

The sense of coherence in women undergoing coronary arteriography

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Summary

Aim. The examination referred to two groups of female patients: with and without significant coronary stenoses in coronarography. There were two stages of the examination: before and 6-9 months after coronarography. The factor dividing patients into two groups: without significant atheromatosis and with coronary atheromatosis, was the result of invasive diagnostics of coronary heart disease.

Methods. The sense of coherence scale (SOC-29) and sociodemographic questionnaires were used to evaluate the condition of the two groups.

Results. In group of patients with irrelevant coronary stenoses statistically lower values of sense of comprehension were noticed in the first and the second examination and also statistically lower values of sense of manage were observed, comparing to the group of patients with significant stenoses. The initial value of general coherence was comparable in both groups and did not significantly change in 6-9 months after coronarography. The characteristic parameters: lack of social support, intensity of depressiveness and anxiety before getting information about necessity of coronarography and worse education were connected with lower sense of coherence.

Conclusions. The baseline strength of the total sense of coherence was not different between groups. Patients with no significant stenosis of coronary arteries demonstrate a lower sense of comprehensibility before and after the coronary arteriography and lower sense of manageability after the procedure compared to the group of patients with significant atherosclerotic lesions. No social support, tendency for depression and anxiety and lower level of education were associated with lower sense of coherence in both groups.

Key words: coronary artery disease, sense of coherence, cardiac syndrome X

Introduction

In the end of 1970s a particular attention was drawn to a separate characteristics of ischaemic heart disease in women. Before that time it had been believed that the incidence of the disease was lower and its course was milder in women [1]. However, it was demonstrated that there are some separate characteristics of epidemiology, diagnostics, pathomechanism, course, prognosis and probably also medication effects in coronary heart disease in females compared to males [2,3]. Women with ischaemic heart disease present less typical clinical symptoms compared to men. There is a higher incidence of chest pain and the pain is more commonly untypical. Often, patients themselves find it difficult to define the character of their complaints [4,5]. Pain is less correlated with existence of lesions in epicardial arteries. In women presenting untypical pain, even in case of a positive result of exercise ECG testing, significant changes in coronary arteriography are rarely seen, and the, so called, cardiological X syndrome is diagnosed in part of them [6]. The syndrome is believed to be one form of coronary heart disease. Patients complain about pain in the chest, and complaints appear disproportionate to objectively diagnosed vascular lesions. It is possible that difficulties of mental nature are an important aetiological factor of the syndrome [7,8]. In investigations completed within the scope of the *Coronary Artery Surgery Study* (CASS), in women with a positive result of the exercise test, coronary arteriography confirmed existence of lesions in 50% of patients only [9,10]. In case of a typical symptomatology of angina pectoris in women, coronary arteriography usually confirms existence of coronary disease, although slightly less commonly than in case of men [11]. Women with confirmed coronary disease most often experience pain at rest, emotion-triggered pain and nocturnal pain. In older female patients, some comorbidities occur more often, including arterial hypertension or diabetes, compared to men. Besides somatic risk factors of heart diseases there are also those associated with particular types of behaviour and lifestyle, referred as behavioural factors. There are also psycho-social risk factors, of which the most important are: depression, anxiety, personality-associated factors, social isolation, lack of support and chronic stress. Significance of individual behavioural risk factors of coronary heart disease is similar for both sexes. Differences may be a consequence of their frequency and intensity in relation to age, personal traits and particular physiological conditions existing in women. Study results indicate that lack of emotional support is an important risk factor of further development of coronary atheromatosis in women below the age of 65 years [12]. Confirmed coronary disease in women is more often associated with psychosomatic disorders, insomnia, depression and anxiety than it is in men. Identification of protective factors is important from the clinical point of view. Considerations of that type are the subject of the concept of salutogenesis, based on the assumption that throughout their life humans are continuously changing, moving between extremes of the continuum: absolute health and total disease [13]. The Sense of Coherence (SOC) expresses the opinion that the external world is predictable and it is possible to meet its requirements, perceived as challenge by an individual. The sense is composed of three elements: the sense of comprehensibility (perception

of the world as orderly and predictable), manageability (awareness of having an influence on the environment) and the sense of rationality (perception of the world as worth emotional engaging and investing effort in creation of your own life) [14]. The first two elements are of cognitive nature, the last one – and the most important one – is an emotional-motivational dimension. Although successful dealing with life depends on the sense of coherence as a whole, its motivational element of rationality seems to play the main role, and comprehensibility appears more important than manageability [15]. People with higher SOC assess stimuli as less threatening, better cope with stress, and therefore, remain healthy for longer period of time. The sense of coherence is lower in people with somatic diseases and mental disorders. It may also be treated as a significant variable in the process of dealing with a disease [16].

