

Title Page**Development and Psychometric Validation of the Second Version of the Coronary Artery Disease Education Questionnaire (CADE-Q II)**

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*No sources of support, disclaimers or previous presentations.

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Abstract

Objectives: To develop and psychometrically-validate a revised version of the Coronary Artery Disease Education Questionnaire (CADE-Q)- a tool to assess patients' knowledge about CAD in cardiac rehabilitation (CR).

Methods: After a needs assessment, a literature review and focus group with CR experts, the revised questionnaire was developed. It underwent pilot-testing in 30 patients, which lead to further refinement. The questionnaire was then psychometrically-tested in 307 CR patients. Internal consistency was assessed using Cronbach's alpha, the dimensional structure through exploratory factor analysis, and criterion validity with regard to educational level.

Results: Cronbach's alpha was 0.91. Criterion validity was supported by significant differences in mean scores by educational level ($p<.001$). Factor analysis revealed four factors, which were internally-consistent (0.65-0.77), and well-defined by items. The mean total score was $64.2\pm18.1/93$. Patients with a history of heart failure, cardiomyopathy and percutaneous coronary intervention ($p<0.05$) had significantly higher knowledge scores compared with patients without such a history. Knowledge about exercise and their medical condition was significantly higher than risk factors, nutrition and psychosocial risk.

Conclusions: The CADE-QII has good reliability and validity.

Practical Implications: This tool may be useful to assess CR participants' knowledge gaps, and to evaluate the efficacy of educational delivery in CR.

Abstract word count: 200

Keywords: Coronary Artery Disease; Patient Education; Health Knowledge, Attitudes, Practice; Questionnaires; Psychometric Validation.

1. Introduction

Cardiovascular diseases (CVDs) are the leading cause of death worldwide [1], and a significant contributor to morbidity and health-related costs [2]. Coronary Artery Disease (CAD) – the most common type of CVD – is increasing in prevalence due to improvements in acute care. Accordingly, chronic disease management is needed to optimize secondary prevention, including patient education [3-5]. Findings from a recent systematic review confirm the benefits of educational interventions in CAD patients, through increasing knowledge and facilitation of heart health behaviour change [6].

Cardiac rehabilitation (CR) is a comprehensive risk reduction program recommended for CVD patients [4,5,7]. Patients participate in CR approximately two times a week over a few months, during which time medical and lifestyle risk factors are managed, cardioprotective therapies are optimized and psychosocial health is promoted. Patient education is considered one of the core components of CR [3,8-10], to promote patient understanding of the multitude of recommended therapies and behaviour changes, as well as their adoption and maintenance [11-13].

In order to plan and deliver an effective CR educational intervention, it is important to have precise information of what cardiac patients know about their condition [11,14]. Accordingly, the 19-item Coronary Artery Disease Education Questionnaire (CADE-Q) was previously developed and psychometrically-validated to assess CR patients' knowledge about CAD [15-17]. It is one of the very few available tools to measure CAD patient knowledge in the CR context that is psychometrically-validated [18-21]. Although it demonstrated good reliability and validity, the CADE-Q failed to assess all the core components of cardiac rehabilitation (CR), most notably excluding nutrition and psychosocial knowledge. Considering that the focus of CR have been

changed over the past years – from exercise-only to comprehensive secondary prevention [3,6] – this second version of the CADE-Q II was developed to not only update content, but to address all components of cardiac patients' care. For instance, psychosocial health is considered a core component of CR, and this area is now included in the scale.

Therefore, the availability of a more comprehensive and updated CADE-Q is important to assess cardiac patients' knowledge and to tailor the educational component of CR programs [22]. The aim of this study was to develop and psychometrically-validate a revised version of the CADE-Q (CADE-Q II).

2. Methods

2.1 Design and Procedure

This study was reviewed and approved by the University Health Network Research Ethics Board. The design consisted of a series of cross-sectional, observational studies.

The first step in this research was the development of a revised survey based on a literature review. A literature search on patient education in CR, and review of CR practice guidelines [3,8-10] was performed to identify the most important information that coronary patients need to know about their disease and its' management. The literature search is classified as a rapid review and was conducted for published articles from PubMed database from inception to September 2013, in conjunction with a subject librarian.

