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Mapping Knowledge of Secondary Prevention in Patients with Coronary Artery Disease

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Summary

Objective: The aim of our study was to map the proportion of completely correct answers and to compare the level of knowledge between two age groups in the studied domains.

Design: Pilot study.

Participants: 180 hospitalised patients with coronary artery disease.

Methods: We used the Slovak version of the Coronary Artery Disease Education Questionnaire (CADE Q-II), which targets five domains: health status, risk factors, exercise, nutrition and psychosocial risk.

Results: We found that patients <60 years of age provided more completely correct answers in all studied domains compared to patients >60 years. Patients <60 years achieved a total mean score of 63.47±12.3 SD out of 93; compared to patients >60 years with 58.84±10.1 SD out of 93 (p=0.014). In the comparison of the two age groups, we found statistically significant differences in the studied domains.

Conclusion: The pilot study shows that both age groups scored an acceptable level of knowledge and have gaps of knowledge in five studied domains.

Keywords Gaps of Knowledge; Secondary Prevention; Assessment Tool; Coronary Artery Disease; Age Groups.

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INTRODUCTION

Up to 60% of patients with cardiovascular disease have limited health literacy, which is associated with low commitment to lifestyle changes, increased number of hospitalizations and a higher risk of mortality [1]. Studies confirm that adequate knowledge about the disease improves the patient's awareness of potential and existing risk factors and supports the maintenance of a healthy lifestyle, which leads to better cardiovascular health [2]. Nurse-managed interventions effectively help change the lifestyle of individuals by promoting knowledge and increasing health literacy [16]. Nurses are in an important position to contribute to the reduction of deficits and uncertainties in the field of health, increase awareness and health literacy, and thus play an important role in the field of prevention [11]. The CADE-Q II questionnaire is a suitable tool for evaluating knowledge, as well as the effectiveness of education in the field of secondary prevention [7]. Assessment tools to assess knowledge and identify patients with low health literacy should be incorporated into standard health care for patients with coronary artery disease [6]. During patient education, it is not enough to just provide information; at the same time, it is necessary to achieve a change in attitude and behaviour in the field of health and integrate it

into comprehensive care [12]. A prerequisite for effective prevention is a comprehensive, multidisciplinary and holistic approach.

Aim

To map the proportion of completely correct answers in studied domains; to compare the level of knowledge between the two age groups in the studied domains.

Materials and methods

In a pilot cross-sectional study, we approached 180 hospitalized patients at The National Institute of Cardiovascular Diseases in the Slovak Republic. Data collection took place between June 2021 and April 2024.

Inclusion criteria

Hospitalized patients with coronary artery disease aged between 35 and 75 years.

Exclusion criteria

Patients with congestive heart failure, chronic liver failure, chronic kidney disease G3-G5, post-cardiac arrest amnesia.

DATA COLLECTION

In the pilot study, we used the Slovak version of the standardized Coronary Artery Disease Education Questionnaire. The CADE-Q II questionnaire was translated from the English original into the Slovak language; the translated questionnaire was repeatedly checked and compared to the original. Patients participating in the study were approached separately by the study investigator. The questionnaire is focused on five domains: health status, risk factors, exercise, nutrition and psychosocial risk; it contains 31 closed items with a choice of one of 4 answers. A score of 3 is for a completely correct answer, a score of 1 is for a partially correct answer, a score of 0 is for two incorrect answers. The maximum achievable score is 93 [5].

Data analysis

The questionnaire return rate was 100%; all items of the CADE-Q II questionnaire were answered. We used a descriptive analysis of the obtained CADE-Q II data. Subsequently, the monitored variables were analysed using the statistical program IBM SPSS. Continuous variables were tested for normality of distribution using the Kolmogorov-Smirnov and Shapiro-Wilk goodness-of-fit tests with normal distribution. We used the parametric Student's T test and the non-parametric Mann-Whitney U test. All tests were carried out at the level of significance $\alpha = 0.05$.

Results

Sample characteristics

The sample consisted of 78 % male; 22 % female; mean age of the sample was 57.83±8.68 SD years; the youngest patient was 35 years and the oldest was 74 years old. 47,2 % of patients were hospitalized as NSTEMI; 52,8 % of patients as STEMI; 18,8 % of patients were indicated for CABG. 66,6 % of patients had arterial hypertension; 21,6 % had diabetes mellitus. 36,7 % of patients were regular smokers. The body mass index of the sample was 28.53±4.46 SD; waist circumference was 102.98±12.0 SD. Other sample characteristics are shown in Table 1.

