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Sense of coherence, its meaning and coping with stress among people after orthopedic surgery

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Abstract
Aim: Assessment of the sense of coherence, methods of coping with stress and the relationship between their components among people after orthopedic surgery.
Materials and methods: 100 people were examined. The proper group consists of 50 patients after orthopedic surgery. The control group consists of 50 healthy people. All the subjects completed a questionnaire with questions about basic metrical data and two standardized questionnaires: SOC-29 and Mini-COPE. The results underwent statistical analysis.
Results: Both groups did not differ in the level of the sense of coherence, the distribution was notably similar to normal ($p > 0,05$). However, the differences in the strategies of coping with stress were observed. Differences in correlations between individual coherence components and remediation strategies have also been noticed.
Conclusions: The patients were characterized by a greater intensity of non-constructive coping strategies compared to the control group. Only among them the stronger sense of coherence coexisted with lower inclinations to negative patterns of behavior. Higher global life orientation was associated with a more favorable and positive approach to problems among healthy people.

Keywords: sense of coherence; coping with stress; orthopedic patients.

Introduction

What makes some people, despite obstacles and difficulties in life, look ahead with optimism, while other, despite similar experiences, lose joy and are discouraged from living? Why do some people live long and in relative health, while others are more susceptible to diseases and die at an early age? According to the concept of Aaron Antonovsky's salutogenesis, the answer to these questions may be a global orientation of life, called by the author mentioned above, the sense of coherence. It is a continuous, dynamic process and its aim is to balance the requirements and resources in response to the stress factor. The sense of coherence (internal consistency) consists of three components: comprehensibility, manageability, and meaningfulness [1, 2, 3, 4].

The sense of comprehensibility determines the degree of perception of stimuli coming from the external and internal environment in an orderly, comprehensible, coherent and clear way by a person. A person with a high sense of intelligibility will receive these stimuli as predictable, whether they are desirable or undesirable.

The sense of manageability determines the degree of perception of incoming stimuli as possible to solve thanks to the resources available to him. A person with a high resourcefulness expect that everything will be in order. Resources that are designed to help cope with upcoming requirements, are resources that a person or her loved ones may have.

The sense of meaningfulness expresses the degree up to which a person feels that life makes sense. Any obstacles in their life are worth the effort, sacrifice and commitment. They are able to perceive them as challenges that are worth taking. In short, the sense of meaningfulness expresses the degree of human motivation to act [1, 2, 3].

According to Aaron Antonovsky, people with a high sense of coherence are characterized by pro-health behaviors. They are more resistant to difficult situations. It is also easier for them to come to terms with, e.g. illness and its consequences, assessing the state of health at a higher level in comparison to people in a similar situation, but with a lower sense of coherence [2, 5, 6, 7]. Therefore, the sense of coherence is a crucial factor influencing the human experience, moreover it also influences psychological stress and coping with it. Generally speaking, global life orientation assumes that human perception of the world is intelligible, meaningful and controllable. Consequently, the use of appropriate adaptive mechanisms and the awareness that human's activity determines the effects of stressful events, can contribute to taking actions to cope with stress and give a hope that working on a mental attitude makes sense [8].

So far, many studies have been carried out which described the relationship between diseases and the indicator of global life orientation. Reduced sense of coherence was observed in cancer patients, in the majority of people after heart transplantation, in people with multiple sclerosis and in patients diagnosed with hypertension [3, 6, 8, 9, 10, 11]. The average level of sense of coherence was also noted in people with kidney disease and diabetes [12]. Its correlation with quality of life and styles of coping with the disease or with stress was also measured. The results suggested that the higher level of the sense of coherence was noted, the better the quality of life of the subjects [4, 11, 13, 14]. In some studies on the sense of coherence and styles of coping with the disease, it was noted that people with a high sense of coherence prefer a task-oriented coping style, and are less likely to undertake an emotional approach to the problem [6, 9, 10, 15]. In addition, it is suggested that a higher degree of sense of coherence reduces the risk of developing mental disorders [16, 17].

Aim

The main assumption of the research was to determine the level of the sense of coherence and coping with stress among patients after orthopedic surgery. In addition, the results were compared with a control group consisting of people who have not undergone traumatic event related to the disease in recent months. Also sociodemographic variables such as age, sex, education, employment and marital status were also taken into account. The results of studies can have a beneficial effect on facilitating understanding of the behavior, needs of patients and

helping to make sense of them. The study may also be a support for the subsequent rehabilitation process, with an emphasis on medical personnel like nurses or physiotherapists. Knowledge of the mental state of the patients may translate into greater understanding and taking appropriate steps to help patients understand and give meaning to activities that improve their quality of life.

