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STRATEGIES FOR COPING WITH STRESS IN PATIENTS WITH TETRAPLEGIA AND PARAPLEGIA

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SUMMARY

Background:

We examined the role of psychological resources in coping with a difficult situation by persons with tetraplegia and paraplegia.

Material/ Methods:

103 wheelchair-bound males above 17 years of age were tested. In addition to an interview questionnaire, we used Polish versions of the Endler-Parker CISS Test, which measures coping with stress strategies, the State-Trait Anxiety Inventory (STAI), and the Life Orientation Test (LOT-R).

Results:

The results suggested that a low quality of life does not always characterise persons who have suffered a spinal injury as a result of random events. This is shown by a higher level of dispositional optimism in tetraplegics, in whom the range of disability is wider than in paraplegics. Furthermore, we observed that persons who rated their physical well-being highly most often solved problems in a stressful situation in a task-oriented way, while persons who evaluated their physical well-being as poor tended to concentrate on emotions when solving difficult situations. A high level of optimism was characteristic of persons who positively assessed their mental condition and had a stabilised financial situation.

Conclusions:

Among psychological variables, such as styles of coping with stress, optimism and the level of anxiety, only dispositional optimism differentiated between persons with tetraplegia and paraplegia. Persons with a wider range of disability, i.e. persons with tetraplegia, exhibited a higher level of optimism than persons with paraplegia.

Key words: psychological resources, quality of life, dispositional optimism

INTRODUCTION

Among physical disabilities, those caused by a spinal cord injury (SCI) belong to the most severe, especially when there is damage to the upper levels of the spinal cord. There are two general types of disorder, depending on the specific location and the extent of the injury to the spinal cord: paraplegia and tetraplegia. Horizontal damage to the cord at the upper cervical level, from C1 to C2, is usually fatal, due to respiratory failure. Damage to the cord at the level of C3-C5 results in the loss of function of all four limbs, which is tetraplegia. Horizontal damage to the cord from C6 down to and including Th11 (in the thoracic segment of the spine) causes spastic paralysis of the lower limbs, which is called paraplegia, i.e. the paralysis of the lower limbs and, frequently, of the lower part of the abdomen (Martin, 2006; Matsumoto, 2009).

Physiological, psychological and social adaptation to the existing situation by persons affected by severe disablement lasts a long time and requires the continuous observation of one's own body, in order to avoid inflammatory states of the respiratory tract or the excretory system, decubitus ulcers, contractures, or limb edema. It is vital, therefore, that persons with a spinal injury change their style of functioning. Thus increased mental and physical effort and more self-discipline are necessary. Numerous aspects of their lives must be worked through, while objectives and life plans need to be reconstructed adequately to the new situation (Block 1999; Kowalik 2007). A. Brzezińska (2007) suggests that, when considering the situation of disabled persons in psychological terms, one should focus principally on the following categories:

- limitations resulting from the disability;
- the individual's personal traits;
- social support, analysed along the continuum from insufficient, to optimal, to excessive.

Physical disability as the consequence of a trauma to the spine results in numerous problems related to physical and psychological functioning. This is due to the fact that the impairment of the organism, which is of a relatively permanent character, complicates the possibility of meeting needs and performing various social tasks. Consequently, not only does one's life change in its entirety, but, more importantly, this is a radical alteration. The quality of life after a trauma to the spine depends essentially on one's psychophysical predisposition. It is of crucial importance whether one is an active person who is trying to find their way out of a difficult situation, whether one is aware of the necessity to develop new forms of adaptation that would be accepted in the environment, whether one believes in oneself and is able to cope with problems effectively, and, last but not least, whether one is able to accept the assistance of others. Thus it can be argued that the disability results in psychological consequences, both emotional and cognitive. These may include emotional lability, low and unstable self-esteem, an increase in neurotic reactions, and an increase in emotional sensitivity. This last conse-

quence may intensify the sense of incongruity and a tendency to concentrate on an emotional or avoidance style of coping with stress.

Microgenetic theory, which emphasises the interdependence of the cognitive and emotional sphere of functioning, plays a pivotal role in assessing and explaining human behaviour in a difficult situation, as well as in the perception and experience of relations with other people. The essence of microgenetic theory is the notion that cerebral processes, including linguistic and cognitive, do not develop from minute bites of information compiled into complex and holistic representations, but from unity to parts, from generalisation to details. In perception, within fractions of a second the wave of activation develops from extero-, intero- and proprioceptors in the peripheral nervous system to the brain stem and the mid-brain, then through the limbic system to the cerebral cortex. In action, conversely, the way leads from the cerebral cortex through the limbic system to the brain stem, and then to the proper innervation areas and effectors (Leventhal 1974; Brown 2002; Paçhalska 2007; Rostowski 2009). This supports the claims of numerous researchers that emotions may influence what attention is directed at, and the manner in which things seen-perceived are interpreted. This happens because emotions are primarily combined with the mechanisms of the right and left hemispheres responsible for conscious appraisal. Therefore, they can affect all aspects of the process of cognition, from perception to making rational decisions. Moreover, emotions direct the flow of activation or energy, supporting by this motivation and engagement in the course of cognitive processes. Furthermore, emotions set a specific and individual direction for the interpretation of the meaning of processed information. Thus emotions should not be treated as a single, isolated group of processes, but as collections (modules) of processes influencing the whole mentality, the mode of thinking and the individual's mind (Rostowski 2008; Dalglish 2004; Atkinson 2005; Siegel 1999).