Objective: The study was aimed at assessment of the sense of coherence in a group of women subject to invasive diagnostics of coronary disease. An attempt was also made to find a correlation between strength of the sense of coherence and critical stenoses of coronary arteries.

Material and Methods

Ninety women were included in the study. Their age ranged from 37 to 65 years (mean age – 55.2). They were in-patients of the Department of Cardiology of the Silesian Cardiologial Centre in Zabrze, admitted for invasive diagnostics of coronary disease. There were two phases of the study: before the coronary arteriography and 6–9 months after the procedure. Patients who had been never subject to invasive coronary diagnostics were included. The patients were divided into two groups, based on the result of the coronary arteriography. The first group (Group I) consisted of 48 patients with no significant stenosis of coronary vessels in arteriographic examination (mean age – 54.9). The other group (Group II) consisted of 42 women with confirmed, significant atherosclerotic lesions revealed by the coronary arteriography (mean age – 55.6).

The following parameters were assumed characteristic for the whole study group: waiting time for the coronary arteriographic examination, the level of depression and anxiety before obtaining the information on necessity of the procedure, number of visits in the GP's office or Cardiology Clinic during the last year related to experienced chest discomfort, presence of hypertension, hyperlipidemia, past myocardial infarction, current use of the hormone replacement therapy, declared coronarography-associated concerns, information regarding the procedure provided by a doctor and sense of comprehension of that information, current stressful situations, support from other people, age, education level and marital status.

Additionally, parameters measured in the repeated assessment (6-9 months after the coronary arteriography) were analysed. They are: past hospitalisation due to cardiological reasons, a subjective assessment of the general and mental condition in 6-9-months-long follow-up, current stressful situations, presence of pain in the chest and contact with a psychiatrist.

The study utilised a patient survey questionnaire developed by authors for the purpose of this study and including questions regarding the above mentioned

socio-demographic data and selected clinical parameters. The sense of coherence was measured using the Polish adaptation of the Orientation to Life Questionnaire SOC-29 by Aaron Antonovsky. The questionnaire consists of 29 questions allowing scoring of the general level of the sense of coherence and individual scoring of its three constituents: the sense of comprehensibility – PZR, manageability – PZ and rationality – PS [15]. The scale was not standardised, but numerous studies indicate that the score of approx. 140-160 stands for a strong sense of coherence, 110-130 medium and below 100 – low sense of coherence [16].

The level of depression and anxiety of information about the necessary coronary arteriography were assessed according to the scale from 0 to 10, determining subjective sense of presence of signs of depression and anxiety (contained in the questionnaire), which is not equivalent to an objective diagnosis. Just like other researchers, authors of this paper assumed that the subjective sense of a patient that she had symptoms recognised by psychiatrists as depression- or anxiety-related is an indicator of depression or anxiety [17].

Statistical analysis

Continuous parameters demonstrating a normal distribution were presented as mean \pm standard deviation. Significance of differences between mean values for continuous parameters was verified with the variance analysis (for independent or dependent variables). Qualitative parameters were compared using the chi-square test (in case of expected numbers below 5, the exact Fisher test was used). The p values <0.05 were accepted as statistically significant. Calculations and statistical analyses were done with the Statistica PL version 6.1 software (StatSoft Inc).

Results

In the group of patients with excluded atheromatosis or insignificant stenosis of arteries revealed in coronary arteriography statistically significant lower values of the sense of comprehensibility (PZR) were observed both before the coronarography and in 6-9 months after the procedure, along with a statistically significantly lower value of the sense of manageability (PZ) in the follow-up examination (6-9 months after the procedure), compared to the group of patients with significant atherosclerotic lesions (Table 1).

Tab. 1. The parameter values of sense of coherence SOC-29 questionnaire in both groups of respondents – only for those who have obtained two measurements (M-average, SD-standard deviation, P-level of significance). PZR-sense of comprehensibility, PZ-sense of manageability, PS-sense of rationality, SOC-TOTAL-total result of the sense of coherence