The drafted questionnaire was then reviewed by a committee of 15 clinicians and researchers who were experts in CR, from multiple programs in Ontario, Canada. They

performed a content analysis, verifying if the new instrument was appropriate for administration in a CR population. Items were refined based on the findings.

The second step was a pilot study to verify the applicability of the instrument, and to evaluate patient understanding of the items (clarity). A convenience sample of coronary patients that completed the local CR program and had previously-agreed to be contacted about research were recruited. Results were used to further refine the CADE-Q II.

The third step was the psychometric validation. The refined tool was administered to a larger convenience sample of cardiac patients who were approached to participate before starting CR at a program in Toronto, Canada. Data were collected between May and December 2013.

2.2 Participants

For the pilot test, graduates of the Toronto Rehabilitation Institute CR program were surveyed. For the psychometric validation, a convenience sample of cardiac patients from this institution was recruited before their participation in CR or during their first week in the program. The inclusion criteria were the following: confirmed CAD diagnosis or multiple cardiovascular risk factors (such as hypertension and diabetes). The exclusion criteria were the following: younger than 18 years old, lack of English-language proficiency, any significant visual or cognitive condition or serious mental illness which would preclude the participant's ability to answer the questionnaire.

2.3 Measures

To assess clarity, the pilot study participants were asked to rate each questionnaire item on a Likert-type scale [23] ranging from 1 (not clear) to 10 (very clear).

Patients participating in the psychometric validation were characterized according to sex, age, highest educational level attained, comorbidities, cardiac risk factors and history. All characteristics were extracted from their medical chart, except educational level which was self-reported.

They were also provided the CADE-QII to complete. Instructions and items are shown in Annex 1. There were 31 items, each with 4 response options. Similar to the CADE-Q, for each item one response option is the most correct and is scored with 3 points, and one response option is somewhat correct and is scored with 1 point. The other 2 response options are incorrect (no scores). Correct responses are also denoted in the Annex 1. The sum of scores is computed to represent mean total knowledge, with a maximum score of 93 representing perfect knowledge.

2.4 Statistical Analyses

The sample size calculation for the psychometric analysis was based on Hair & Anderson's [24] recommendation of a sample of 10 participants per item, and/or at least 100 participants. Since the questionnaire has 31 items, the sample size of 307 can be considered sufficient.

To investigate the psychometric properties of the new tool, the internal consistency, criterion validity and the factor structure were assessed. Item completion rates were also described. First, the internal consistency was assessed by Cronbach's alpha, reflecting the internal correlation between items and factors [25]. Values higher than 0.60 are generally considered acceptable [24]. Second, criterion validity was assessed by comparing CADE-Q II scores by participant's level of education, using

ANOVA. This criterion was applied as studies have shown that individuals with lower level of education have lower knowledge about their health and disease [26-28].

Third, the dimensional structure (and also construct validity) was analyzed through exploratory factor analysis. The main component method for factor extraction was used, considering only those that had *eigenvalues* > 1.0. Factor loadings were then examined. Item reduction - by removing items with poor loadings (i.e., <0.35), or those which loaded unsuitably and / or cross-loaded (i.e., a gap of at least 0.2 between primary and cross-loading should exist) - was considered. After the selection of the factors, a correlation matrix was generated, where the associations between items and factors were observed through factor loadings greater than 0.30 on only one factor. The promax method was used to interpret the matrix [29].

Finally, a descriptive analysis of the CADE-Q II was performed. A mean total score was computed to reflect total knowledge. T-tests, one-way analysis of variance and chi-square tests were used as appropriate to assess differences in CADE-Q II scores based on patient's socio-demographic and clinical characteristics.

SPSS Version 20 (IBM Inc 2011, NYC) was used for analysis, and the level of significance was set at 0.05 for all tests. Where more than 10% of the items were missing, the data were excluded from further analysis.

3. Results

3.1 Participants Characteristics

For the content validation, there were 10 (75%) clinicians, and 5 (25%) researchers who reviewed the items (N=15). For the pilot test, 50 CR graduates were contacted and 30 (60%) responded, of which 8 (27%) were female. Respondents had a

mean age of 68.7 ± 8.4 , and had participated in a mean (25th-75th percentile) of 15.0 ± 20.8 (1.0-29.0) months of CR.

For the psychometric validation study, 307 coronary patients (representing approximately 26% of total annual CR patients) completed the CADE-Q II. The characteristics of these participants are presented in Table 1.

