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# Sociodemographic and clinical determinants of the functioning of patients with coronary artery disease

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## ABSTRACT

**Introduction:** Chronic diseases affect many aspects of patients' lives in various ways, including physical activity, emotional and spiritual sphere as well as social functioning. The study aimed to identify factors that determine the functioning of people with CAD, based on the original self-reported questionnaire.

**Material and methods:** A single-centre, prospective, observational cohort study was carried out in 202 consecutive patients hospitalized due to CAD. The study assessed their functioning in chronic disease using the comprehensive tool: The Functioning in Chronic Illness Scale.

**Results:** Most of the respondents (44.55%) showed a medium level of functioning in CAD [79 < result < 94 points]. Economic status (average) was an independent factor contributing to better functioning in the disease. Treatment time (1–5 years), marital status (widow/widower) and prior PTCA treatment were independent risk factors for worse FCIS scores. The independent factors determining the negative impact of the disease on the patient were: previous invasive treatment (PTCA and/or CABG) and age (> 65 years), while the independent determinants of the belief that the course of the disease can be modified were: sex (male) and duration of the disease (< 1 year).

**Conclusions:** The study identifies independent factors affecting the functioning of patients with CAD. FCIS questionnaire comprehensively measures patients' beliefs about the disease. Effective assessment of the quality of the patient's functioning in the disease may be useful in more individualized therapeutic management.

**Key words:** coronary artery disease, functioning in the disease, chronic diseases

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## Introduction

CAD affects many aspects of patients' lives in many ways, including physical activity, emotional and spiritual spheres, or social functioning. Limited functioning of a patient with chronic disease results in decreased self-esteem, deteriorated well-being, increased anxiety and uncertainty about the future [1–4].

The studies available to date are lacking in a comprehensive, multi-faceted assessment of the impact of chronic diseases on patients global functioning. The FCIS questionnaire, validated in patients with CAD, is a unique tool in this respect, providing the possibility of a comprehensive assessment of functioning in chronic disease [5].

This study aimed to identify factors that determine the functioning of patients with CAD, with the use of the FCIS questionnaire.

## Material and methods

The single-centre prospective observational study was planned by the principles of ethics of the Helsinki Declaration and was approved by the Bioethics Committee of L. Rydygier Collegium Medicum, Nicolaus Copernicus University in Torun, Poland (no. KB 769/2016). The study enrolled patients between September 2017 and March 2019 admitted to the Cardiology Department, University Hospital No. 1 in Bydgoszcz, who met the following criteria:

1. treated or/and diagnosed with CAD at least 6 months before the hospital admission;
2. age  $\geq$  18 years;
3. written informed consent to participate in the study;
4. ability to self-filling in the patient survey and FCIS questionnaire.

The patient survey inquires about their sociodemographic status (age, sex, place of residence, level of education, marital status), economic factors (a type of employment, economic status) and health (height and weight, family history of cardiovascular diseases, treatment duration of CAD, previous invasive procedures for cardiovascular disease, smoking habit).

The FCIS is a new self-reported questionnaire for patients with chronic disease assessing the impact of the disease on the patient, the patient's impact on the disease and the impact of the disease on the patient's attitudes. This diagnostic tool was designed to identify deficient areas in the functioning of the patient with chronic disease in order to undertake adequate therapeutic actions. The questionnaire consisted of 24 questions divided into three parts, with a catalogue of 5 answers added to each question. The high score for the entire questionnaire indicates the high physical and mental functioning of the surveyed persons. The high score related to the answers in consecutive subscales reflects patient's functioning respectively: the illness does not affect the patient's functioning; the patient believes she/he has a significant impact on the course of illness; the patient holds a very optimistic view for the future. The questionnaire is available free of charge on the website of the Department of Health Promotion, Collegium Medicum, Nicolaus Copernicus University in Poland (<https://www.wnoz.cm.umk.pl/kizprzdr/narzedzia-badawcze-research-tools/>) [5, 6].

The patients whose physical and mental status was not sufficient to independently consent to the study and fill in the questionnaires were excluded from the study. Of the 224 consecutive patients meeting the inclusion criteria, 22 of these did not fully complete at least one of the questionnaires. In total, 202 patients (129 men and 73 women) were included in the analysis. The mean (SD) age of the study group was 64.4 (11.6) years. The study cohort characteristics are presented in Table 1.

The statistical analysis was carried out using the Statistica 13.0 package (TIBCO Software Inc, California, USA). Continuous variables were presented as means with standard deviations. The Shapiro-Wilk test demonstrated the non-normal distribution of the investigated continuous variables. Therefore, non-parametric tests were used for statistical analysis. Comparisons between the two groups were performed with the Mann-Whitney unpaired rank-sum test. For comparisons between three or more groups, the Kruskal-Wallis one-way analysis of variance was used. Results were considered significant

at  $p < 0.05$ . To identify factors with independent influence on FCIS score multiple regression analysis was performed. For finding the best model backwards stepwise regression was applied. Variables with a p-value of  $< 0.1$  in univariate analysis were introduced into the multiple regression model. Subsequently, variables without significant impact ( $p > 0.05$ ) were one after another removed from the multivariate model.