PZR			
	Before	After 6-9 months	P
	M \pm SD	M \pm SD	
Group I	43,3 \pm 10,3	43,1 \pm 13,5	0,96

table continued on the next page

Group II	49,8±10,8	51,1±11,7	0,51
P	0,049	0,047	
PZ			
	Before	After 6-9 months	P
Group I	47,9±12,1	44,7±9,6	0,20
Group II	51,1±9,1	50,8±10,4	0,83
P	0,35	0,050	
PS			
	Before	After 6-9 months	P
Group I	42,8±9,1	40,4±9,5	0,30
Group II	40,7±7,7	41,8±7,3	0,52
P	0,43	0,60	
SOC-TOTAL			
	Before	After 6-9 months	P
Group I	131,9±28,8	128,2±29,7	0,55
Group II	142,4±21,6	143,7±25,0	0,72
P	0,19	0,075	

No statistically significant changes were observed in baseline and control (6-9 months after the procedure) values of individual components of the sense of coherence and of the total result within both groups. Both groups differed with values of the sense of rationality (PS) and with the total result of the sense of coherence (SOC-TOTAL).

Analysing associations between individual components and the total result of the sense of coherence obtained from the first measurement and characteristic parameters of groups, the following were demonstrated (Table 2 – Table 7):

Tab. 2. The impact of these factors on the output value of the result of the general sense of coherence (SOC-TOTAL) (R – Spearman correlation coefficient, P – value level of significance, NS – not statistically significant)

Univariate analysis		
Analyzed factor	R	p
Age	0,10	NS
Education	0,22	NS
Number of visits to the Clinic of General and Cardiac / year	-0,30	<0,05
The waiting time for coronary angiography	0,0	NS
The level of depression before getting information of necessary treatment	-0,40	<0,05
The level of anxiety before getting information of necessary treatment	-0,38	<0,05

Tab. 3. **Influence of analyzed parameters for the output value of the overall sense of coherence (SOC-TOTAL) (M-average, SD-standard deviation)**

Analyzed factor	SOC-TOTAL (I)		P
	YES	NO	
	M±SD	M±SD	
Significant changes in coronary angiography	136,2±25,9	138,1±26,5	0,77
Declared fear of coronary angiography	135,6±26,3	141,5±25,4	0,43
Providing information about the treatment procedure and a sense of understanding of the information	138,5±23,3	135,7±28,8	0,66
Hypertension	136,9±23,4	137,7±31,9	0,92
Hyperlipidemia	133,8±22,9	142,3±30,0	0,22
Prior myocardial infarction	135,8±31,1	137,5±25,0	0,86
Current use of hormone replacement therapy	142,1±25,7	136,4±26,2	0,55
Currently experienced stressful situations	135,0±26,1	140,2±26,1	0,43
Support from other people	140,9±25,3	123,2±24,7	0,028
Marital status – married	139,5±25,8	130,7±26,4	0,23

Tab. 4. **The impact of these factors on the individual components of sense of coherence in the first measurement (R – Spearman correlation coefficient, P – value level of significance, NS – not statistically significant)**

Analyzed factor	PZR (I)		PZ (I)		PS (I)	
	R	p	R	p	R	P
Age	0,17	NS	0,03	NS	0,11	NS
Education	0,20	NS	0,09	NS	0,30	<0,05
Number of visits to the Clinic of General and Cardiac / year	-0,31	<0,05	-0,25	<0,05	-0,32	<0,05
The waiting time for coronary angiography	-0,01	NS	-0,08	NS	-0,12	NS
The level of depression before getting information of necessary treatment	-0,36	<0,05	-0,31	<0,05	-0,31	<0,05
The level of anxiety before getting information of necessary treatment	-0,32	<0,05	-0,32	<0,05	-0,27	<0,05

Tab. 5. **Influence of analyzed parameters for the output value of the sense of comprehensibility (M-average, SD-standard deviation)**

Analyzed factor	PZR (I)		P
	YES	NO	
	M±SD	M±SD	

table continued on the next page

Significant changes in coronary angiography	46,8±11,8	48,1±14,4	0,67
Declared fear of coronary angiography	47,3±11,4	46,4±11,3	0,78
Providing information about the treatment procedure and a sense of understanding of the information	46,5±12,4	46,8±10,2	0,90
Hypertension	47,5±14,0	47,4±11,2	0,98
Hyperlipidemia	46,5±13,2	48,9±13,0	0,48
Prior myocardial infarction	47,2±11,1	48,0±13,6	0,92
Current use of hormone replacement therapy	47,3±13,6	48,2±10,2	0,82
Currently experienced stressful situations	47,3±14,8	47,6±10,2	0,92
Support from other people	48,3±10,8	44,6±19,2	0,49
Marital status – married	43,7±11,3	48,8±13,5	0,13

Tab. 6. **Influence of analyzed parameters for the output value of the sense of manageability (M-average, SD-standard deviation)**