Table 1 Demographic, clinical and anthropometric characteristics of patients

Demographic characteristics

Sex	*n*	%	Age (means+ SD)
Male	**141**	**78**	**57,56±8,62**
Female	39	22	58,82±8,95
Education level			
University	63	35	58,55±8,97
Secondary	115	64	57,4±8,6
Primary	2	1	59,5±0,7
Age groups			
Patients <60 years	101	56	51,55±5,97
Patients >60 years	79	44	65,86±3,34

Clinical characteristics

	<60 years n=101	*>60 years n=79*	*N=180*
NSTEMI	**35**	**50**	**47,2 %**
STEMI	66	29	52,8 %
Indicated for CABG	16	18	18,8 %
Arterial hypertension	61	59	66,6 %
Diabetes mellitus	17	22	21,6 %

	<60 years n=101	>60 years n=79	N=180
Current smokers	44	22	36,7 %

Anthropometric characteristics (mean + SD)

	<60 years n=101	>60 years n=79	N=180
Body Mass Index	29,2±4,9	27,7±3,7	28,53±4,46
Waist circumference (cm)	104,1±13,2	101,5±10,2	102,98±12,0

1. ***STEMI*** – *ST - Elevation Myocardial Infarction;* ***NSTEMI*** *- Non-ST-Elevation Myocardial Infarction;* ***CABG*** *– Coronary artery bypass graft*

