recipients draw attention to the importance of the limit value. The protective role of resilience was confirmed by previous research (Aspinwall, Tedeschi, 2010; Colaianna et al., 2013; De Wazières, Vuitton, Dupond, 1999; Kövesdi 2018) and the inverse relationship between resilience, depression and anxiety (Kiss et al., 2012; Kövesdi 2018). Significant resilience potential protects against psychiatric illnesses (Bachen, Chesney, Criswell, 2009; Erim et al., 2010). The development of the resilience potential is recommended based on the results in the examined sample.

We verified the coexistence of self-efficacy and resilience in the entire sample and in the group breakdown. The results of self-efficacy are consistent with previous research (Olson, 2003; Sümer, Kumas, 2020). It is worth considering the result in support interventions due to the fact that they go together. By increasing self-efficacy (e.g.: specific tasks, situations), the resilience potential can be expected to increase. The well-being of the transplanted and control groups is similar.

In terms of coping, adaptive problem-focused coping is the least characteristic of transplanted adolescents. Rather, the group is characterized by the use of maladaptive strategies (emotion-focused, avoidant). One explanation for this may be the special lifestyle associated with chronic disease. In the recovery phase after transplantation, the attending physician is primarily the „problem solver” for both the parent and the child. The treatments also determine the life of the family and the child later on, e.g. optimally, the frequency of going to school, the possibility of solving school situations. Transplanted children and adolescents have fewer opportunities to develop solutions to difficulties and conflicts. One of the pillars of supportive interventions can be the promotion of problem solving in safe conditions and the support of age-appropriate independence. In terms of coping, adaptive problem-focused coping is the least characteristic of transplanted adolescents. Rather, the group is characterized by the use of maladaptive strategies (emotion-focused, avoidant).

Transplanted adolescents have difficulties in prosocial behavior, which can also be explained by the specific lifestyle, living situations associated with chronic disease and physical condition. Prosocial behavior is a particularly important area during adolescence when the importance of peer relationships increases during personality development. Since we found no differences in terms of personality characteristics compared to healthy peers, we can state that the lack of prosocial behavior is not a difference determined by a basic personality characteristic but rather a consequence of a special lifestyle and requires support.

### OUTLOOK

Based on our results, interventions supporting transplanted adolescents can be built to treat depression, anxiety and stress, to support problem-focused coping and to develop prosocial behavior. We recommend resilience-based screening for psychological support and future cooperation.

### LIMITATIONS

From a statistical point of view, the low number of elements appears as a limitation, however, considering the special sample, it is fortunate that the number of test elements does not increase significantly. When interpreting the results, it is worth considering that the study data were collected during the COVID-19 epidemic, where the life of the control group changed significantly compared to the normal way of life in terms of restrictions and the stress caused by the epidemic.

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