3.2 Development of the Tool

The literature review on core content for a patient education program revealed content was quite consistent across sources, including the following topics: medical condition, risk factor targets and modification, nutrition, exercise, smoking cessation, and psychosocial risk. The CR Guidelines' review identified recommendations for adapting a CR education program for special populations, such as patients with diabetes and the elderly, as well as patients from other nationalities and cultures. Results from a study using the information needs assessment tool (INCR) tool [30] showed that CR participants rated emergency/safety, the heart, and stress/psychological factors as the areas with the greatest information needs. Given few of these were addressed in the CADE-Q, questions related to these needs were drafted for the CADE-Q II.

Based on the literature, the first version of the CADE-Q II was drafted. It was comprised of 5 areas of knowledge: medical condition, risk factors, exercise, nutrition, and psychosocial risk. The questionnaire consisted of 31 multiple-choice questions. Overall, three items from the CADE-Q were retained (items 1, 2 and 4) and modified. The Flesch-Kincaid grade level of the questionnaire was 4.9. The experts concluded that all items were appropriate for administration in a CR population and no changes were made to the questionnaire at this phase.

3.3 Pilot Testing

The 30 participants took a mean of 20 minutes to complete the CADE-Q II. Regarding the evaluation of clarity, mean clarity of the items was 8.2 ± 1.9 . No items had mean clarity scores lower than 7. Ratings are shown in Table 2. These results indicated that the target population understood the questionnaire.

3.4 Psychometric Validation

The CADE-Q II was administered to the CR participants from one CR program, and the mean scores are shown in Table 2. Item completion rates are also shown in Table 2.

The reliability of each area was assessed using Cronbach's alpha (Table 2). The overall scale was considered internally consistent ($\alpha > 0.7$), however 3 of 5 subscales demonstrated internal reliability somewhat lower than acceptable.

With regard to criterion validity, total CADE-Q II scores were compared by educational attainment level. As shown in Table 1, patients with lower educational had significantly lower knowledge than those with higher education ($p < .001$).

The dimensional structure was evaluated through exploratory factor analysis. The results from the Kaiser-Meyer-Olkin index ($KMO = 0.859$) and Bartlett's Sphericity tests ($X^2 = 2073.98$; $p < 0.001$) indicated that the data were suitable for factor analysis. Four factors were extracted, representing 62.2% of the total variance. Table 3 shows the factor loadings for each item. Factor 1 reflected medical condition items, factor 2 reflected risk factors and exercise, factor 3 reflected nutrition, and factor 4 reflected psychosocial risk.

3.5 Patient Knowledge and Its' Correlates

CADE-Q II scores are shown in Table 2. The mean total score was 64.2 ± 18.1 . Almost half (47%) of patients scored higher than 68/93, which indicates a knowledge of

75% or higher. The items where knowledge was greatest were: “What combination of foods can help lower blood pressure?” , “Coronary Artery Disease is:” , “The actions that can be taken to control blood pressure include:” , and “If a person gets chest discomfort during a walking exercise session, he or she should:” . The items where knowledge was lowest were: “How does a person know if he/she is exercising at the right level?” , “What are the important parts of an exercise prescription?” , and “When reading food labels, what should one look at first?” . Regarding the 5 areas, patients had the greatest knowledge related to exercise and their medical condition; patients had the least knowledge related to risk factors.

As shown in Table 1, patients with comorbid Type I diabetes, valvular heart disease and cerebral vascular disease had the lowest mean knowledge scores. Greater knowledge was significantly related to having heart failure ($p=0.01$), cardiomyopathy ($p=0.04$) and percutaneous coronary intervention ($p=0.04$) when compared to patients without these cardiac indications.

4. Discussion and Conclusions

4.1 Discussion

The development of the CADE-Q II was undertaken using best practices, and this study has demonstrated its reliability, validity and multi-faceted structure. Since patient education is a core component of CR, the CADE-Q II will be instrumental to healthcare providers to convey what information cardiac patients need to know about CAD and its management, as well as to evaluate educational strategies for these patients. This initial study suggests that patients' overall knowledge at the beginning of CR was acceptable,

and that information provision in the areas of psychosocial risk and risk factors are required.

