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

Corresponding author:
Piotr Michalski, Department of Health Promotion, Collegium Medicum, Nicolaus Copernicus University, Lukasiewicz 1 Str., 85-821 Bydgoszcz, Poland, e-mail: michalski.piotr@onet.eu

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

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:

- 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].
treated or diagnose with CAD at least 6 months before the hospital admission;
2. age ≥ 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 consists 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 sub-scales 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/kizprrzd/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 (± 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/m²    | 52  | 25.74 |
|                           | 25–30 kg/m²   | 83  | 41.09 |
|                           | > 25 kg/m²    | 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 patients attitude | P       | General result | P       |
|------------------------------------|-----|-------------------------------------|---------|------------------------------------|---------|------------------------------------------|---------|--------------|---------|
| **Gender**                         |     |                                     |         |                                    |         |                                          |         |              |         |
| 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                       | 0.001   | 29.92 ± 6.42                             | 0.003   | 83.78 ± 10.19 |         |
| **Age**                            |     |                                     |         |                                    |         |                                          |         |              |         |
| < 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                       | 0.012   | 31.12 ± 5.39                             | 0.012   | 85.85 ± 10.85 |         |
| **Marital status**                 |     |                                     |         |                                    |         |                                          |         |              |         |
| 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                       | 0.001   | 31.27 ± 5.68                             | 0.001   | 82.02 ± 10.57 |         |
| Single                             | 27  | 28.00 ± 4.91                        |         | 28.30 ± 3.72                       | 0.001   | 30.30 ± 6.11                             | 0.001   | 86.59 ± 10.46 |         |
| **Place of residence**             |     |                                     |         |                                    |         |                                          |         |              |         |
| 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                       | 0.080   | 30.53 ± 5.45                             | 0.080   | 86.03 ± 10.90 |         |
| **Education**                      |     |                                     |         |                                    |         |                                          |         |              |         |
| 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                       | 0.301   | 30.26 ± 5.01                             | 0.301   | 86.47 ± 11.03 |         |
| Higher                             | 23  | 28.35 ± 4.39                        |         | 28.83 ± 3.34                       | 0.317   | 31.17 ± 4.52                             | 0.317   | 88.35 ± 9.69  |         |
| **Employment status**              |     |                                     |         |                                    |         |                                          |         |              |         |
| Pensioner/invalid                  | 134 | 26.82 ± 6.00                        | 0.019   | 28.22 ± 4.48                       | 0.457   | 30.63 ± 5.86                             | 0.606   | 85.67 ± 11.09 | 0.051   |
| Unemployed                         | 11  | 28.64 ± 4.11                        |         | 28.09 ± 3.81                       | 0.001   | 30.45 ± 4.08                             | 0.001   | 87.18 ± 5.91  |         |
| Employed                           | 57  | 29.58 ± 4.90                        |         | 28.77 ± 3.87                       | 0.001   | 31.11 ± 6.14                             | 0.001   | 89.46 ± 11.14 |         |
| **Self-reported economic status**  |     |                                     |         |                                    |         |                                          |         |              |         |
| 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                       | 0.021   | 31.13 ± 5.50                             | 0.021   | 87.86 ± 10.47 |         |
| Good                               | 11  | 27.18 ± 5.08                        |         | 27.00 ± 3.41                       | 0.001   | 26.00 ± 5.76                             | 0.001   | 80.18 ± 10.66 |         |
| **Family history of CVD**          |     |                                     |         |                                    |         |                                          |         |              |         |
| 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                       | 0.040   | 30.68 ± 6.07                             | 0.040   | 85.30 ± 9.22  |         |
| **Duration of CAD**                |     |                                     |         |                                    |         |                                          |         |              |         |
| < 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                       | 0.001   | 30.02 ± 6.28                             | 0.001   | 83.87 ± 10.97 |         |
| > 5 years                          | 83  | 27.36 ± 5.69                        |         | 28.10 ± 4.71                       | 0.001   | 30.72 ± 6.29                             | 0.001   | 86.18 ± 11.09 |         |
| **Smoking status**                 |     |                                     |         |                                    |         |                                          |         |              |         |
| Yes                                | 55  | 26.91 ± 5.00                        | 0.083   | 29.15 ± 4.25                       | 0.069   | 30.15 ± 5.74                             | 0.069   | 86.20 ± 10.71 | 0.360   |
| No                                 | 147 | 27.99 ± 5.98                        |         | 28.08 ± 4.26                       | 0.080   | 30.98 ± 5.88                             | 0.080   | 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 patient’s attitude | P   | General result | P   |
|--------------------|----|-------------------------------------|-----|-----------------------------------|-----|------------------------------------------|-----|----------------|-----|
| **Body mass index**|    |                                      |     |                                   |     |                                          |     |                |     |
| < 25 kg/m²         | 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/m²        | 83 | 27.30 ± 5.80                        | 0.011| 28.72 ± 4.30                     | 0.847| 30.97 ± 5.15                              | 0.953| 85.99 ± 10.64  | 0.259|
| > 30 kg/m²         | 67 | 28.48 ± 5.80                        | 0.306| 28.48 ± 4.20                     | 3.144| 31.01 ± 5.30                              | 87.97 ± 10.80 |                |     |
| **Prior MI**       |    |                                      |     |                                   |     |                                          |     |                |     |
| 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                        | 0.306| 28.34 ± 3.93                     | 3.064| 30.62 ± 6.23                              | 87.31 ± 11.18 |                |     |
| **Prior PTCA**     |    |                                      |     |                                   |     |                                          |     |                |     |
| 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                        | 0.0009| 28.24 ± 4.43                    | 3.096| 30.97 ± 6.88                              | 87.67 ± 11.23 |                |     |
| **Prior CABG**     |    |                                      |     |                                   |     |                                          |     |                |     |
| 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                        | 0.0009| 28.58 ± 4.21                    | 3.077| 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  |
|----------------------------------|--------------------------|----------------------------------------|-----|
| **FCIS I: The impact of illness on the patients** |                          |                                        |     |
| 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|
| **FCIS II: The patient’s impact on the illness** |                          |                                        |     |
| Duration of CAD < 1 year         | 1.48                     | 0.61                                   | 0.016|
| Gender – male                    | 2.09                     | 0.60                                   | 0.0007|
| **FCIS III: The impact of illness on a patient’s attitude** |                          |                                        |     |
| 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 behaviors 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 procedure) 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.