Figure 1 Representation of CADE-Q II answers of patients <60 years; n=101

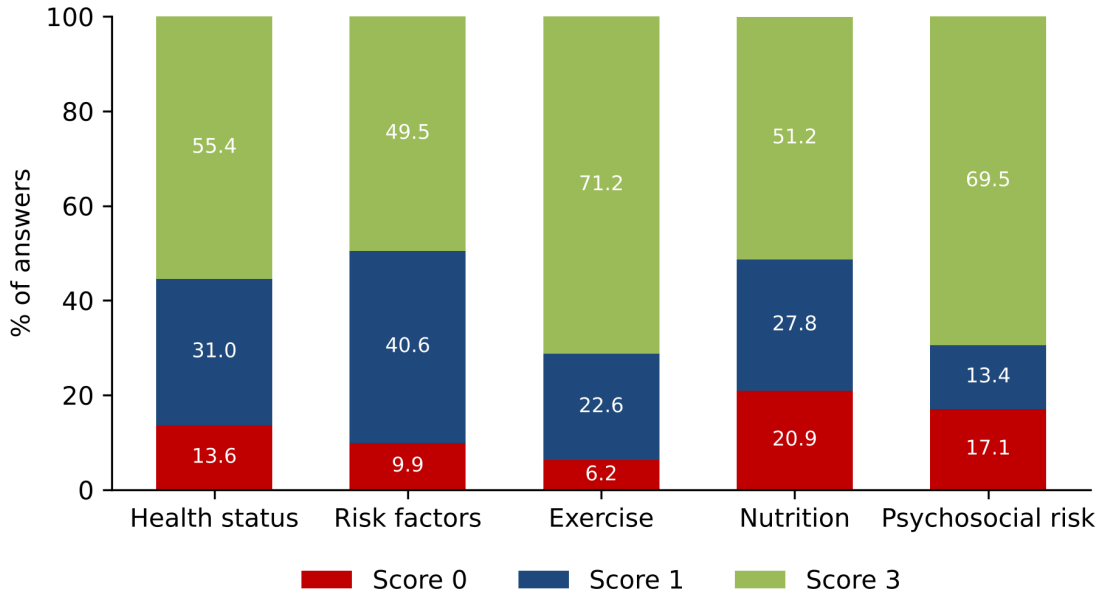


Figure 2 Representation of CADE-Q II answers of patients >60 years; n=79

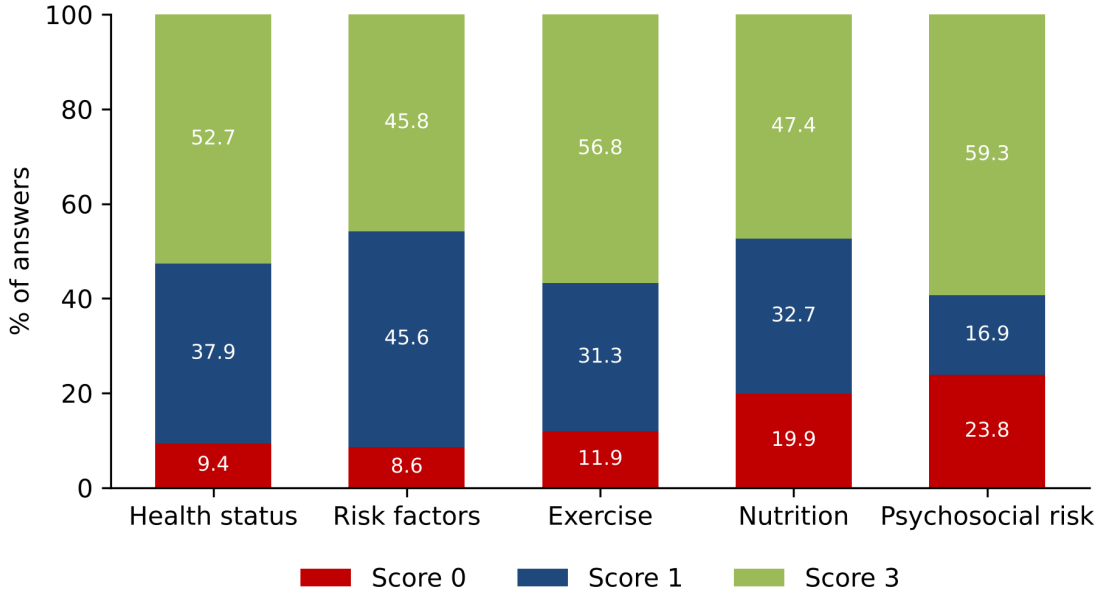


Table 2 Completely correct answers in domains scored 3 by age groups

DOMAIN	<60 years	>60 years
Health status	**55,4 %**	**52,7 %**
Risk factors	49,5 %	45,8 %
Exercise	71,2 %	56,8 %
Nutrition	51,2 %	47,4 %
Psychosocial risk	69,5 %	59,3 %

Figure 3 Mean CADE-Q II score in the studied domains by age group

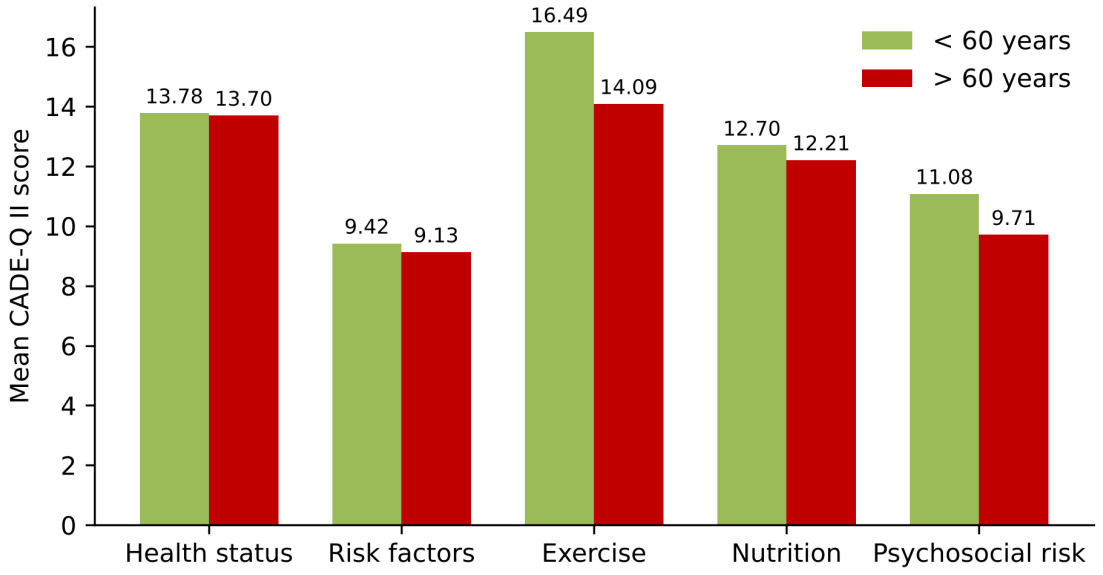


Table 3 Mean score of CADE-Q II items in studied domains; patients <60 years; n=101