Materials and methods

The proper study group were 50 people aged 19-93 residing in the Department of Orthopaedics, Traumatology, and Oncology of the Musculoskeletal System at Unii Lubelskiej Street in Szczecin. The patients have been subjected to an orthopedic surgery. The study was performed in a few days after the surgery.

The control group consists of 50 people aged 18-80 who have not undergone surgery the previous year and also have not been in hospital. The sociodemographic characteristics for both groups are shown in Table 1.

The study has been carried out with the use of a three questionnaires. The first one includes a survey about basic metrical data. The second is the standardized Orientation to Life Questionnaire (SOC-29). The last is the standardized Mini-COPE questionnaire.

The Orientation to Life Questionnaire (SOC-29) by Aaron Antonovsky, measures resistance to stress and the ability to maintain a healthy and long life, which is understood by the concept of a sense of coherence. The questionnaire refers to various aspects of a person's life. It consists of 29 questions or statements with seven possible answers. It contains numbers at which 1 and 7 mean extreme answers, the number 4 usually means indifference or lack of opinion on a given topic. Only one answer can be selected that best suits the feelings of the person. The time to complete the questionnaire is undefined.

The MINI-COPE questionnaire by Charles S. Carver, in the Polish adaptation of Siegfried Juczyński and Nina Ogińska-Bulik. It is used to assess the methods of coping with stress in adults, healthy and sick people. It consists of 28 statements that answer the question placed at the beginning of the questionnaire. It reads as follows: "When I am in a very difficult situation, it is usually:". The people examined responds using a 4-point scale (from 0 - "I almost never do this" to 3 - "I almost always do this"). The person is asked to mark the answer that best suits his image of himself. The study is not limited in time.

Statistical analysis

The results underwent statistical analysis using the IBM SPSS Statistics v.25 package. The methods were used to compare independent groups with Student's t-test for quantitative data, the U Mann-Whiteney test for ordinal data and the pairwise correlation method with the Spearman rho coefficient. The compliance of the data distributions obtained in the study with the normal distribution, typical for the general population, was checked by the Shapiro-Wilk test. The p-value $< 0,05$ was assumed as the statistical significance index and the p-value $< 0,1$ was taken as an index of not fully statistical significance.

Table 1. The sociodemographic characteristics of the two groups.

Sociodemographic variables	**Patients**, n = 50		**Healthy people,** n = 50	
	M/N	SD/%	M/N	SD/%
Age in years	52,06	20,09	45,94	17,78
Gender				
female	26	52,0	30	60,0
male	24	48,0	20	40,0
Place of residence				
village	8	16,0	21	42,0
small town	13	26,0	7	14,0
big city	29	58,0	22	44,0
Employment status				
unemployed	4	8,0	9	18,0
employee	21	42,0	31	62,0
pensioner	25	50,0	10	20,0
Marital status				
single	6	12,0	7	14,0
in a relationship	33	66,0	37	74,0
divorced	4	8,0	4	8,0
widowed	7	14,0	2	4,0
Education level				
primary	4	8,0	0	0,0
middle	1	2,0	1	2,0
secondary	18	36,0	19	38,0
vocational	12	24,0	6	12,0
higher	15	30,0	24	48,0
No co-morbidities	18	36,0	24	48,0

Source: author's own analysis.

Results

Both groups did not differ in the intensity of the sense of coherence, which in both cases reached a distribution significantly similar to normal ($p > 0,05$). On the other hand, the differences in the methods of coping with stress have been demonstrated (Table 2). The two groups were characterized by the most intensive constructive strategies such as active coping with stress (on average over 4,5 points), the acceptance and planning future actions to improve their situation (on average over 4 points), and the least intense - destructive behaviors such as taking psychoactive substances (on average about 1 point), denial of problems or cessation of activities (on average less than 1,5 points).

Table 2. The average intensifications of stress-coping strategies among patients and healthy people.