Analyzed factor	PZ (I)		P
	YES	NO	
	M±SD	M±SD	
Significant changes in coronary angiography	49,2±10,1	49,5±10,9	0,92
Declared fear of coronary angiography	51,0±10,1	48,8±10,5	0,45
Providing information about the treatment procedure and a sense of understanding of the information	49,1±11,3	49,5±9,6	0,86
Hypertension	48,5±9,5	51,2±12,3	0,39
Hyperlipidemia	48,9±8,9	50,0±12,5	0,68
Prior myocardial infarction	47,5±11,5	49,8±10,2	0,52
Current use of hormone replacement therapy	48,8±10,3	52,3±11,1	0,40
Currently experienced stressful situations	48,0±10,1	51,3±10,7	0,21
Support from other people	50,8±10,4	43,6±8,2	0,01
Marital status – married	47,1±10,1	50,2±10,5	0,28

Tab. 7. **Influence of analyzed parameters for the output value of the sense of rationality (M-medium, SD-standard deviation)**

Analyzed factor	PS (I)		P
	YES	NO	
	M±SD	M±SD	
Significant changes in coronary angiography	39,6±8,8	43,4±7,7	0,07
Declared fear of coronary angiography	43,2±7,6	40,9±8,7	0,30

table continued on the next page

Providing information about the treatment procedure and a sense of understanding of the information	39,8±9,5	43,1±7,1	0,12
Hypertension	41,9±7,3	40,6±10,7	0,63
Hyperlipidemia	40,3±8,5	43,2±8,2	0,13
Prior myocardial infarction	40,5±11,6	41,8±7,6	0,71
Current use of hormone replacement therapy	41,5±8,8	41,6±6,7	0,98
Currently experienced stressful situations	41,9±8,2	41,0±8,9	0,65
Support from other people	42,3±8,2	38,4±8,8	0,14
Marital status – married	39,9±8,2	42,1±8,6	0,36

1. existence of an association:

- with the number of visits to the GP's office or a Cardiology Clinic / year because of experienced chest discomfort – higher values of all components and of the total result were observed in people less frequently visiting a doctor,
- with the level of depression and anxiety preceding the information of necessary procedure – people with higher level of depression and anxiety had a lower result of total sense of coherence and of all its components,
- with the support from others – people declaring presence of a support had higher results of the total sense of coherence and of the component of sense of manageability,
- with education level – people with higher education had better results of the components of sense of rationality,

2. absence of an association:

- with age, education (except for the sense of rationality), time of waiting for the arteriographic procedure, presence of lesions revealed by coronary arteriography, arterial hypertension, declared procedure-related concerns, information regarding the procedure and the sense of comprehension of that information, hyperlipidemia, current use of the hormone replacement therapy, social support (except for the total sense of coherence and the component of sense of manageability), past myocardial infarction, current stressful situations and marital status.

None of the analysed factors caused deterioration of the results in the SOC-TOTAL scale during the 6-9-months-long follow-up. Considering the fact that the value of the sense of coherence was stable in time, no correlation between parameters of the second examination was examined.

Discussion

Both groups did not differ from each other in terms of values of the sense of rationality (PS) and of total sense of coherence (SOC-TOTAL). Despite lack of statistically significant differences in the sense of coherence in the global perspective, in the group of patients with significant atherosclerosis a tendency for a higher sense of coherence

was observed compared to the patients with no significant atherosclerosis. It seems, therefore, that people with excluded coronary disease or insignificant stenosis of coronary arteries, and often with a diagnosed cardiological syndrome X, may be a group less resistant to stress compared to people with angiographically confirmed disease.

Women in the group I demonstrated a lower sense of comprehensibility (PZR) both at the first (before the procedure) and at the second (6-9 months later) examination compared to the other group. That result suggests that people with excluded or hemodynamically insignificant atherosclerosis are less able to perform a cognitive assessment of reality than those with a significant stenosis revealed in coronary arteriography. They classify incoming stimuli as less coherent and less structuralised. Maybe they are characterised by an increased tendency for “emotional” style of cognition in a difficult situation. It seems also, that the reduction was momentary, because it was observed in both measurements, and its value had no effect on the total result. Moreover, people with cardiological syndrome X had also lower values of the sense of manageability (PZ) in the control examination. The observed difference between both groups was at the border of statistical significance. That allows drawing a conclusion that women with no significant stenosis of coronary arteries demonstrate a reduced sense of controllability of their own life and have a limited ability of using their resources, compared to people with diagnosed coronary disease and significant atherosclerosis. However, it is worth noting that it may be a momentary reduction of that components of the sense of coherence with no effect on the global score, as it was observed only in the control examination.