Emotional experience may be varied by the context of social support. Such support may be reflected by the concern of people close to the disabled person. This concern may be perceived as positive or negative, depending on the needs, expectations, attitudes and personality dispositions of all those involved. Other people's assistance for a person with disability is valued positively, provided that the patient understands that the aim of concern about him or her is to adjust the living conditions to his or her needs, that this concern influences the improvement of life activity and psychological conditions, with the indication that despite his or her disability he or she is a person, a person that is loved, accepted and needed for the environment. It may occur, however, that a patient evaluates the concern about their life and health negatively. Excessive concern may be particularly irritating for an ill or disabled person, who believes that they are a great burden for their loved ones (Kalfoss, Jaracz 2001). In order to change the attitude of a patient to negatively perceived concern on the part of those who in fact wish to help them, a well designed rehabilitation and psychotherapy program is a necessity. This type of supportive action aims to improve the physical and mental health of a patient, thereby improving the quality of his or her life. In such a situation, psy-

chotherapy and rehabilitation should aim for improvement in the motor functioning of the patient, his or her self-esteem, and psychological resistance to difficult situations, as well as the indication of new possibilities and life goals, and the development of new strategies for coping with difficult situations. Therefore, it seems that efficient and effective techniques of coping with stress may be treated as one of the partial conditions of the quality of life (Kalfoss, Jaracz 2001).

Coping with stress as a determinant of the quality of life

The concept of coping appeared in the psychological literature in the 1950s. Current research on coping with stress is conducted not only within the framework of psychology, but also in the context of a variety of medical specialities. In Lazarus's relational theory of stress, coping – next to cognitive appraisal – is qualified as a process mediating between stress and its consequences. Lazarus and Folkman (1984) describe two types of coping strategies:

- problem – focused strategies
- emotion – focused strategies

The function of problem- focused strategies is instrumental. They include activities directed at confronting the problem, while the task of emotion-focused strategies is self-regulation of unpleasant emotions, and the strategies are oriented towards their reduction. Emotion-focused strategies consist in the direction of somatic and subjective components of emotions associated with stress in such a way that they stay under control and do not damage or collapse psychological resistance or social functioning. According to Lazarus and Folkman (1984) the concept of coping is more important for the theory of adaptation than the concept of stress. This is due to the fact that stress is a ubiquitous and inevitable element of life. Coping with stress is of crucial importance for good adjustment to the environment. Wrześniewski (1993) points out that in the research on coping it is vital to differentiate between “coping” and “successful coping,” i. e. between action and the result of this action. Lazarus believes that the effectiveness of coping should be evaluated on several levels: physiological, psychological and social. The essential criterion of assessment should be the fulfillment of the basic functions of coping, which include both finding a solution to the problem and effective coping with emotions. In the literature, there are other criteria listed, such as the reduction of tension and its physiological exponents, the maintenance of normal social functioning and daily activity, the maintenance of the sense of well-being or positive self-esteem. Based on these suggestions, the patients' quality of life may be treated as an index of adaptation to life stress, including the stress associated with disease or disability. This assumption has its justification in the definition given by Killilea (cited by Oleś 1996), who states that coping is “the process of attempting to overcome a stress situation in such a way that protects an individual's psychological and physical health.” In this approach, the effectiveness of the protection of an individual against the adverse consequences of stress for health constitutes the criterion of the efficiency of coping with stress. Markowska and Poprawa (1996) treat coping with stress as a mediator in the relation: “stress-

health.” This relationship becomes obvious once psychosomatics is taken into consideration, as each instance of managing stress has its complex and parallel physiological counterparts. In fact, Everly and Rosenfeld (1992) claim that no psychological phenomenon is possible without an accompanying somatic phenomenon, while there is no somatic phenomenon without a psychological basis. Markowska and Poprawa (1996) state that “coping” provides the possibility of transforming output emotions, most often negative ones, and the behavioural patterns connected with them, into emotions that are weaker or positive, with behavioural patterns that are more beneficial for health. This is a matter of crucial importance in the life of an individual with an acquired disability.

A sudden and significant loss of physical fitness and health puts a person in a critical situation, i. e. an excessive load on the system of self-regulation, which induces a state of emotional tension and causes changes in various spheres of the mind. After this phase a difficult stressful situation may occur, which is similar in content to the former one. While adapting to the situation of a permanent handicap a person may encounter problems of two types:

- negative, when such behaviours occur as to neutralise the risks caused by the loss of an important function, such as mobility;
- positive, when values are discovered to replace those that have been lost.