When a revised version of a questionnaire is developed it should not only be updated, but must also present psychometric properties at least as good as the original instrument. Indeed, properties of the CADE-Q II were consistent with those from the original [15], and the English version of the CADE-Q [16], particularly in relation to criterion validity (i.e., association with educational attainment), and internal consistency ($\alpha > 0.70$).

Patients' overall knowledge, as well as in the sub-areas were high, suggesting that CR participants are knowledgeable regarding their condition. However, individuals with low educational attainment were not represented in the sample. Clearly strategies to eliminate barriers to access CR among less-educated patients who are likely more in need of the education interventions offered in CR should be implemented [31,32]. Moreover, it was observed that participants with several cardiac indications had greater knowledge, suggesting they may have received prior education in the inpatient setting or at a clinic for example. This again highlights the importance of initially assessing knowledge, so that time is spent teaching patients about information gaps.

There are some limitations to this study. Notably other psychometric properties of the scale require assessment. First, test-retest reliability, convergent validity, index of difficulty and discrimination, and confirmatory factor analysis were not evaluated, and this should form the basis for future study. Second, criterion validity was assessed only in relation to educational attainment. Other indicators, such as health literacy, the original CADE-Q [15] or other non-validated but published knowledge questionnaires for patients

with CAD [11], and exposure to patient education should be assessed in future research. Third, future research is needed to assess whether the scale is sensitive to change, such that increases in knowledge are observed with participation in CR. Another limitation is that previous education received by participants was not considered. We failed to identify if patients received education previously, and the nature of any education received. Finally, generalizability is limited as the scale was administered at a single CR site, in a sample of highly-educated participants.

4.2 Conclusions

In this study we have demonstrated that the CADE-Q II has strong psychometric properties, providing preliminary evidence of its reliability and validity to assess patients knowledge about CAD suitable for the CR setting. It is hoped this tool can support CR program evaluation of their education component, and promote greater provision of information consistent with patient's educational needs.

4.3 Practice Implications

Good patient education involves first assessing patients' knowledge [33]; therefore, with the administration of the CADE-Q II, CR education can be tailored to patients' learning needs. While the administration of the tool requires 20 minutes, the scale is self-administered and the CR setting provides repeated opportunities for administration, scoring and review of knowledge. Moreover, the CADE-Q II may serve as a tool to evaluate the effectiveness of CR education.

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Tables

Table 1: Sociodemographic and Clinical Characteristics of Patient Respondents (N=307), and Mean and Standard Deviation of CADE-Q II Scores by these Characteristics.

Characteristic	CADE-Q II scores (maximum = 93)		
	(mean±SD)	p	
Sociodemographic			
Age (mean±SD)	63.78±11.9		
<65 years old	149 (48.5%)	65.9±17.7	0.11
≥65 years old	158 (51.5%)	62.6±18.6	
Sex n (%)			0.24
Male	239 (77.9%)	63.9±18.6	
Female	68 (22.1%)	65.5±15.9	
Educational Level ^a n (%)			<.001***
Less than high school	20 (6.5%)	53.5±18.8	
High school/graduation certificate	40 (13%)	60.4±17.8	
Trades certificate	11 (3.6%)	57.1±18.2	
College certificate or diploma	61 (19.9%)	66.3±18.0	
University	166 (54.1%)	67.4±16.0	
Missing	9 (2.9%)	=	
Clinical, n (% yes)			
Hypertension	143 (46.9%)	64.2±17.2	0.17
Smoking History	103 (33.6%)	63.7±18.2	0.90
Diabetes Type I	21 (6.8%)	57.6±21.5	0.35
Diabetes Type II	50 (16.3%)	63.6±16.1	0.34
Depression	9 (2.9%)	67.8±18.3	0.75
Sleep Apnea	26 (8.5%)	67.5±14.9	0.07
Fibrillation	28 (9.1%)	67.8±17.3	0.69
Angina	10 (3.3%)	60.1±15.9	0.97
Previous MI	114 (37.1%)	65.0±18.4	0.72
Transient Ischaemic Attack	8 (2.6%)	69.5±11.4	0.30
Prior CABG	71 (23.1%)	66.5±15.8	0.13
Prior PCI	118 (38.4%)	64.1±20.1	0.04*
Heart Failure	18 (5.9%)	67.4±8.6	0.01*
Cardiomyopathy	14 (4.6%)	71.8±9.2	0.04*
Valvular Heart Disease	39 (12.5%)	58.8±18.4	0.98
Peripheral Vascular Disease	11 (3.6%)	65.6±13.4	0.25
Chronic Obstructive Coronary Disease	16 (5.2%)	63.7±16.8	0.51
Cerebral Vascular Accident	21 (6.8%)	57.5±20.4	0.72

MI indicates myocardial infarction, CABG coronary bypass artery graft surgery, PCI percutaneous coronary intervention, SD standard deviation.