No statistically significant change of the sense of coherence was observed throughout 6-9 months in either of groups, both in the global perspective, and in relation to individual components, although a minor reduction of the total sense of coherence was observed in the group I and a minor increase in the group II. Besides that none of the analysed factors characterizing the whole group had an effect on deterioration of results in the SOC-TOTAL scale throughout the 6-9-months-long follow-up. That is consistent with the Antonovsky’s concept, assuming that the sense shaped finally at the age of about 30 years remains fairly stable and depends on no other variables [15]. A situation that would lead to a critical change in a short period of time is improbable. Nilsson demonstrated that a stable value of the sense of coherence is characteristic only for people with high baseline SOC score, and those with a medium or low score would demonstrate a decreasing tendency under influence of various psycho-social factors [18]. Other researchers demonstrated, however, that various trauma-inducing situations affect the value of the sense of coherence in long perspective (several years) [19], and that traumatic events during childhood are associated with a lower sense of coherence [20].

Analysing the association between the sense of coherence and its components and group-characterising factors, higher values of all components and of the total score were demonstrated for people less frequently visiting a GP or a cardiologist. Maybe those people are able to maintain a satisfactory health condition for longer, demonstrate better compliance with doctors’ recommendations and choose pro-health behaviour. People who more often visit doctors feel as “more ill”, are less satisfied with effects

of a therapy, and their health condition itself strengthens or deteriorates their sense of coherence [15]. Maybe they do not recognise their existing problems of mental nature, similarly to people suffering from disorders of somatoform character. [8]. The Flensburg-Madsen meta-analysis is worth noting here. The analysis involved 50 research papers in order to determine an association between the sense of coherence and various health aspects, and proposed a theory of a close relation between SOC and psychological aspects of health only, without taking a definite position in respect to an expected role of the score as an indication of health understood in a physical sense [21]. Also authors of this paper observed an association between lower scores of some components of the sense of coherence and determinants of less favourable mental condition characteristic for women with cardiological X syndrome, than the objectively inferior somatic condition presented by people with hemodynamically significant atherosclerosis in whom coronary disease is diagnosed. The central role of the sense of coherence in health (particularly mental health) maintenance and promotion is underlined also by other authors [22-24].

The correlation analysis demonstrated also that the sense of coherence – both globally and divided into individual components – was statistically significantly negatively correlated with increased level of depression and anxiety of getting information about necessity of a procedure.

Support from others appeared to be a factor significantly influencing the total sense of coherence and its component – the sense of manageability. People declaring presence of a support had higher scores in those scopes. It is doubtless that ability to rely on others is a valuable asset, allowing high sense of effective impact on others and on their own fate. Similar conclusions were drawn by Krantz and Ostergren, who observed that lack of social support and poor network of social contacts, and stress associated with professional life are independent factors associated with low SOC score in mature women [25]. Besides that they concluded that the value of the sense of coherence is more determined by a position occupied in the social structure and by social support, than by experience gained during childhood.

Studies realised by authors of this report demonstrated an association between the component of the sense of rationality and the level of education. Higher scores of the sense of rationality were observed in people with higher education. Therefore it may be assumed that better educated women see the sense in taking actions, become emotionally engaged and invest in their own life, contrary to women with lower education. Not all researchers demonstrate similar associations. Mroziak noted no association between the sense of coherence and the level of education and age, but noted a slightly higher sense of comprehensibility in women compared to men [16]. An association with age was not confirmed also by authors of this report. That is consistent with Antonovsky's assumptions, stressing no association between SOC and age of adults [15].

No association between SOC and the following factors was demonstrated: waiting time for coronary arteriography, presence of significant lesions demonstrated by the procedure, arterial hypertension, procedure-associated concerns, information about the procedure and the sense of comprehension of that information, hyperlipidemia, current use of the hormone replacement therapy, past myocardial infarction, current

stressful situations and marital status. Those results seem to support the hypothesis that maybe SOC is a more sensitive tool for measurement of health in its mental aspect than an indicator of a general health condition [26, 27].

Conclusions

1. The baseline strength of the total sense of coherence was not different between groups and remained unchanged within the 6-9 months following the procedure of coronary arteriography.
2. Patients with no significant stenosis of coronary arteries demonstrate a lower sense of comprehensibility before and after the coronary arteriography and lower sense of manageability after the procedure compared to the group of patients with significant atherosclerotic lesions.
3. No social support, more frequent visit to doctors, tendency for depression and anxiety and lower level of education were associated with lower sense of coherence in both study groups.

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