Coping with stress in the case of an injury of the vertebral column resulting in a permanent disability (paraplegia or tetraplegia) is not an action based solely on simple, daily, adaptive habits. The stress experienced by a disabled person requires a special organisation of mental and behavioural activity, which is to say, the process of coping. The process of coping reveals over time certain patterns of a relative constancy, which allow a person with a motor disability to develop an individual style of coping with difficult situations. A systematic classification of these styles has yet to be developed (Heszen-Niejodek 2000). Research in this field indicates that the styles of coping with stress are firmly linked to the personality structure (in particular to emotionality, neuroticism, locus of control, optimism-pessimism, and attitude towards danger). Contemporary psychologists attribute special significance to the mental regulation of human behaviour, one’s expectations concerning the consequences of one’s own actions. Hope that the action will produce an effect prompts the person to take the action and deal with the troubles it may bring. The belief that the desired effects are impossible to reach results, most often, in avoidance reactions and withdrawal from making the effort. Such generalised expectations constitute significant dimensions of personality. Moreover, these expectations form an essential dimension of personality, termed dispositional optimism. Dispositional optimism is a tendency to think that good things will generally be experienced in one’s life. Dispositional optimism allows humans to preserve substantially better subjective well-being in the mental and physical sphere, and is a good predictor of constructive coping with stress, e. g. in the situation of disease (Juczyński 2001).

The reasons for the beneficial impact of dispositional optimism on psychophysical well-being stem from the different ways of coping with stress used by optimists

and pessimists. Optimists, more than pessimists, are prone to rely on active coping, while pessimists more often apply avoidance styles of coping. Avoidance strategies lead to worse adaptation results, and, consequently, increase the state of distress. Optimists, as opposed to pessimists, are more concentrated on the effort associated with the overcoming of difficulties, more readily accept the situational circumstances, and do not collapse in the face of failure. What is more, they are able to benefit from it for their own development. Thus optimism seems to be generally linked to more effective, constructive styles of coping. The literature concerning the issues of coping with stress sometimes describes approaches that relate the adoption of a particular style of coping with stress to personality dispositions. Miller (1990) states that it is an individual's approach towards stress information that plays a fundamental role in coping with stress. The author distinguishes a tendency to seek information and a tendency to avoid information. These are relatively constant. Carver and Scheier (1994) demonstrated that optimists are more prone to apply active strategies of coping with stress than the forms of coping focused on emotions. In Pearlin and Schooler's studies, persons with high self-esteem seemed to be more likely to cope with stress in an active way (cited by Poprawa, 2001).

Subject of studies and research questions

The personal resources that allow one to overcome a traumatic situation underlie the adaptive abilities of patients after spinal injury. Although research has been conducted in this field, numerous issues have not yet been clarified. There is thus a need to conduct further research on this subject, in order to discover relevant conditionings underlying the adaptive abilities of patients with posttraumatic tetraplegia and paraplegia. The research presented in this article constitutes a partial answer. Our aim is to define the role of socioeconomic conditions and such psychological variables as strategies of coping with stress, the level of optimism and the level of experienced anxiety, in adaptation to a new situation and the improvement of the quality of one's life.

The essential aim of the research was to find answers to the following research questions:

- Do demographic variables, such as age, place of residence, educational level, and financial circumstances differentiate between persons with tetraplegia and paraplegia?
- Do persons after spinal injury differ in terms of styles of coping with stress, the level of optimism and the experienced sense of anxiety, as a state and as a trait? How do these psychological variables influence their adaptation to the new life conditions?
- What is the relation between demographic variables and the styles of coping with stress, the level of optimism and the experienced sense of anxiety, as a state and as a trait, in persons with posttraumatic tetraplegia and paraplegia?

METHODS AND PARTICIPANTS

Methods

In order to answer the aforementioned research questions the subsequent methods were employed:

- Interview questionnaire;
- CISS Test by N.S. Endler and D.A.Parker;
- State-Trait Anxiety Inventory (STAI) by C.D. Spielberger, R. L. Gorsuch, and R. E. Lushene.
- Life Orientation Test (LOT-R) by M. F. Scheier, C. S. Carver and M. W. Bridges (Polish adaptation by R. Poprawa and Z. Juczyński).

Interview questionnaire

It was possible to obtain necessary information about the participants through the use of an interview questionnaire, which was designed specifically for this study. The questionnaire included questions about different areas of the lives of persons with a spinal injury. In the first part of the questionnaire, the questions concerned demographic variables: age, gender, educational level, place of residence, source of income, financial and residential conditions. The second part of the questionnaire included questions about the course of the disease and the social functioning of persons with a spinal injury, as well as questions about:

- sources of social support during the course of the disorder and rehabilitation;
- subjective appraisal of the quality of life in the psychological, physical and emotional sphere;
- degree of independence in everyday life;
- participants' opinions on the attitude of healthy persons toward the disabled;
- participants' opinions on rehabilitation care.