Stress-coping strategies	**Patients**, n = 50		**Healthy people**, n = 50		The U Mann-Whiteney test	
	mean	SD	mean	SD	Z	p
Active coping	4,52	1,36	4,68	1,19	-0,453	0,651
Planning	4,02	1,29	4,58	1,43	**-2,321**	**0,020**
Positive reframing	3,54	1,36	3,52	1,62	-0,413	0,680
Acceptance	4,26	1,56	4,10	1,42	-0,724	0,469
Sense of humor	1,76	1,53	1,78	1,53	-0,074	0,941
Turning to religion	2,32	2,25	1,82	2,10	-1,214	0,225
Seeking emotional support	3,30	1,85	3,60	1,74	-0,647	0,518
Seeking instrumental support	3,28	1,67	3,60	1,70	-0,858	0,391
Self-distraction	4,06	1,58	2,92	1,77	**-3,282**	**0,001**
Denial	1,52	1,58	1,20	1,50	-1,044	0,296
Discharge	2,76	1,32	2,62	1,64	-0,866	0,386
Psychoactive substance abuse	1,16	1,52	0,72	1,16	-1,400	0,161
Ceasing activity	1,48	1,42	1,52	1,46	-0,014	0,989
Self-blaming	3,22	1,39	2,44	1,63	**-2,467**	**0,014**

SD – standard deviation, Z – the result of the difference test, p – significance of differences.
Source: author's own analysis.

The patients were characterized by a significantly higher intensity of the strategies of self-distraction by means of different activities (reaching an average of 1,14 points more on this scale, $p < 0,01$) and a tendency to blame themselves (on average 0,78 points more; $p < 0,05$). At the same time they showed significantly weaker predispositions for planning actions in a stressful situation, reaching an average of 0,54 points less than healthy people ($p < 0,05$).

Analyzing the correlations between indicators of the sense of coherence and coping styles, it was noticed that among healthy people and postoperative patients, the individual relationships differ in the level of significance and strength. In the whole group (N = 100) the general sense of coherence was associated with a greater ability to active coping (rho = 0,437; $p < 0,001$), acceptance of the problem (rho = 0,303; $p < 0,01$), positive reframing (rho = 0,286; $p < 0,01$) planning (rho = 0,261; $p < 0,01$), and with a lower tendency to self-distraction (rho = -0,310; $p < 0,01$), denying problems (rho = -0,246; $p < 0,05$), discharging frustration (rho = -0,348; $p < 0,001$), ceasing activity (rho = -0,311; $p < 0,01$) and self-blaming (rho = -0,362; $p < 0,001$). What is more, the correlations between individual coherence components and remedial strategies were, in the vast majority, very similar to those of the overall result. After the division of the sample into healthy people and postoperative patients, some differences in significance levels and strengths of some compounds were noticed, which may indicate the intermediary role of the sense of coherence in coping with disease. Table 3 contains coefficients of correlation between indicators of the sense of coherence and stress response strategies in proper and control groups.

Table 3. The Spearman's rank-order correlations between indicators of the sense of coherence and stress-coping strategies in both groups.

Stress-coping strategies	**Patients**, n = 50				**Healthy people**, n = 50			
	SOC	COM	MEA	MAN	SOC	COM	MEA	MAN
Active coping	0,430**	0,372**	0,377**	0,408**	0,448**	0,441**	0,364**	0,318*
Planning	0,282*	0,248 (082)	0,234	0,262 (066)	0,225	0,070	0,313*	0,222
Positive reframing	0,180	0,150	0,052	0,311*	0,428**	0,183	0,466**	0,404**
Acceptance	0,264 (064)	0,241 (091)	0,179	0,332*	0,347*	0,221	0,302*	0,359*
Sense of humor	-0,019	0,026	-0,129	0,087	0,137	0,213	-0,020	0,074
Turning to religion	-0,221	-0,348*	-0,098	-0,248 (083)	-0,049	-0,028	0,003	-0,071
Seeking emotional support	0,074	0,036	0,085	0,078	-0,043	0,007	-0,062	-0,078
Seeking instrumental support	-0,011	-0,002	0,011	-0,067	-0,089	-0,107	-0,051	-0,064
Self-distraction	-0,412**	-0,452**	-0,378**	-0,211	-0,156	-0,284*	-0,020	-0,016
Denial	-0,152	-0,219	-0,059	-0,189	-0,330*	-0,195	-0,214	-0,378**
Discharge	-0,391**	-0,280*	-0,291*	-0,440**	-0,287*	-0,208	-0,406**	-0,252 (078)
Psychoactive substance abuse	0,136	0,138	0,033	0,152	-0,138	-0,221	-0,228	0,028
Ceasing activity	-0,363**	-0,278*	-0,264 (064)	-0,484***	-0,288*	-0,105	-0,337*	-0,326*
Self-blaming	-0,492***	-0,442**	-0,340*	-0,503***	-0,165	-0,295*	-0,035	-0,106

SOC – sense of coherence, COM – comprehensibility, MEA – meaningfulness, MAN – manageability. ** - p<0,05;* *** - p<0,01;* **** - p<0,001.*
Source: author's own analysis.