^aself-reported

Significant differences between samples: *p<.05, **p<.01, ***p<.001

Note 1: The maximum CADE-Q II score is 93, with higher scores indicating greater knowledge.

Note 2: Clinical characteristics were compared between having and not having a condition. All significant differences were associated with having the condition (e.g. Prior PCI is associated with higher knowledge).

Table 2 – Mean and Standard Deviation of Clarity Rating by Pilot Study Patients (N=30), CADE-Q II Score (N=307), CADE-Q II Item Completion Rates, Cronbach’s alpha per area, and Mean Score per area.

		Clarity Rating by Pilot Study Patients ^a	CADE-Q II Score ^b	CADE-QII Item Completion Rate	Cronbach’s alpha per area	CADE-Q II Mean Score per Area ^c
Areas	Question	Mean±SD	Mean±SD	%	α	Mean±SD
Medical condition	1. Coronary Artery Disease is:	8.6±2.4	<u>2.9±0.7</u>	96.7%	0.71	<u>15.1±4.9</u>
	2. Angina (chest pain or discomfort) occurs:	8.9±2.1	<u>2.1±0.6</u>	97.7%		
	3. In a person with coronary artery disease, which of the following is a usual description of angina?	8.5±2.2	<u>2.3±0.7</u>	97.4%		
	4. A heart attack occurs:	8.8±1.6	<u>2.8±0.8</u>	98%		
	5. The best resources available to help someone understand his/her medications are:	8.5±2.2	<u>1.7±1.1</u>	99%		
	6. Medications such as aspirin (ASA) and clopidogrel (Plavix™) are important because:	8.6±1.7	<u>2.7±0.6</u>	98%		
	7. The “statin” medications, such as atorvastatin (Lipitor™), rosuvastatin (Crestor™), or simvastatin (Zocor™), have a beneficial effect in the body by:	8.0±3.6	<u>2.1±1.1</u>	96.4%		
Risk factors	1. The risk factors for heart disease that can be changed are:	8.7±3.2	<u>2.6±0.9</u>	96.7%	0.65	<u>9.4±3.4</u>
	2. The actions that can be taken to control cholesterol levels include:	8.9±2.6	<u>2.3±0.6</u>	97.1%		
	3. The actions that can be taken to control blood pressure include:	8.7±2.2	<u>2.9±0.5</u>	98%		
	4. The first step towards controlling a risk factor (such as blood pressure or cholesterol) is:	7.4±4.2	<u>2.5±1.0</u>	97.7%		
	5. The actions to prevent developing diabetes include:	7.4±3.0	<u>1.9±1.2</u>	96.1%		
Exercise	1. What are the important parts of an exercise prescription?	8.3±3.2	<u>1.8±1.1</u>	98.4%	0.77	<u>15.6±5.3</u>
	2. For a person living with heart disease, it is important to do a cardiovascular warm-up before exercising because:	7.9±2.5	<u>2.2±0.6</u>	97.7%		
	3. The pulse can be found:	8.1±2.7	<u>2.7±0.8</u>	97.4%		
	4. Three things that one can do to exercise safely outdoors in the winter are:	7.8±2.2	<u>2.2±1.0</u>	98%		
	5. The benefits of doing resistance training (lift weights or elastic bands) include:	7.9±2.1	<u>2.7±0.9</u>	97.4%		
	6. If a person gets chest discomfort during a walking exercise session, he or she should:	8.2±2.1	<u>2.9±0.5</u>	98%		
	7. How does a person know if he/she is exercising at the right level?	8.6±1.9	<u>1.6±1.1</u>	98%		
Nutrition	1. What is the best source of omega 3 fats in food?	8.6±4.2	<u>3.0±0.7</u>	98.4%	0.66	<u>14.0±4.8</u>
	2. Trans fat are:	7.8±2.5	<u>2.6±1.0</u>	97.1%		