Endler-Parker CISS Test

To measure the strategies of coping with stress, we used the Endler-Parker CISS Test, as adopted to Polish conditions by Szczepaniak, Strelau, and Wrześniewski (1996).

The style of coping with stress is understood as a manner of behaviour in a variety of stressful situations which is specific for an individual. CISS measures the following three styles of coping with stress:

- task-oriented coping;
- emotion-oriented coping;
- avoidance-oriented coping.

This last category can be divided further into two forms:

- distraction, or focusing attention on something else, e. g. watching TV, overeating, thinking about pleasant matters, sleep.
- social diversion (Endler, Parker 1990; Strelau 2000).

Emotion-oriented coping is clearly maladaptive. Neither do persons who react in this way attempt to solve problems, nor do they reduce tension created by stress-causing stimuli, e. g. through undertaking other forms of activity, as in the case of avoidance-oriented coping.

The State-Trait Anxiety Inventory (STAI)

The STAI Inventory, developed by C.D. Spielberger, R. L. Gorsuch, and R. E. Lushene (Wrześniewski, Sosnowski & Matusik 2002) can be used to identify persons of a definitely high or definitely low anxiety level, understood as a constant internal disposition (trait). It also identifies changes in the intensity of anxiety, understood as a state occurring in response to certain external stimuli.

Anxiety understood as a state is characterised by subjective, consciously perceived feelings of apprehension and tension, which are accompanied by activation or arousal of the autonomic nervous system, related to these feelings. Trait anxiety is defined as a theoretical construct referring to a motif, or an acquired behavioural disposition, which renders an individual prone to the perception of a wide array of objectively harmless situations as threatening and reacting to them with the states of anxiety, disproportionately strong in relation to the size of the objective danger (Wrześniewski, Sosnowski & Matusik 2002).

The Life Orientation Test (LOT-R)

The Life Orientation Test (LOT-R), developed by M. F. Scheier, C. S. Carver, and M. W. Bridges, as adapted to Polish conditions by R. Poprawa and Z. Juczyński, measures dispositional optimism, understood as a dispositional trait expressing a generalised expectation of positive events. Research demonstrates that optimism is an essential personal resource, which influences a person's physical state and good well-being. It is also beneficial to achieving life successes and strengthens resistance to stressful life events. Success expectation goes hand-in-hand with undertaking actions, while lack of belief in success is conducive to refraining from action. (Juczyński 2001).

Participants

We examined 103 males with medically diagnosed tetraplegia and paraplegia were tested.

One of the demographic variables included in the analysis of the results was the participants' age. There is a greater incidence of spinal injuries during the period of professional activity. Therefore, the lower limit of age in these studies was determined as 17 years. As Table 1 illustrates, the group with the highest number of participants in both groups constituted males with tetra- and paraplegia, aged 36-50 years, which is the most dynamic period for professional activity. It must be added that the prevalence of spinal injuries in the remaining age brackets in the two groups is similar (see Table 1).

These data suggest that age is not a variable that differentiates between persons with tetra- and paraplegia. It was also revealed that in the compared groups

Table 1. Distribution of participants by age

Age (in years)	Type of disorder	
	paraplegia	tetraplegia
17-25	11.5	21.4
26-35	36.1	21.4
36-50	44.3	40.5
51-60	4.9	11.9
Above 60	3.3	4.8
V- Cramer	Vc =0.22	P =0.27

such cases took place with similar frequency in the period of middle and late adolescence and early adulthood. The differences in these results measured with the V-Cramer test proved to be statistically insignificant ($V_c = 0.22$, $p = 0.27$).

The analysis of the data concerning the place of residence of persons with tetra- and paraplegia revealed characteristic regularities, which is illustrated by the percentage distributions presented in Table 2.

These data show that the largest number of spine injuries occur among residents of cities with a population over 100,000, and among people living in the country. The differences in these results measured with V-Cramer Test proved to be statistically insignificant ($V_c = 0.22$, $p = 0.30$). This finding may demonstrate the occurrence of similar tendencies as far as the prevalence of spinal injuries is concerned in persons living in the city and in the country. This similarity in the risk of spine injuries may be explained by road accidents or the nature of the work carried out, e. g. work on heights.

Analysis of the data concerning the educational level of persons with tetraplegia and paraplegia shows that, in this case also, the differences in the results proved to be statistically insignificant (see Table 3).

Table 2. Distribution of participants by place of residence

Place of residence	Type of disorder	
	paraplegia	tetraplegia
Cities with population over 100,000	31.1	33.3
From 50,000 to 100,000	18.0	9.5
From 10,000 to 50,000	14.8	23.8
Up to 10,000	1.6	7.1
Country	34.4	26.2
V- Cramer	Vc = 0.22	p = 0.30

Table 3. Distribution of participants by educational level

Educational levels	Type of disorder	
	paraplegia	tetraplegia
Undergraduate or postgraduate, degree	11.5	9.5
Some college, no degree	6.6	2.4
High school graduate	39.3	33.3
Vocational	32.8	40.5
Primary	9.8	14.3
V- Cramer	Vc = 0.14	p = 0.72

Table 4. Distribution of participants by causes of spinal injuries.