DOMAIN	Q 1	Q 2	Q 3	Q 4	Q 5	Q 6	Q 7	SCORE
Health status	**1,92**	**2,57**	**2,45**	**2,32**	**1,86**	**1,59**	**1,07**	**13,78 / 21**
Risk factors	2,24	2,51	2,16	1,25	1,26			**9,42 / 15**
Exercise	2,64	2,18	2,77	1,98	2,42	2,41	2,09	**16,49/ 21**
Nutrition	2,36	0,62	2,6	2,48	2,72	0,96	0,96	**12,7 / 21**
Psychosocial risk	2,47	2,28	2,5	1,86	1,97			**11,08 / 15**
TOTAL MEAN SCORE								**63,47 / 93**

Table 4 Mean score of CADE-Q II items in studied domains; patients >60 years; n=79

DOMAIN	Q 1	Q 2	Q 3	Q 4	Q 5	Q 6	Q 7	SCORE
Health status	**1,7**	**2,68**	**2,55**	**2,15**	**1,81**	**1,41**	**1,4**	**13,7 / 21**
Risk factors	2,2	2,21	2,03	1,53	1,16			**9,13 / 15**
Exercise	2,21	1,72	2,43	1,48	2,03	2,21	2,01	**14,09 / 21**
Nutrition	2,25	0,75	2,46	2,26	2,67	0,96	0,86	**12,21 / 21**
Psychosocial risk	2,11	2,07	2,29	1,74	1,5			**9,71 / 15**
TOTAL MEAN SCORE								**58,84 / 93**

Patients <60 years obtained statistically significantly higher score in exercise 16.49 v.s. 14.09 (p=0.001); psychosocial risk 11.08 v.s. 9.71 (p=0.011) compared to patients >60 years. Patients <60 years obtained statistically significantly higher CADE-Q II total score 63.47 v.s. 58.84 (p=0.014) compared to patients >60 years.

Figure 4 Patient groups based on CADE-Q II score

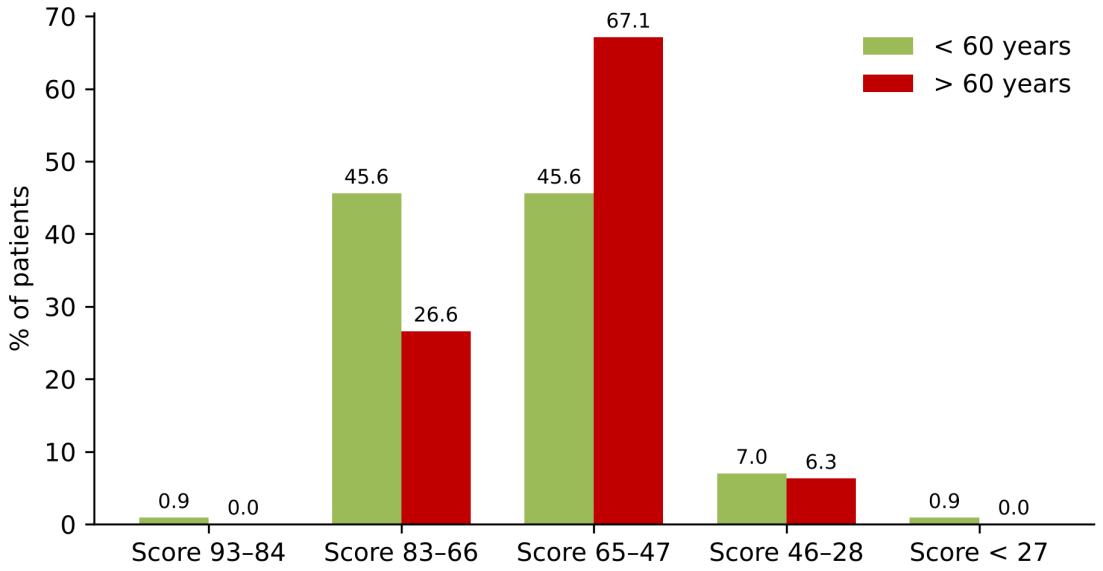


Table 5 Patients' knowledge level based on CADE-Q II score

KNOWLEDGE Level	SCORE	<60 years n=101	%	>60 years n=79	%
Great	**93-84**	**1**	**0,9**	**0**	**0**
Good	83-66	46	45,6	21	26,6
Acceptable	65-47	46	45,6	53	67,1

KNOWLEDGE Level	SCORE	<60 years n=101	%	>60 years n=79	%
Poor	46-28	7	7	5	6,3
Insufficient	<27	1	0,9	0	0

Great knowledge level in group of <60 years was obtained by 0,9 %; good level was obtained by 45,6 %; acceptable level was obtained by 45,6 %; poor level was obtained by 7 %; insufficient level was obtained by 0,9 % patients.