	3. What is one good way to add more fibre to your diet:	7.7±2.2	<u>2.7±0.9</u>	96.4%		
	4. Which of the following foods has the most salt:	8.2±3.8	<u>2.1±0.6</u>	99%		
	5. What combination of foods can help lower blood pressure?	8.3±2.2	<u>2.9±0.5</u>	98%		
	6. When reading food labels, what should one look at first?	8.3±3.2	<u>1.8±1.1</u>	98.4%		
	7. How many servings of fruits and vegetables should adults consume?	7.8±1.1	<u>2.1±1.1</u>	98%		
Psychosocial risk	1. Which of the below are effective stress management techniques?	8.4±2.5	<u>2.8±0.7</u>	97.7%	0.67	<u>10.2±3.7</u>
	2. What stresses have been related to increased risk for heart attacks?	8.1±0.28	<u>1.9±1.2</u>	97.4%		
	3. Which of the following describes your best option for reducing your risk from depression:	7.8±1.6	<u>2.1±0.6</u>	98.7%		
	4. It is important to recognize “sleep apnea” because:	7.9±0.29	<u>2.6±0.9</u>	98.4%		
	5. “Chronic stress” is defined as:	7.3±0.69	<u>2.2±1.0</u>	95.8%		
Total		8.2±1.90	<u>64.2±18.1</u>	97.7%	0.91	-

SD=standard deviation.

^aClarity rating out of 10 were 1 = not clear and 10 = very clear.

^bCADE-Q scores range from 0 to 3 in each question. The maximum total CADE-Q II score is 93.

^cThe maximum score for medical condition, exercise and nutrition areas is 21 and for risk factors and psychosocial risk is 15.

Table 3 – Factor Structure of the CADE-Q II, sorted by loading

Areas	Items	Factor 1 Medical Condition	Factor 2 Risk factors/ Exercise	Factor 3 Nutrition	Factor 4 Psychosocial risk
Medical Condition	Q1	.454			
	Q2	.425			
	Q3	.499			
	Q4	.573			
	Q5	.399			
	Q6	.506			
	Q7	.559			
Risk Factors	Q1		.534		
	Q2		.638		
	Q3		.637		
	Q4		.499		
	Q5		.549		
Exercise	Q1		.626		
	Q2		.582		
	Q3		.442		
	Q4		.566		
	Q5		.642		
	Q6		.541		
	Q7		.595		
Nutrition	Q1			.570	
	Q2			.518	
	Q3			.447	
	Q4			.433	
	Q5			.537	
	Q6			<u>.430</u>	
	Q7			<u>.407</u>	
Psychosocial Risk	Q1				.584
	Q2				.491
	Q3				.412
	Q4				.610
	Q5				.538

Annex 1: The Coronary Artery Disease Education Questionnaire II (CADE-Q II)

PART 1: Instructions:

About the questionnaire:

The purpose of this questionnaire is:

- to assess patients' overall knowledge about heart disease and related factors; and,
- to assess specific areas/domains of knowledge (medical condition, risk factors, exercise, nutrition, and psychosocial risk,).

Questions are structured as followed:

- multiple choice
- each question has 4 possible answers/alternatives
- each answer corresponds to a knowledge level:
 - a correct statement showing "complete knowledge"
 - a correct statement showing "incomplete knowledge"
 - an incorrect statement showing "wrong knowledge"
 - a don't know statement showing "lack of knowledge"
- each alternative has a score and the sum of final scores lead to a classification on knowledge.

Instructions for completing this survey:

- Questions are grouped in domains (areas of knowledge);
- Please answer as many questions as you can;
- Check the alternative you think that is the most correct one;
- If you don't know the answer, mark the "don't know" statement (do not leave the question blank);
- After completing the questionnaire, please return to the researcher or to the reception;

This questionnaire is **confidential** and completely **voluntary**.

It should take around 20 minutes to complete.

PART 2: Questionnaire:

***Complete knowledge (score=3)

**Incomplete knowledge (score=1)

*Wrong (score=0)

Domain: Medical Condition

Question 1

Coronary Artery Disease is:

*a) A disease of the heart's arteries that occurs only in older age and is mainly caused by deposits of calcium in the arteries.

**b) A disease of the arteries of the heart which occurs in older age in people with high cholesterol or who smoke.

***c) A disease of the arteries of the heart that starts silently at a young age. It is influenced by poor life style habits, genetics, and involves inflammation in the arteries.

d) I don't know.