Cause of spinal injuries	Type of disorder	
	paraplegia	tetraplegia
Motor vehicle accident	50.8	33.3
Sports	11.5	31.0
Accident at work	16.4	26.2
Other	19.7	9.5
V- Cramer	Vc = 0.31 p = 0.04	

The data presented in Table 3 demonstrate that persons with both tetraplegia and paraplegia are most often high school graduates or have graduated from a vocational school. A substantial percent, especially among persons with tetraplegia, were males who had graduated only from a primary school.

One of the questions in the interview questionnaire covered the causes of spinal injury. The analysis of the empirical material for this variable proves that the participants with paraplegia most often indicated a motor vehicle accident as the cause of a spinal injury (see Table 4).

In the group of persons with tetraplegia the situation was slightly different. The most frequent causes of a spinal injury were motor vehicle accidents, accidents while playing sports, and accidents at work. The differences in these results measured with V-Cramer Test proved to be statistically significant ($V_c = 0.31$, $p = 0.04$).

The answer "Between 5 and 10 years" was the most frequent response to the question, "How long have you been using a wheelchair?" This is a question of crucial importance for the entirety of the research presented here, as during such a long period of disability these individuals had to develop new mechanisms of coping with daily problems. Consequently, they had to work out new mechanisms of behaviour, allowing them to adapt to a situation totally dissimilar to the one that existed before the accident. The distribution of scores illustrating this question is reported in Table 5.

Table 5. Distribution of participants by duration of wheelchair use

Duration of wheelchair use	Type of disorder	
	paraplegia	tetraplegia
For a year	6.6	11.9
For two years	4.9	21.4
For five years	26.2	19.0
For ten years	36.1	31.0
For twenty years	9.8	2.4
For twenty one years and longer	16.4	11.9
V- Cramer	Vc = 0.19	p = 0.43

The differences between the persons from the compared groups in terms of the duration of disease failed to reach the level of statistical significance.

Psychological variables and adaptive functioning in persons with a spinal injury

The identification of the possibly extensive array of factors conditioning human adaptive abilities to new circumstances caused by a difficult situation is a central research task. The aim of statistical analysis of the results presented in this paper is to answer the following research questions:

Do persons with tetraplegia and paraplegia differ from each other in terms of the styles of coping with stress, the level of optimism and the experienced sense of anxiety understood as a state and as a trait?

In what way do these psychological variables influence the participants' adaptation to new life conditions?

The analysis of variance proved that among these psychological variables only the difference in dispositional optimism between persons with tetra- and paraplegia reached statistical significance (see Table 6).

The comparison of mean scores on the optimism scale reveals a certain paradox (see Table 6): persons with tetraplegia, despite a wider extent of disability, displayed a higher level of optimism than did persons with paraplegia. This piece of information may be partly explained by the fact that persons suffering from a wider extent of physical disability are able to enjoy the most modest success, take pleasure in anything they can still achieve with the support of others, are more reconciled to their fate, and have a lesser range of expectations. Conversely, persons with a smaller extent of disability, in this case persons with paraplegia, are more frustrated and uneasy when there is something else they cannot do. They exhibit a different array of expectations and aspirations, life strategy, hierarchy of goals and values.

Further analysis of the results was conducted to explain whether the participants' age is a variable that differentiates the styles of coping with stress, the level of optimism and the level of anxiety understood as a state and a trait, as reported in Table 7.

As Table 7 shows, the participants' age did not differentiate either the style of coping with stress or the level of anxiety. An interesting regularity was noticed with respect to dispositional optimism. The analysis of mean scores concerning this dimension suggests that older persons with a spinal injury, above 51 years of age, displayed a higher level of optimism than did persons aged 17 through 35 years. The lowest level of optimism was manifested by persons aged 36 through 50 years. The difference in results measured with variance analysis proved to be statistically significant ($p=0.02$). Within the context of these statistical analyses, it should be stated that age is a factor that differentiates the level of optimism ex-

Table 6. Significance of difference between means with respect to coping with stress (CISS), dispositional optimism (LOT-R) and anxiety (STAI) in persons with spine injury

Type of disorder	Styles of coping with stress										LOT-R		STAI			
	Task-oriented coping		Emotion-oriented coping		Avoidance-oriented coping		Distraction		Social diversion		Dispositional optimism		State anxiety		Trait anxiety	
	M	σ	M	σ	M	σ	M	σ	M	σ	M	σ	M	σ	M	σ
Paraplegia	54.28	7.66	41.87	11.40	49.02	10.32	21.61	6.48	17.39	4.32	5.43	2.71	6.80	2.40	7.00	2.48
Tetraplegia	54.55	7.48	38.95	10.48	46.57	12.39	21.05	5.66	16.95	3.66	23.21	31.32	6.21	1.92	6.93	2.11
P	0.86		0.19		0.28		0.65		0.59		0.01		0.19		0.88	