The biggest differences in the links between the sense of coherence and styles of coping with stress can be noticed in relation to two remedial strategies, which significantly differentiated between patients and healthy people. It turns out that the relationship between the sense of coherence and the tendency to self-distraction by means of different activities in a stressful situations concerned only patients who along with the increase in the general sense of coherence and level of comprehensibility, decreased their tendency to divert attention from the problem in difficult situations. A similar, though slightly weaker, correlation connects this mechanism to the sense of meaningfulness.

There is also a clear difference in the relationship between coherence and the intensity of tendency to blame themselves in difficult situations. Among healthy people, apart from a weak

correlation in relation to the sense of intelligibility, the features were not significantly related, while among patients the tendency to self-blaming moderately decreased with the increase in manageability and comprehensibility, and slightly less with the increase in meaningfulness.

In addition to behaviors, which were significantly different in subgroups, the difference can also be seen in relation to the strategy of positive reframing, whose average level did not differ significantly between healthy subjects and patients. Among healthy people, the ability to see positive aspects of the problem was moderately and positively related to the majority of coherence indicators, while in the group of patients - only poorly connected with greater manageability. In turn, only in patients were a negative relationship between comprehensibility and the strategy of turning to religion. The subjects with a greater sense of predictability, to a lesser extent referred to the issue of faith as support in stressful situations. On the other hand, only healthy people showed weak relationships indicating that the lower sense of overall coherence and manageability is accompanied by a higher tendency to denying problems.

Discussion

The above results confirm that a high sense of coherence is associated with positive behavior patterns and a world-view that is beneficial to mental health. Despite the fact that subjects after surgery did not differ from healthy people with the level of the sense of coherence, it was noticed that their remedial strategies for stressful situations were less favorable. While a higher sense of coherence weakened the intensity of non-constructive behavior patterns, which promotes the development of healthy reactions in difficult situations.

Studies conducted by Gerasimčik-Pulko et al. on 100 early breast cancer patients also indicate a positive correlation between the sense of coherence and better mental and physical functioning in both conservative treatment woman and post-mastectomy women. In addition, a high level of life orientation was associated with less frequent complaints about side effects and negative symptoms associated with the treatment. Also in subjects characterized by a strong sense of coherence, there was less stress associated with the body image and with respect to their future, which may indicate that they are better at dealing with difficult situations. [18].

Freitas et al. described a study conducted on a group of 147 people with inflammatory bowel disease, which shows that the sense of coherence has a significant relationship with the feeling of symptoms associated with stress and with the quality of life of ill people. The lower SOC level was associated with intensity of the anxiety and depressive symptoms. Whereas a strong sense of coherence positively correlated with good quality of life, which was also associated with a lower level of negative stress symptoms. Therefore, also these studies seem to confirm the relationship between the orientation of life and a constructive approach to the problem [19].

A five-year study by Goulia et al. involving 74 patients with rheumatoid arthritis checked how the various factors affecting the quality of life can change over time and whether there are correlations between them. It was found that the sense of coherence is an independent factor that contributes to and predicts an improvement in the mental state, general health and quality of life in people affected by chronic disease [20].

The presented results show that the sense of coherence can be a very important element that participates in the formation of positive reactions of organism to the existing, negative changes. Thus it may be important to continue further studies involving more subjects in order to better perceive at these relationship, which could contribute to more effective counteracting to the negative effects associated with the disease.

Conclusions

The results of the study did not show that patients and healthy people differed in their sense of coherence, although the patients were more prone to blame themselves and self-distraction in difficult situations as well as a weaker tendency to planning actions under stress. Among all subjects, indicators of the sense of coherence coexisted with a greater intensity of positive coping

strategies and a lower intensity of unconstructive behavior patterns in difficult situations.

Only in the group of patients, a greater sense of coherence favored a lower inclination to self-blaming and to diverting attention from problems. These results may indicate that among subjects after surgery, a greater sense of coherence may favor a weaker intensity of non-constructive strategies for coping with stress that may moreover be more typical in patients than the general population. What is more, the results suggest that among healthy people, greater coherence may foster the competence to positively reevaluate the problems in order to find benefits and resources for the future.

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