Question 2

Angina (chest pain or discomfort) occurs:

**a) When the heart muscle is working too hard.

***b) When the heart muscle is not getting enough blood and oxygen to work properly.

*c) When the brain is not getting enough oxygen.

d) I don't know.

Question 3

In a person with coronary artery disease, which of the following is a usual description of angina?

*a) Headache after meals.

***b) Chest pain or discomfort, at rest or during physical activity, which can also be felt in the arm and/or back and/or neck.

**c) Chest pain or discomfort during physical activity.

d) I don't know.

Question 4

A heart attack occurs:

**a) If an artery in the heart becomes blocked.

*b) If the heart suddenly races in response to stress.

***c) If the flow of oxygen-rich blood to an area of heart muscle suddenly becomes blocked. If blood flow is not restored quickly, the area of heart muscle begins to die.

d) I don't know.

Question 5

The best resources available to help someone understand his/her medications are:

***a) The doctor, the cardiac rehab team, the pharmacist and recommended resources on the internet.

*b) What someone reads on the internet.

**c) The doctor and the cardiac rehab team.

d) I don't know.

Question 6

Medications such as aspirin (ASA) and clopidogrel (Plavix™) are important because:

*a) They lower blood pressure.

**b) They "thin" the blood.

***c) They reduce the "stickiness" of platelets in the blood so that blood flows more easily through coronary arteries and past coronary stents.

d) I don't know.

Question 7

The "statin" medications, such as atorvastatin (Lipitor™), rosuvastatin (Crestor™), or simvastatin (Zocor™), have a beneficial effect in the body by:

**a) Lowering LDL cholesterol in the blood stream.

***b) Blocking the production of LDL cholesterol in the liver, lowering LDL cholesterol in the blood stream, and encouraging cholesterol to move out of plaques from the arteries.

*c) Reducing the absorption of cholesterol from food.

d) I don't know.

Domain: Risk Factors**Question 1**

The risk factors for heart disease that can be changed are:

**a) Blood pressure, cholesterol, and smoking.

*b) Age, family history of heart disease, ethnicity and sex.

***c) Blood pressure (systolic and diastolic), LDL + HDL cholesterol, smoking and second hand smoking, waist size, and reaction to stress.

d) I don't know.

Question 2

The actions that can be taken to control cholesterol levels include:

*a) Knowing the total cholesterol level, becoming a vegetarian and avoiding eggs.

***b) Knowing the LDL and HDL levels, taking cholesterol medication as prescribed, increasing soluble fibre intake and reducing saturated fat in the diet, and participating in aerobic exercise 5 times per week.

**c) Knowing the cholesterol levels and taking cholesterol medication as prescribed.

d) I don't know.

Question 3

The actions that can be taken to control blood pressure include:

*a) Increasing calcium in the diet.

**b) Reducing the amount of salt in the diet, and taking blood pressure medication.

***c) Reducing the amount of sodium in the diet to <2000 mg per day, exercising, taking blood pressure medication regularly and learning relaxation techniques.

d) I don't know.

Question 4

The first step towards controlling a risk factor (such as blood pressure or cholesterol) is:

**a) Knowing if someone has the risk factor.

***b) Knowing the level of the risk factor.

*c) Setting a goal or action plan to control the risk factor.

d) I don't know.

Question 5

The actions to prevent developing diabetes include:

***a) Follow a heart healthy diet, do 150 minutes of aerobic exercise weekly and twice weekly resistance exercises with weights and therabands.

**b) Reduce the amount of fats and carbs in the diet.

*c) With a family history of diabetes, a person is bound to develop diabetes because diabetes is not a preventable disease.

d) I don't know.

Domain: Exercise

Question 1

What are the important parts of an exercise prescription?

*a) Replacing calories and salt during a light workout.

***b) How hard to exercise, how long to exercise, how often to exercise and what type of exercise to do.

**c) How hard to exercise, and how long to exercise.

d) I don't know.

Question 2

For a person living with heart disease, it is important to do a cardiovascular warm-up before exercising because:

***a) It gradually increases the heart rate, it may reduce muscle soreness and can reduce the risk of developing angina.

*b) It adds more time to the total amount of minutes of exercise.

**c) It prepares the body for exercise.

d) I don't know.