Table 7. Relationships between styles of coping with stress, dispositional optimism, anxiety and age of persons with spinal injury

Age (in years)	Styles of coping with stress										LOT-R		STAI			
	Task-oriented coping		Emotion-oriented coping		Avoidance-oriented coping		Distraction		Social diversion		Dispositional optimism		State anxiety		Trait anxiety	
	M	σ	M	σ	M	σ	M	σ	M	σ	M	σ	M	σ	M	σ
17-25	52.44	8.41	43.06	11.18	48.44	10.53	21.69	5.34	16.81	3.39	11.38	18.94	7.00	2.19	7.63	2.16
26-35	56.03	6.85	40.29	12.38	48.94	13.81	23.19	5.40	17.26	4.21	12.13	22.27	6.10	2.27	6.55	2.69
36-50	54.05	7.77	41.09	11.20	47.73	10.52	20.41	6.87	17.41	4.53	8.84	14.80	7.07	2.07	7.74	2.01
51-60	52.25	6.71	37.13	6.13	47.00	6.39	20.12	4.19	16.25	3.06	22.50	30.39	4.88	2.17	5.50	2.20
over 60	57.50	8.43	36.75	6.18	44.50	10.25	19.25	8.38	18.25	1.50	44.75	47.69	6.25	2.36	6.50	2.52
p	0.42		0.71		0.95		0.33		0.92		0.02		0.06		0.15	

perienced by physically disabled persons. It must be emphasised here that it was persons with tetraplegia that scored higher in the optimism scale than persons with paraplegia.

Another demographic variable that was examined with respect to psychological variables was the educational level of the participants. Statistical analysis was used to measure whether the educational level of these participants differentiated the styles of coping with stress, the level of optimism, and anxiety (see Table 8).

The results of our statistical analysis indicate that educational level differentiates the style of coping with stress, or, to be more precise, emotion-oriented, avoidance-oriented, and proneness to distraction related to avoidance (see Table 8). Persons who have graduated from primary and vocational schools scored the highest means within the emotion-oriented style. As far as the remaining educational levels are concerned, the results were similar. The differences in these scores as measured with the analysis of variance reached a high level of statistical significance ($p=0.01$). It was also noticed that the avoidance style of coping with stress was most often exhibited by persons with lower educational levels, i.e. persons who have graduated from primary and vocational schools ($p=0.01$). Moreover, persons with a higher level of education were prone to distraction to the lowest degree, while with the decreasing of the level of education the proneness to distraction increased ($p=0.02$). Arguably, the educational level of persons with a spinal injury is connected to the emotion-oriented and the avoidance-oriented styles of coping with stress.

There was also a question included in the interview questionnaire concerning the well-being of persons who suffered a spinal injury. This question make it possible to assess, though indirectly, the participants' quality of life. The analysis of

Table 8. Relationships between styles of coping with stress, dispositional optimism, anxiety and the educational level of participants

Educational levels	Styles of coping with stress										LOT-R		STAI			
	Task-oriented coping		Emotion-oriented coping		Avoidance-oriented coping		Distraction		Social diversion		Dispositional optimism		State anxiety		Trait anxiety	
	M	σ	M	σ	M	σ	M	σ	M	σ	M	σ	M	σ	M	σ
Degree	59.18	6.84	34.73	10.30	38.27	11.54	16.45	6.46	15.45	4.76	25.45	34.47	5.55	2.54	5.55	1.92
Some college, no degree	58.40	6.39	32.20	10.71	48.20	14.55	23.20	5.40	17.00	4.18	6.00	1.22	5.20	2.59	5.60	2.97
High school graduate	53.26	8.80	38.13	9.92	47.00	11.57	20.79	5.62	17.00	4.37	12.18	22.24	6.63	2.20	6.87	2.38
Vocational	53.43	6.27	43.84	10.30	50.38	9.35	22.30	6.30	17.81	3.64	12.78	20.65	6.92	2.06	7.43	2.17
Primary	54.83	6.67	46.75	13.24	52.83	9.44	24.17	5.15	17.75	3.57	5.00	4.82	6.75	2.26	7.75	2.18
p	0.11		0.01		0.01		0.02		0.53		0.22		0.26		0.06	

the results concerning the reciprocal relationships between physical well-being and examined psychological variables indicated the occurrence of interesting regularities, as shown in Table 9.

The results of statistical analyses in this respect indicated that physical well-being is in a statistically significant relationship with such psychological variables as task-oriented coping, emotion-oriented coping, dispositional optimism and anxiety as a trait. Furthermore, persons who evaluate highly their physical well-being most often engage in actions with the aim of managing a difficult situation in a problem-focused way. The difference in results as far as this style of coping with stress is concerned proved to be highly statistically significant ($p=0.01$).