Great knowledge level in group of >60 years was obtained by 0 %; good level was obtained by 26,6 %; acceptable level was obtained by 67,1 %; poor level was obtained by 6,3 %; insufficient level was obtained by 0 % patients.

DISCUSSION

Education is an essential part of cardiovascular rehabilitation and care for patients with coronary artery disease. Education is needed to support understanding of secondary prevention strategies and for treatment compliance [8].

Our research showed that the average value of the total mean score in both age groups corresponds to an acceptable level of knowledge (Tab. 3 and 4). We know that one of the factors that influence the patient's ability to achieve and maintain a favourable health status is the support of knowledge and health literacy [1]. During hospitalization, patients want and need information, including advice about their disease, its causes, course and prognosis, treatment, necessary changes in lifestyle and level of physical activity [10]. Further, our research showed that patients >60 years of age achieved a statistically significant worse overall score compared to patients <60 years of age (Tab. 3 and 4); more than two thirds of patients >60 years of age achieved the acceptable level of knowledge (Fig.4). The aim of elderly patient education is to maintain as independent and self-sufficient a lifestyle as possible. Maintaining the independence of elderly patients with coronary artery disease leads to their higher quality of life [3].

Our research showed that almost half of the patients in both age groups did not provide a completely correct answer in the domain of health status (Tab. 2); which makes patients feel insecure about their health and prognosis. If patients receive contradictory and incomplete information or no information regarding their health status and treatment, this leads to more intense stress and a deterioration in their compliance; the uncertainty or no knowledge about one's own state of health will have a negative impact on the patient's state of health and quality of life [3]. An important aspect of patient education is to be well informed, the patients must be supported to understand the risks and benefits of each treatment alternative, and what would happen if they decide to refuse treatment [11].

Further, our research showed that more than half of both age groups of patients did not give the completely correct answer in the domain of risk factors (Tab. 2); while we know that the decrease in mortality and morbidity from cardiovascular causes is influenced in 44% by influencing risk factors, in 47% by effective pharmacotherapy [17]. The reduction of risk factors in an individual should be adapted to his overall cardiovascular risk [18]. Therefore, we must be sure that the patient understands which specific risk factors increase the likelihood of another cardiac event. The patient must be well aware of the health risks resulting from the presence of risk factors, as well as the benefits of their reduction [3]. The role of nurses in the nursing process is to identify risk factors increasing cardiac risk in the patient and to intervene in this area, to intervene in the event of a lack of knowledge and to support adherence to pharmacological and non-pharmacological treatment [4]. The recognized risk factors must be actively managed to achieve an optimal risk profile for each individual with coronary artery disease.

Our research showed that patients >60 years of age obtained a statistically significant worse score in the domain of exercise compared to patients <60 years of age (Fig. 3), while we know that a low level of prevention knowledge in the area of exercise increases the risk of secondary cardiac events. We know that in elderly patients, regular aerobic exercise is one of the non-pharmacological prevention methods [16;19]. The intensity, type and frequency of exercise for the elderly should be

adapted to their biological age, functional capacity, safety, comorbidities present, lifestyle habits and previous exercise experience [15], identical principles for safe physical activity also apply to younger patients with coronary artery disease. The aim of educating elderly patients in the area of physical exercise is to provide knowledge about the benefits of physical activity, to raise awareness of the possibilities of increasing the level of physical activity, to explain methods for overcoming barriers and negative attitudes towards physical activity [10], because it is known that a sedentary lifestyle and lack of exercise are significant risk factors for morbidity and mortality from cardiovascular causes [17].