## Results

The mean (SD) result of FCIS was 88.82 ( $\pm$  10.98) points. Most respondents (44.55%) manifested a medium level of functioning in CAD [79 < result < 94 points]. Only 24.75% of patients achieved a low FCIS score [ $< 79$  points]. The results of functioning in CAD (FCIS scores) in relation to selected sociodemographic and clinical factors are presented in Table 2.

Higher results in the subscale that describes the impact of the disease on the patient functioning were obtained by men, patients under 65 years old, working and with CAD duration less than a year. The earlier occurrence of myocardial infarction and previous PTCA and/or CABG were associated with strong beliefs about a significant impact of the disease on patients' functioning. The conviction about the possibility of influencing the course of the disease (subscale: patient's impact on the disease) was observed in men, patients remaining in a relationship and those who had a family member treated for CAD. On the other hand, patients after the CABG procedure held a weaker belief about the possibility of influencing the course of the disease. When assessing the impact of the disease on the patient's attitudes, it was noticed that optimism about the future was observed in patients remaining in a relationship and those with an average economic status.

In the univariate analysis, better functioning in the disease (FCIS overall score) was determined by male gender, remaining in a relationship, living in the countryside, average economic status and CAD duration of less than a year.

Multivariate analysis identified the economic status (average) was an independent factor contributing to better functioning in the disease. The CAD duration (1–5 years), marital status (widow/widower) and previous treatment with PTCA were independent factors contributing to the worse results in the FCIS scores. Regarding individual subscales, the independent factor determining the belief about the impact of the disease on the patient functioning was: the previous treatment with PTCA and/or CABG and age ( $> 65$  years), while the belief about the possibility of influencing the course of the disease was independently influenced by gender (male) and the CAD duration (shorter than a year) (Tab. 3).

**Table 1.** Characteristics of the study group

Parameter	Variable	Total sample	
		N	%
Gender	Male	129	63.86
	Female	73	36.14
Age	< 65	89	44.06
	≥ 65	113	55.94
Place of residence	Country	52	25.74
	City	150	74.26
Education	Primary/vocational	109	53.96
	Secondary	70	34.65
	Higher	23	11.39
Self-reported economic status	Bad	28	13.86
	Satisfactory	163	80.69
	Good	11	5.45
Employment status	Pensioner/invalid	134	66.33
	Unemployed	11	5.45
	Employed	57	28.22
Marital status	Widowed	29	14.36
	Married/in a relationship	146	72.28
	Single	27	13.37
Family history of CVD	Yes	149	73.76
	No	53	26.24
Duration of CAD	< 1 year	72	35.64
	1–5 years	47	23.27
	> 5 years	83	41.09
Smoking status	Yes	55	27.23
	No	147	72.77
Body mass index	< 25 kg/m <sup>2</sup>	52	25.74
	25–30 kg/m <sup>2</sup>	83	41.09
	> 25 kg/m <sup>2</sup>	67	33.17
Prior MI	Yes	75	37.13
	No	127	62.87
Prior PTCA	Yes	581	28.71
	No	144	71.29
Prior CABG	Yes	18	8.91
	No	184	91.09

## Discussion

Faced with an illness, a person activates various mechanisms aimed at coping with the problem. Active behaviours focused on seeking information to control and influence one's illness seem to be the most

beneficial. On the other hand, patient attitudes that are unfavourable to treatment, such as denial, fear or avoidance, may result from a subjective assessment of the situation inadequate to scientific knowledge [7, 8].

To the best of the authors' knowledge, the FCIS is a unique, validated tool that allows for a comprehensive