An opposite relationship occurred with respect to emotion-oriented coping. Here, the highest mean values were scored by those persons who assessed their physical well-being as unbearable. Moreover, those persons who were very happy with their lives more rarely employed emotion-oriented coping. The difference in results as far as these variables are concerned proved to be highly statistically significant ($p= 0.02$) (see Table 9).

Dispositional optimism is a vital variable for good psychophysical functioning. This variable remains in a close relationship with the level of satisfaction or dissatisfaction with one's physical fitness. Our statistical analyses showed that a high level of optimism accompanies perfect physical well-being, while low optimism was exhibited most frequently by those persons who saw their lives as unbearable. The difference in these results as measured with variance analysis proved to be statistically significant ($p=0.05$).

Another dimension in which statistically significant differences were observed was anxiety understood as a trait. Persons after a spinal injury who assessed their physical fitness as poor exhibited a higher degree of anxiety than persons who described their physical well-being as perfect ($p= 0.01$) (see Table.10).

Unquestionably, in the case of a spinal cord injury one of the basic ways of coping is to care for the maintenance of good fitness of one's own body, which is possible through systematic and well-conducted rehabilitation. In our research

Table 9. Relationships between styles of coping with stress, dispositional optimism, experienced anxiety and self-assessment of physical well-being

Self-assessment of physical well-being	Task-oriented		Emotion-oriented		Avoidance-oriented		Distraction		Social diversion		Dispositional optimism		State anxiety		Trait anxiety	
	M	σ	M	σ	M	σ	M	σ	M	σ	M	σ	M	σ	M	σ
Perfect	67.43	6.21	32.71	9.27	52.14	13.63	23.00	6.73	19.00	4.12	30.57	41.70	4.57	1.72	4.14	1.35
Good and rather good	56.64	6.87	37.92	10.19	45.48	13.64	20.92	6.12	17.68	4.01	16.72	24.42	6.64	2.15	6.80	2.50
Ambivalent	53.16	6.94	40.73	10.50	47.66	11.15	21.02	6.72	16.90	4.08	10.93	16.75	6.73	2.25	7.07	2.14
Unbearable	50.93	5.10	45.22	11.73	49.89	7.65	21.96	5.16	16.80	4.09	7.15	17.66	6.74	2.23	7.70	2.16
P	0.01		0.02		0.39		0.80		0.54		0.05		0.11		0.01	

Table 10. Significance of differences between the frequency of use of rehabilitation services and styles of coping with stress, dispositional optimism, experienced anxiety in persons with spine injury

Use of rehabilitation services	Styles of coping with stress										LOT-R		STAI			
	Task-oriented coping		Emotion-oriented coping		Avoidance-oriented coping		Distraction		Social diversion		Dispositional optimism		State anxiety		Trait anxiety	
	M	σ	M	σ	M	Σ	M	σ	M	σ	M	σ	M	σ	M	σ
Yes	52.95	6.36	40.87	11.14	48.76	9.29	21.41	6.40	17.37	3.97	11.68	21.55	6.71	2.03	7.10	2.24
No	56.55	8.90	40.76	11.21	46.68	13.79	21.18	5.83	16.95	4.13	13.24	21.75	6.24	2.55	6.71	2.50
p	0.02		0.96		0.37		0.86		0.61		0.73		0.30		0.43	

group, over one-third of male participants did not participate in rehabilitation services. The reasons listed by the participants as justification were the following:

- lack of proper engagement by physiotherapists during exercises;
- difficulty in accessing rehabilitation benefits;
- lack of proper exercise tools.

It may be claimed that the participation in rehabilitation services is related to the styles of coping with stress employed by patients with a spinal injury, as shown in Table 10.

The data presented in Table 10 show that the disabled who do not participate in rehabilitation services more often solve a stressful situation in a task-oriented way ($p= 0.02$). Individual conversations held during studies demonstrate that the participants often use other forms of support. One of these is the mutual aid organization called Movement for Active Rehabilitation. Specialised training sessions organised by instructors for the disabled serve to develop the skills needed to cope with difficult situations in various fields of life.

The examination of relationships between psychological variables and a subjective appraisal of mental well-being revealed connections within task-oriented style of coping with stress and within dispositional optimism (see Table 11).

The data presented in Table 11 suggest that those persons who assess their mental well-being well most often employ task-oriented coping when in stressful situations ($p= 0.05$). Similarly, the disabled with a more optimistic outlook on life, despite their disability, emphasise their satisfaction with life ($p= 0.03$).

The individual's financial status proved to be an important category of demographic variables which determine to a large extent the quality of mental functioning. This is due to the fact that it provides the opportunity to meet a vast range of life needs. This is confirmed by the data presented in Table 12. The analysis of results concerning the styles of coping with stress suggests that those persons who assess their financial situation as good most often employ task-oriented coping when facing a difficult situation .