References

1. Hawkes AL, Patrao TA, Ware R, et al. Predictors of physical and mental health-related quality of life outcomes among myocardial infarction patients. BMC Cardiovasc Disord. 2013; 13: 69, doi: 10.1186/1471-2261-13-69, indexed in Pubmed: 24020831.
2. Assari S, Lankarani MM, et al. Comorbidity influences multiple aspects of well-being of patients with ischemic heart disease. Int. Cardiovasc. Res. J. 2013; 7(118): 123.
3. Lalande L, Clarke A, Joseph L, et al. Health-related quality of life with coronary heart disease prevention and treatment. Journal of Clinical Epidemiology. 2001; 54(10): 1011–1018, doi: 10.1016/s0895-4356(01)00361-4.
4. Olanc-Lizarraga M, Oroviogoicoechea C, Errasti-Ibarondo B, et al. The personal experience of living with chronic heart failure: a qualitative meta-synthesis of the literature. J Clin Nurs. 2016; 25(17-18): 2413–2429, doi: 10.1111/jocn.13285, indexed in Pubmed: 27273246.
5. Buszko K, Pietrzykowski L, Michalski P, et al. Validation of the Functioning in Chronic Illness Scale (FCIS). Medical Research Journal. 2018, 3(2): 63–69, doi: 10.5603/mrj.2018.0011.
6. Kubica A. Self-reported questionnaires for a comprehensive assessment of patients after acute coronary syndrome. Medical Research Journal. 2019, 4(2): 106–109, doi: 10.5603/mrj.a2019.0021.
7. Leksowska A, Jaworska I, et al. Somatic disease as an adaptation challenge for humans. Folia Cardiologica Excerpta. 2011; 6(4): 244–248.
8. Furmańska J, Pietrzak-Nowacka M, et al. Psychosocial determinants of the appraisal of disease significance by patients with a chronic disease. Człowiek i Społeczeństwo. 2018; XLV(245): 261.

9. Dueñas M, Ramírez C, Arana R, et al. Gender differences and determinants of health-related quality of life in coronary patients: a follow-up study. BMC Cardiovasc Disord. 2011; 11: 24, doi: 10.1186/1471-2261-11-24, indexed in PubMed: 21619566.

10. Dąbrowski R, Smoliś-Baj E, Kowalik I, et al. Quality of life and depression in patients with different patterns of atrial fibrillation. Kardiol Pol. 2010; 68(10): 1133–1139, indexed in PubMed: 20967710.