**Table 2.** The FCIS results depending on sociodemographic and clinical factors

Parameter/ variable	N	The impact of illness on the patient	P	The patient's impact on the illness	P	The impact of illness on patents attitude	P	General result	P
<b>Gender</b>									
Male	129	28.22 ± 5.98	0.044	29.09 ± 4.29	0.002	31.22 ± 5.45	0.153	88.54 ± 11.07	0.003
Female	73	26.77 ± 5.19		27.10 ± 3.95		29.92 ± 6.42		83.78 ± 10.19	
<b>Age</b>									
< 65 years	89	28.83 ± 4.97	0.042	28.94 ± 3.77	0.080	30.28 ± 6.36	0.573	88.06 ± 11.07	0.086
≥ 65 years	113	26.81 ± 6.15		27.92 ± 4.59		31.12 ± 5.39		85.85 ± 10.85	
<b>Marital status</b>									
Widowed	29	26.21 ± 6.00	0.355	26.11 ± 4.45	0.009	28.59 ± 6.03	0.031	81.00 ± 11.92	0.014
Married/in a relationship	146	27.94 ± 5.81		28.82 ± 4.22		31.27 ± 5.68		82.02 ± 10.57	
Single	27	28.00 ± 4.91		28.30 ± 3.72		30.30 ± 6.11		86.59 ± 10.46	
<b>Place of residence</b>									
Country	52	28.56 ± 4.58	0.270	29.17 ± 4.19	0.121	31.38 ± 6.85	0.137	89.12 ± 10.98	0.049
City	150	27.40 ± 6.07		28.09 ± 4.28		30.53 ± 5.45		86.03 ± 10.90	
<b>Education</b>									
Primary/ vocational	109	27.34 ± 5.64	0.590	28.40 ± 4.21	0.630	30.98 ± 6.56	0.391	86.72 ± 11.26	0.841
Secondary	70	28.04 ± 6.28		28.17 ± 4.67		30.26 ± 5.01		86.47 ± 11.03	
Higher	23	28.35 ± 4.39		28.83 ± 3.34		31.17 ± 4.52		88.35 ± 9.69	
<b>Employment status</b>									
Pensioner/ invalid	134	26.82 ± 6.00	0.019	28.22 ± 4.48	0.574	30.63 ± 5.86	0.660	85.67 ± 11.09	0.051
Unemployed	11	28.64 ± 4.11		28.09 ± 3.81		30.45 ± 4.08		87.18 ± 5.91	
Employed	57	29.58 ± 4.90		28.77 ± 3.87		31.11 ± 6.14		89.46 ± 11.14	
<b>Self-reported economic status</b>									
Bad	28	25.29 ± 6.64	0.072	27.71 ± 4.88	0.389	30.39 ± 7.06	0.021	83.39 ± 12.65	0.019
Satisfactory	163	28.15 ± 5.53		28.58 ± 4.21		31.13 ± 5.50		87.86 ± 10.47	
Good	11	27.18 ± 5.08		27.00 ± 3.41		26.00 ± 5.76		80.18 ± 10.66	
<b>Family history of CVD</b>									
Yes	149	27.88 ± 5.41	0.473	28.70 ± 4.25	0.040	30.78 ± 5.77	0.717	87.36 ± 11.52	0.183
No	53	27.19 ± 6.58		27.43 ± 4.24		30.68 ± 6.07		85.30 ± 9.22	
<b>Duration of CAD</b>									
< 1 year	72	28.99 ± 4.91	0.034	29.24 ± 3.87	0.082	31.26 ± 4.96	0.618	89.49 ± 10.37	0.016
1–5 years	47	26.32 ± 6.64		27.53 ± 3.88		30.02 ± 6.28		83.87 ± 10.97	
> 5 years	83	27.36 ± 5.69		28.10 ± 4.71		30.72 ± 6.29		86.18 ± 11.09	
<b>Smoking status</b>									
Yes	55	26.91 ± 5.00	0.083	29.15 ± 4.25	0.169	30.15 ± 5.74	0.301	86.20 ± 10.71	0.360
No	147	27.99 ± 5.98		28.08 ± 4.26		30.98 ± 5.88		87.05 ± 11.10	

→

**Table 2 cont.** The FCIS results depending on sociodemographic and clinical factors

Parameter/ /variable	N	The impact of illness on the patient	P	The patient's impact on the illness	P	The impact of illness on patients attitude	P	General result	P
<b>Body mass index</b>									
< 25 kg/m <sup>2</sup>	52	27.33 ± 5.42	0.439	27.67 ± 4.32	0.144	31.50 ± 4.87	0.681	86.50 ± 9.00	0.626
25–30 kg/m <sup>2</sup>	83	27.30 ± 5.80		28.72 ± 4.30		30.07 ± 6.70		86.10 ± 12.30	
> 30 kg/m <sup>2</sup>	67	28.48 ± 5.80		28.48 ± 4.20		31.01 ± 5.30		87.97 ± 10.80	
<b>Prior MI</b>									
Yes	75	26.59 ± 5.48	0.011	28.43 ± 4.82	0.847	30.97 ± 5.15	0.953	85.99 ± 10.64	0.259
No	127	28.35 ± 5.80		28.34 ± 3.93		30.62 ± 6.23		87.31 ± 11.18	
<b>Prior PTCA</b>									
Yes	58	25.79 ± 5.23	0.0006	28.71 ± 3.85	0.442	30.22 ± 6.88	0.808	84.72 ± 10.12	0.073
No	144	28.47 ± 5.77		28.24 ± 4.43		30.97 ± 6.88		87.67 ± 11.23	
<b>Prior CABG</b>									
Yes	18	23.33 ± 6.12	0.0009	26.22 ± 4.41	0.012	31.00 ± 4.95	0.933	80.56 ± 9.73	0.010
No	184	28.13 ± 5.53		28.58 ± 4.21		30.73 ± 5.93		87.43 ± 10.92	