The data presented in Table 12 demonstrate that those physically disabled persons who assessed their financial situation as good exhibited a higher level of op-

Table 11. Relationships between styles of coping with stress, dispositional optimism, anxiety and mental well-being

Mental well-being within the last month	Styles of coping with stress										LOT-R		STAI			
	Task-oriented		Emotion-oriented		Avoidance-oriented		Distraction		Social diversion		Dispositional optimism		State anxiety		Trait anxiety	
	M	σ	M	σ	M	σ	M	σ	M	σ	M	σ	M	σ	M	σ
Good	55.24	7.67	40.76	10.83	48.20	11.72	21.70	6.46	17.50	3.78	15.74	25.09	6.68	2.25	6.97	2.32
Bad	52.00	6.65	40.38	10.97	48.23	9.68	20.50	5.48	17.19	4.19	5.04	2.16	6.54	1.75	7.15	2.17
p	0.05		0.88		0.99		0.39		0.73		0.03		0.78		0.73	

Table 12. Significance of differences between styles of coping with stress, dispositional optimism, anxiety and participants' financial status

Financial situation	Styles of coping with stress										LOT-R		STAI			
	Task-oriented coping		Emotion-oriented coping		Avoidance-oriented coping		Distraction		Social diversion		Dispositional optimism		State anxiety		Trait anxiety	
	M	σ	M	σ	M	Σ	M	σ	M	σ	M	σ	M	σ	M	σ
Good	58.00	6.92	36.57	13.00	46.71	10.13	20.07	6.63	17.79	4.32	20.00	31.34	6.00	2.72	5.57	2.77
Average	54.98	7.91	41.55	10.55	47.55	12.21	21.77	6.35	17.08	3.79	14.02	22.80	6.72	2.17	7.14	2.19
Poor	50.70	5.46	40.85	11.48	49.52	8.71	20.83	5.30	17.00	4.63	4.78	2.33	6.39	2.13	7.39	2.25
p	0.01		0.32		0.71		0.59		0.82		0.04		0.51		0.04	

timism in comparison with those persons for whom economical troubles were a daily burden ($p=0.04$).

Furthermore, these results suggest that satisfactory financial security for persons with a spinal injury is connected to anxiety as a trait. Persons who assessed their financial situation as average or poor exhibited a higher level of anxiety than persons who were satisfied with their situation ($p = 0.04$).

DISCUSSION

Each human being perceives themselves, the surrounding world and their relationships with others in a specific way, depending on their innate or acquired predispositions, as well as the characteristics of the environment in which they live. This perception of the world and ourselves depends on our beliefs, expectations, the system of values, desires, life goals, the motives of behaviour, attitudes towards ourselves and others, our life experiences and our commitment to the realisation of life tasks which we should accomplish. There are situations, though, when all our objectives, aims and life plans lose their worth, once life has been endangered. Such a danger may be a trauma to the spine, which may result in

tetraplegia or paraplegia. The life situation of people after a spinal injury changes radically. In order to find an answer to the research questions posed in this paper, 103 patients with medically diagnosed tetraplegia and paraplegia were assessed with a set of psychological tests. The aim of the studies was to determine the most preferred strategies of coping with stress, exhibited level of anxiety and optimism in persons after a spine injury.

The results presented in this paper proved that not always does a low quality of life characterise those persons who suffered a spine injury as a result of random events. A confirmation of this thesis is a higher level of dispositional optimism in tetraplegics, in whom the range of disability is wider than in paraplegics. This surprising result proves that optimism constitutes a vital personal resource, which influences one's physical state and good well-being, so crucial a factor throughout the process of recovery. It is beyond doubt that a positive outlook on life and minor successes inspire the disabled to commence new actions in order to overcome everyday difficulties. On the other hand, lack of faith in success is conducive to apathy and resignation from active actions, which are most certainly detrimental factors to the process of rehabilitation.

CONCLUSIONS

The research results reported here lead to the following conclusions:

- Among our subjects with a spinal injury, most were from large cities or rural settings. Usually, they have graduated from a high school or a vocational school.
- Motor vehicle, sport and work accidents were the most frequent causes of traumas to the spine resulting in tetraplegia. As far as paraplegia is concerned, motor vehicle accidents were the most frequent cause.
- Among psychological variables, such as styles of coping with stress, optimism and the level of anxiety, only dispositional optimism was revealed to be a variable differentiating between persons with tetraplegia and paraplegia. The persons with a wider range of disability, namely persons with tetraplegia, exhibited a higher level of optimism than persons with paraplegia.
- While studying the relationships between the demographic and psychological variables, we noticed that age does not differentiate styles of coping with stress and the level of anxiety. We did observe, however, that persons above 51 years of age exhibited a higher level of optimism than did younger persons (17-35 lat).
- Persons who have completed a lower level of education (primary and secondary school) most often preferred emotion-oriented and avoidance coping when in difficult situations.
- Those persons who highly assessed their physical well-being most often solved problems in a task-oriented way when in a stressful situation, while persons who evaluated their physical well-being as poor tended to concentrate on emotions when solving difficult situations.
- A high level of optimism was characteristic of persons who positively assessed their mental condition and had a stabilised financial situation.

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