11. Wojarska I. Emotional problems arising from chronic disease in patients staying in the cardiology department. Journal of Education, Health and Sport. 2017; 7(7): 226–23.

12. Jankowska-Polańska B, Kaczan A, Lomper K, et al. Symptoms, acceptance of illness and health-related quality of life in patients with atrial fibrillation. Eur J Cardiovasc Nurs. 2018; 17(3): 262–272, doi: 10.1177/1474515117733731, indexed in PubMed: 28933196.

13. Veenstra M, Petterson KI, Rollag A, et al. Symptoms, acceptance of illness and health-related quality of life in patients with coronary artery disease. Eur J Cardiovasc Nurs. 2018; 17(3): 262–272, doi: 10.1177/1474515117733731, indexed in PubMed: 28933196.

14. Pragodpol P, Ryan C. Critical review of factors predicting health-related quality of life in newly diagnosed coronary artery disease patients. J Cardiovasc Nurs. 2013; 28(3): 277–284, doi: 10.1097/JCN.0b013e31824f566, indexed in PubMed: 23485891.

15. Uchmanowicz I, Loboz-Grudziński K, Janekowska-Polanska B, et al. Influence of diabetes on health-related quality of life results in patients with acute coronary syndrome treated with coronary angioplasty. Acta Diabetol. 2013; 50(2): 217–225, doi: 10.1007/s00592-011-0930-2, indexed in PubMed: 21442428.

16. Paźczak E, Uchmanowicz I, et al. Analysis of factors affecting quality of life following myocardial infarction. Piel. Zdr. Publ. 2012; 2(1): 29–37.

17. Jankowska-Polańska B, Kaczan A, Lomper K, et al. Symptoms, acceptance of illness and health-related quality of life in patients with atrial fibrillation. Eur J Cardiovasc Nurs. 2018; 17(3): 262–272, doi: 10.1177/1474515117733731, indexed in PubMed: 28933196.

18. Ślusarska B, Nowicki G. Health behaviours in prophylaxis of cardiovascular diseases among occupationally active population. Probl Hig Epidemiol. 2010; 91(1): 34–40.

19. Kosobucka A, Michalski P, Pietrzykowski Ł, et al. Adherence to treatment assessed with the Adherence in Chronic Diseases Scale in patients after myocardial infarction. Patient Prefer Adherence. 2018; 12: 333–340, doi: 10.2147/PPA.S150435, indexed in PubMed: 29651891.

20. Stringhini S, Carmeli C, Jokela M, et al. LIFEPA TH consortium. Socioeconomic status and the 25 × 25 risk factors as determinants of premature mortality: a multicohort study and meta-analysis of 1.7 million men and women. Lancet. 2017; 389(10075): 1229–1237, doi: 10.1016/S0140-6736(16)32380-7, indexed in PubMed: 28159391.

21. Michalski P, Kosobucka A, Pietrzykowski Ł, et al. Effectiveness of therapeutic education in patients with myocardial infarction. Medical Research Journal. 2018; 2(3): 89–96, doi: 10.5603/mrj.2017.0011.

22. Michalski P, Kasprzak M, Siedlaczek M, et al. The impact of knowledge and effectiveness of educational intervention on readiness for hospital discharge and adherence to therapeutic recommendations in patients with acute coronary syndrome. Medical Research Journal. 2020, doi: 10.5603/mrj.a2020.0023.

23. Kosobucka A, Michalski P, Pietrzykowski Ł, et al. The impact of readiness to discharge from hospital on adherence to treatment in patients after myocardial infarction. Cardiol J. 2020 [Epub ahead of print], doi: 10.5603/CJ.a2020.0005, indexed in PubMed: 32037501.

24. Kubica A, Oborska K, Kasprzak M, et al. Prediction of high risk of non-adherence to antiplatelet treatment. Kardiol Pol. 2016; 74(1): 61–67, doi: 10.5603/KP.a2015.0117, indexed in PubMed: 26101025.

25. Kubica A, Gruchała M, Jaguszkowski M, et al. Adherence to treatment — a pivotal issue in long-term treatment of patients with cardiovascular diseases. An expert standpoint. Medical Research Journal. 2018; 2(4): 123–127, doi: 10.5603/mrj.2017.0016.

26. Kubica A, Bączkowska A. Rationale for motivational interventions as pivotal element of multilevel educational and motivational project MEDMOTION. Folia Cardiologica 2019; 15.; 1: 6–10.