Further, our research showed that less than half of the patients >60 years gave the completely correct answer in the domain of nutrition; while almost half of patients <60 years did not provide the completely correct answer in this domain (Tab. 2); while we know that nutrition significantly contributes to the reduction of risk factors in both primary and secondary prevention [3]. It is known that for patients with coronary artery disease the choice of a healthy diet is associated with the improvement of the management of risk factors, and minimization of the pathophysiological mechanisms that contribute to the incidence of secondary cardiac events [14]. Unhealthy eating habits are significant factors that contribute to the progression of coronary artery disease; changes in eating habits result in a reduction of mortality from cardiovascular causes in patients [13]. A cardioprotective diet is the first choice of secondary prevention counselling in connection with specific dietary counselling for the individual and the relevant risk factors of the individual [14].

Our research showed that patients >60 years of age obtained a statistically significant worse score in the domain of psychosocial risk compared to patients <60 years of age (Fig. 3). It is known that excessive stress burden means a real threat to the state of health, psychosocial stress effects are just as dangerous as the biological stress effects [9]. Therefore, the nurse should be interested in the experience and stress of her patients, nurses should also educate patients in the area of stress management [16]. Patients who suffered a cardiac event are more often exposed to psychosocial problems and it is no exception that they show signs of depression and anxiety. Difficulties related to family relationships, such as limited contact with family or bad relationships with children, are a significant burden on the psychological well-being of elderly patients [3]. We know that depression, anxiety or emotional stress are associated with reduced quality of life, progression of arteriosclerotic disease [14], also experience of negative emotions is an obstacle in implementing positive lifestyle changes and worsens the treatment compliance [13], which increases patients' risk of fatal and non-fatal cardiac events.

CONCLUSION

Our pilot study was aimed at mapping completely correct answers and verification the gaps of knowledge of secondary prevention in the studied domains by using an assessment tool. The findings of our research confirmed a percentage higher representation of completely correct answers in all studied domains in the group of patients <60 years; our research also confirmed the higher score obtained in the group of patients <60 years in all studied domains compared to the group of patients >60 years of age. Patients of both age groups gave the least completely correct answers in the domain of risk factors and nutrition; while patients of both age groups gave the most incorrect answers in the domain of nutrition and psychosocial risk. The research results point to the need for more effective promotion of secondary prevention knowledge to minimize secondary cardiac events and increase the quality of life. The sample had a relatively high prevalence of patients with arterial hypertension, diabetes mellitus, also regular smokers, which significantly increases their cardiovascular risk in case of non-optimized treatment and non-observance of cardioprotective lifestyle principles.

The CADE-Q II questionnaire, with its focus on the studied domains, verifies the knowledge of patients and provides a basis for education, effective information and promotion of secondary prevention knowledge.

Recommendations for practice

- Using assessment tools within the nursing process to validate knowledge gaps of secondary prevention in patients with coronary artery disease.
- Focus on the education process for patients with coronary artery disease with comorbidities and risk behaviour that increase cardiovascular risk.
- Emphasize knowledge promotion, secondary prevention education in hospitalized patients with coronary artery disease.

Limitations

Generalizability of the pilot study findings is limited. A study on a larger sample of patients should be conducted in the future.

Conflict of interest

The authors have no conflict of interest to declare.

Ethics approval statement

The study was approved by the Ethics Committee of Slovak Medical University in Bratislava. The study was conducted in accordance with the Helsinki Declaration of 1975 as revised in 2000. Participation in the pilot study was voluntary; each patient signed an informed consent before participating in the research.

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Author contribution

Concept and design (GB), data collection and data analyses (GB), manuscript draft (GB, ZS), critical revision of the manuscript (ZS), final approval of the manuscript (GB).