Question 3

The pulse can be found:

**a) In the wrist below the base of the thumb.

*b) In the wrist below the base of the pinky finger or on the neck on the Adam's apple.

***c) At the radial artery (wrist) or at the carotid artery (neck).

d) I don't know.

Question 4

Three things that one can do to exercise safely outdoors in the winter are:

**a) Check the temperature and wind-chill, and wear layers of clothing.

***b) Check the temperature and wind-chill and make sure it is not below -10 degrees C, wear 3-4 layers of clothing and adjust the pace of walking so that the level of exertion and heart rate are on target.

*c) Check the temperature and wind-chill and make sure it is not below -15 degrees C, wear a winter coat and jog if one gets too cold.

d) I don't know.

Question 5

The benefits of doing resistance training (lift weights or elastic bands) include:

**a) Builds up strength and muscles.

*b) Lowers resting heart rate.

***c) Increases strength, improves the ability to carry out day to day activities, improves blood sugar levels and increases muscle.

d) I don't know.

Question 6

If a person gets chest discomfort during a walking exercise session, he or she should:

*a) Speed up to see if the discomfort goes away.

**b) Slow down and stop exercising.

***c) Slow the walk pace and if it does not go away within 1 minute, stop exercising. If it still does not go away within the next 1 minute, take nitro-glycerine as prescribed. If the pain continues, get help.

d) I don't know.

Question 7

How does a person know if he/she is exercising at the right level?

***a) The heart rate is in the target zone, the exertion level is no higher than "some-what hard", and the person can exercise and talk.

**b) The heart rate is in the target zone.

*c) Working up a sweat, breathing heavy and the heart rate is going fast.

d) I don't know.

Domain: Nutrition**Question 1**

What is the best source of omega 3 fats in food?

**a) Ground flaxseed.

*b) Pasta.

***c) Fatty fish (e.g. trout, salmon).

d) I don't know.

Question 2**Trans fat are:**

*a) Found in nuts and seeds.

***b) Partially hydrogenated vegetable oils (e.g. vegetable shortening).

**c) Margarine.

d) I don't know.

Question 3**What is one good way to add more fibre to your diet:**

**a) Add nuts and seeds to a salad.

*b) Drink juice.

***c) Eat plant proteins (e.g. legumes/beans, lentils).

d) I don't know.

Question 4**Which of the following foods has the most salt:**

**a) Bread.

***b) Frozen dinners.

*c) Fruits and vegetables.

d) I don't know.

Question 5**What combination of foods can help lower blood pressure?**

*a) Red meat, poultry, fish.

**b) Vegetables and fruits.

***c) Vegetables and fruits, whole grains, low fat dairy, nuts and seeds.

d) I don't know.

Question 6**When reading food labels, what should one look at first?**

**a) Fat content.

*b) Brand name.

***c) Serving size.

d) I don't know.

Question 7

How many servings of fruits and vegetables should adults consume?

***a) 7 to 10 servings a day.

*b) 5 servings a day.

**c) As many as possible.

d) I don't know.

Domain: Psychosocial Risk

Question 1

Which of the below are effective stress management techniques?

**a) Deep breathing.

*b) Avoid communication.

***c) Meditation, progressive muscle relaxation, making social connections, stretching/exercise, deep breathing.

d) I don't know.

Question 2

What stresses have been related to increased risk for heart attacks?

***a) Chronic stresses, major life events, disrupted sleep, and feelings of distress.

**b) Chronic stress at home or at work and feeling depressed.

*c) Stresses that you do not feel in control of.

d) I don't know.

Question 3

Which of the following describes your best option for reducing your risk from depression:

**a) Take an antidepressant, and do your exercise prescription.

***b) Do your exercises, take better care of yourself, and if required take medications.

*c) The risk of heart attack due to depression cannot be reduced.

d) I don't know.

Question 4

It is important to recognize “sleep apnea” because:

*a) It leads to long term lung disease.

***b) It is associated with high blood pressure, abnormal heart rhythms, and higher risk of future heart attack.

**c) It leads to further heart problems.

d) I don't know.

Question 5

“Chronic stress” is defined as:

**a) Ongoing persistent stressful events in one area of your life.

***b) Events at work or at home that make you feel irritable, anxious, or sleepless.

*c) The stresses that are out of a person's control.

d) I don't know.