**Table 3.** Independent factors determining FCIS result

Parameter	Direction component beta	Direction component beta standard error	P
<b>FCIS I: The impact of illness on the patients</b>			
Self-reported economic status - satisfactory	2.20	0.96	0.023
Age ≥ 65 years	-1.94	0.77	0.012
Prior PTCA	-2.17	0.85	0.012
Prior CABG	-3.72	1.36	0.007
<b>FCIS II: The patient's impact on the illness</b>			
Duration of CAD < 1 year	1.48	0.61	0.016
Gender – male	2.09	0.60	0.0007
<b>FCIS III: The impact of illness on a patient's attitude</b>			
No independent factors			
FCIS – General result			
Self-reported economic status – satisfactory	4.33	1.86	0.021
Marital status – widowed	-7.56	2.14	0.0005
Duration of CAD (1-5 years)	-4.68	1.75	0.008
Prior PTCA	-3.41	1.62	0.037

assessment of the functioning of patients with CAD. The current publication is the first scientific report, after the validation studies of the FCIS, to identify sociodemographic and clinical determinants of various aspects of functioning in chronic disease, in relation to CAD.

In previous studies of patients with cardiovascular diseases, better functioning in the physical and mental sphere was observed in men compared to women [9, 10]. Also, in the presented study men showed a higher FCIS score, mainly due to their belief that they could

influence and control the disease. The lower results obtained in women may be related to their tendency towards anxiety, chronic stress and depression [10]. Another study reported a better level of social functioning in women, while men reported a higher degree of vitality and mental health [11]. In the group of patients with atrial fibrillation, the female gender was an independent predictor of worse quality of life [12]. The study results suggest that men are characterized by better functioning in the disease, with the male gender being an independent factor that determines the belief that the patient can influence the course of the disease.

Higher results in the quality of life in terms of physical functioning were observed in younger people, while in terms of mental functioning - in the elderly [13, 14]. In this study, younger age was an independent factor determining the belief that the disease had a limited impact on the functioning of the patient.

We have observed that people who have lost a close person feel less able to influence their own illness. They also show lower mobilization to take an active attitude towards it, which is consistent with other reports regarding the quality of life [15, 16].

In one of the studies, the authors pointed out that living in the city is an independent factor in improving the quality of life in relation to the physical functioning of patients with atrial fibrillation [17]. In the presented study, better functioning in the CAD concerned people living in the countryside.

Lower socioeconomic status is associated with a higher prevalence of risk factors for cardiovascular diseases and a worse prognosis. When analyzing separate components of the socioeconomic status, the authors did not notice, similarly to Uchmanowicz et al. [15], any influence of education level on the functioning of patients with the disease. It was observed that work activity positively influences the functioning in CAD. This positive impact is manifested in the patient's conviction that the disease does not have a significant influence on one's life. Another study found that working people showed a high level of positive mental attitude and preventive behaviours assessed using the IZZ questionnaire [18]. In the authors' previous study it was showed that the attitude to employment positively influences the implementation of the therapeutic plan [19].

When assessing the economic status based on patients' declarations, it appeared that it is an independent factor influencing the FCIS result. Strong evidence for the association of socioeconomic status with the incidence of cardiovascular diseases and mortality is provided by the studies of Stringhini et al. [20], who indicated that it is an independent factor, comparable to traditional risk factors for cardiac events.

Earlier hospitalizations for cardiovascular events (myocardial infarction, PTCA and/or CABG proce-

dures) and longer CAD duration were associated with worse functioning in the disease, especially in terms of the belief that the disease could affect the patient's functioning. The abnormal picture of the disease may be associated with insufficient medical knowledge on one's disease and low readiness for being discharged, which are closely related to the implementation of the therapeutic plan [21–26]. Therefore, it can be assumed that people who do not implement the therapeutic plan as a result of the conviction that it is impossible to influence the course of the disease are at an increased risk of health deterioration. Such an interpretation could justify lower FCIS scores in these patients.

### Study limitations

The study did not take into account the patient's mental construct, which may affect the study outcomes.

### Conclusions

1. The study allowed to identify independent factors that determine the functioning in the chronic disease, in relation to CAD.
2. The proposed tool comprehensively diagnoses patients' beliefs about the disease. Effective assessment of the quality of the patient's functioning in the disease may be useful in more individualized therapeutic management.

**Conflict of interest:** *The authors of the manuscript report no conflict of interest.*

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