REFERENCES

1. BEAUCHAMP A, TALEVSKI J, NIEBAUER J et al. (2022) Health literacy interventions for secondary prevention of coronary artery disease: a scoping review. In: *Open Heart*. 2022; 9 (1): e001895.
2. CHEN Z, GENG J, WANG M, HU L, DE MELO GHISI G. L, YU H (2018) The Chinese version of the Coronary Artery Disease Education Questionnaire II (CADE-Q II): translation and validation. In: *Patient Prefer Adherence*. 2018; 12:1587-1596.
3. DOSBABA F, BAŤALÍK L, FEL7ÖCI M et al. (2023) Cardiovascular rehabilitation and prevention. Prague: Grada. 376 p. ISBN 978-80-271-1376-7.
4. FATTIROLLI F, BETTINARDI O, ANGELINO E et al. (2018) What constitutes the 'Minimal Care' interventions of the nurse, physiotherapist, dietician and psychologist in Cardiovascular Rehabilitation and secondary prevention: A position paper from the Italian Association for Cardiovascular Prevention, Rehabilitation and Epidemiology. In: *European Journal of Preventive Cardiology*. 2018; 25 (17): 1799-1810.
5. GHISI G. L. DE M, GRACE S. L, THOMAS S, EVANS M. F, OH P (2015) Development and psychometric validation of the second version of the Coronary Artery Disease Education Questionnaire (CADE-Q II). In: *Patient Education and Counselling*. 2015; 98(3), 378-383.
6. GHISI G. L. DE M, SANDISON N, OH P (2016) Development, pilot testing and psychometric validation of a short version of the coronary artery disease education questionnaire: The CADE-Q SV. In: *Patient Education and Counselling*. 2016; 99(3), 443-447.
7. GHISI G. L. DE M, DA SILVA CHAVES G. S, BRITTO R. R, OH P (2018) Health literacy and coronary artery disease: a systematic review. In: *Patient Education and Counselling*. 2018; 101(2), 177-184.
8. GHISI G.L. DE M, OH P (2022) Validation of the French-Canadian Version of a Short Questionnaire to Assess Knowledge in Cardiac Patients (CADE-Q SV). In: *Canadian Journal of Nursing Research*. 2022; 54(1):51-58.
9. HONZÁK R (2017) Psycho-somatic elementary education. Prague: Vy8ehrad. 352 p. ISBN 978-80-7429-912-4.
10. JENNINGS C, GRAHAM I, GIELEN S (2016) The ESC handbook of preventive cardiology: Putting prevention into practice. Oxford University Press. 222 p. ISBN 978–0–19–967403–9.
11. JENNINGS C, ASTIN F, FITZSIMONS D et al. (2021) ESC Textbook of Cardiovascular Nursing. Oxford University Press. 472 p. ISBN 978–0–19–884931–5.
12. JONES J, BUCKLEY J, FURZE G et al. (2020) Cardiovascular Prevention and Rehabilitation in Practice. Wiley & Sons. 336 p. ISBN 978-1-118-45869-3.
13. KNUUTI J, WIJNS W, SARASTE A et al. (2019) ESC Guidelines for the diagnosis and management of chronic coronary syndromes: The Task Force for the diagnosis and management of chronic coronary syndromes of the European Society of Cardiology. In: *European Heart Journal*. 2019; 41(3): 407-477.
14. MEMBERS W. C, VIRANI S. S, NEWBY L. K et al. (2023) AHA/ACC/ACCP/ASPC/NLA/PCNA guideline for the management of patients with chronic coronary disease: a report of the American Heart Association/American College of Cardiology Joint Committee on Clinical Practice Guidelines. In: *Journal of the American College of Cardiology*. 2023; 82(9), 833-955.
15. PELLICIA A, SHARMA S, GATI S et al. (2021) ESC Guidelines on sports cardiology and exercise in patients with cardiovascular disease: The Task Force on sports cardiology and exercise in patients with cardiovascular disease of the European Society of Cardiology. In: *European Heart Journal*. 2021; 42.1: 17-96.
16. TÓTHOVÁ V, CHLOUBOVÁ I, PROKE7OVÁ R et al. (2019) The importance of nursing in preventive cardiology. Prague: Grada. 160 p. ISBN 978-80-271-2412-1.
17. TUKA V, ČE7KA R, PETRÁK O et al. (2018) Preventive cardiology for practice. Prague: NOL. 328 p. ISBN 978-80-903929-6-0.
18. VISSEREN F. L, MACH F, SMULDERS Y. M et al. (2021) ESC Guidelines on cardiovascular disease prevention in clinical practice: Developed by the Task Force for cardiovascular

disease prevention in clinical practice with representatives of the European Society of Cardiology and 12 medical societies with the special contribution of the European Association of Preventive Cardiology. In: *European heart Journal*. 2021; 42(34): 3227-3337.

19. VYSOKÝ R, KONEČNÝ P (2022) Rehabilitation and prescription of physical activity in cardiovascular and selected internal diseases. Ostrava: Palacký University Press. 190 p. ISBN 978-80-244-6125-0.