## REVISIONES

# Knowledge assessment instruments on cardiovascular diseases: Integrative Review

Instrumentos de avaliação do conhecimento sobre doenças cardiovasculares: Revisão Integrativa

Instrumentos de evaluación del conocimiento sobre enfermedades cardiovasculares: revisión integradora

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**ABSTRACT:**
**Objective:** To identify and describe the instruments for assessing knowledge about risk factors and prevention of cardiovascular diseases.
**Methods:** This is an integrative literature review conducted in the months of May 2019 and June 2020, through searches at the LILACS, MEDLINE and SciELo databases, using the descriptors knowledge, cardiovascular diseases, risk factors, prevention of diseases and validation studies. The sample included instrument validation studies, published in the years 2005 through 2019, available in Portuguese, English and Spanish, which answered the guiding question.
**Results:** 12 instruments were found. Most were questionnaires and addressed cardiovascular risk factors and lifestyle, directed to people diagnosed with a Cardiovascular Disease (CVD) and to healthy individuals. Nine instruments were developed and validated in terms of content and construct. Ten studies developed and validated questionnaires and the other studies built and validated scales. The most evaluated CVD was coronary artery disease.
**Conclusion:** Instruments are indispensable strategies for measuring the level of knowledge, contributing to supporting the clinical treatment of patients, planning and evaluating educational health programs and practices.

**Key-words:** Knowledge; Cardiovascular diseases; Risk factors; Disease prevention; Validation studies.

**RESUMO:**
**Objetivo:** Identificar e descrever os instrumentos de avaliação do conhecimento sobre fatores de risco e prevenção de doenças cardiovasculares.

**Métodos:** Trata-se de uma revisão integrativa da literatura realizada nos meses de maio de 2019 e junho de 2020, por meio de buscas nas bases de dados LILACS, MEDLINE e SciELo, utilizando os descritores *knowledge, cardiovascular diseases, risk factors, prevention of diseases* e *validation studies*. Foram incluídos estudos de validação de instrumentos, publicados nos anos de 2005 a 2019; disponíveis em português, inglês e espanhol; e que respondessem à questão norteadora.

**Resultados:** Foram encontrados 12 instrumentos. A maioria eram questionários e abordaram fatores de risco cardiovasculares e estilo de vida sendo direcionados a pessoas com diagnóstico de alguma Doença Cardiovascular (DCV) e a indivíduos sadios. Nove instrumentos foram desenvolvidos e validados quanto ao conteúdo e construto. Dez estudos desenvolveram e validaram questionários e os demais estudos construiram e validaram escalas. A DCV mais avaliada foi a doença arterial coronariana.

**Conclusão:** Os instrumentos são estratégias indispensáveis para mensurar o nível de conhecimento, contribuir no apoio ao tratamento clínico dos pacientes, planejar e avaliar os programas e práticas educacionais em saúde.

**Palavras-chave:** Conhecimento; Doenças cardiovasculares; Fatores de risco; Prevenção de doenças; Estudos de validação.

**RESUMEN:**

**Objetivo:** Identificar y describir los instrumentos para evaluar el conocimiento sobre factores de riesgo y prevención de enfermedades cardiovasculares.

**Métodos:** Se trata de una revisión integradora de la literatura realizada en los meses de mayo de 2019 y junio de 2020, mediante búsquedas en las bases de datos LILACS, MEDLINE y SciELo, utilizando los descriptores conocimiento, enfermedades cardiovasculares, factores de riesgo, prevención de enfermedades y estudios de validación. Se incluyeron estudios de validación de instrumentos, publicados en los años 2005 a 2019, disponible en portugués, inglés y españo, y para responder a la pregunta orientadora.

**Resultados:** Se encontraron 12 instrumentos. La mayoría eran cuestionarios y abordaban factores de riesgo cardiovascular y estilo de vida dirigidos a personas diagnosticadas con una enfermedad cardiovascular (ECV) y a individuos sanos. Se desarrollaron y validaron nueve instrumentos en términos de contenido y construcción. Diez estudios desarrollaron y validaron cuestionarios y los otros estudios construyeron y validaron escalas. La ECV más evaluada fue la enfermedad arterial coronaria.

**Conclusión:** Los instrumentos son estrategias indispensables para medir el nivel de conocimiento, contribuir a apoyar el tratamiento clínico de los pacientes, planificar y evaluar programas y prácticas educativas en salud.

**Palabras clave:** Conocimiento; Enfermedades Cardiovasculares; Factores de Riesgo; Prevención de Enfermedades; Estudio de Validación

# INTRODUCTION

The changes caused by scientific and technological development had an effect on the population's living conditions, which led to an increased life expectancy and the risk of developing Chronic Noncommunicable Diseases (CNCDs). CNCDs are the leading causes of death worldwide, and, in 2016, their estimates were 71% of the 57 million deaths that occurred worldwide. Of which 17.9 million were caused by Cardiovascular Diseases (CVD), representing 44% of all deaths from CNCDs and 31% of total deaths overall[1,2].

The increasing prevalence of CVD is directly related to urbanization and lifestyle changes in society that contribute to the adoption of behavioral risk factors such as smoking, inadequate nutrition, sedentary lifestyle and alcoholism[3,4]. The presence of these risk factors can trigger the development of some diseases such as systemic arterial hypertension, diabetes mellitus, dyslipidemia, obesity and metabolic syndrome, representing high cardiovascular risk for the affected individual[5].

The morbidity and mortality from CVD can be reduced by controlling and preventing risk factors. Health education with the incorporation of health technologies contribute to knowledge, stimulating healthy living practices and empowering individuals in the exercise of their autonomy, becoming a relevant method for public health[6,1].

In this context, evaluation instruments are resources often used in educational programs in the health area, as they enable measuring the effects of the teaching and learning process, in addition to possible changes in attitudes about the disease in question[7].

Thus, the aim of this study was to identify and describe the instruments for assessing knowledge about risk factors and prevention of CVD.

# METHODS

This is an integrative literature review. The construction of this review was based on the following steps: 1) elaboration of the guiding question; 2) search in the literature; 3) categorization of primary studies; 4) evaluation of the studies included in the integrative review; 5) interpretation of the results; 6) analysis and synthesis of the knowledge of the studies[8].

The elaboration of the research guiding question was based on the acronym PICo (participants, phenomenon of interest and context of the study)[9], where "P"- individuals in general; "I"- validated instruments; "Co"- knowledge about risk factors and prevention measures for CVD. Thus, the research was based on the following question: "What are the validated instruments for the evaluation of individuals' knowledge about risk factors and prevention measures for cardiovascular diseases?"

The searches were conducted in May 2019 and updated in July 2020 at the Latin American and Caribbean Health Sciences Literature (LILACS), Medical Literature Analysis and Retrieval System Online (MEDLINE) databases via PubMed and the Scientific Electronic Library Online (SciELO). The articles were surveyed with the following descriptors: knowledge, cardiovascular diseases, risk factors, prevention of diseases and validation studies, indexed in Health Sciences Descriptors (DeCS) and Medical Subject Headings (MeSH). The searches were directed by descriptors combined with Boolean operators (AND and OR), with different strategies in each database, as shown in Chart 1.

**Chart 1. Presentation of the search strategies used in the selection process of the articles. Teresina/PI, Brazil, 2020.**

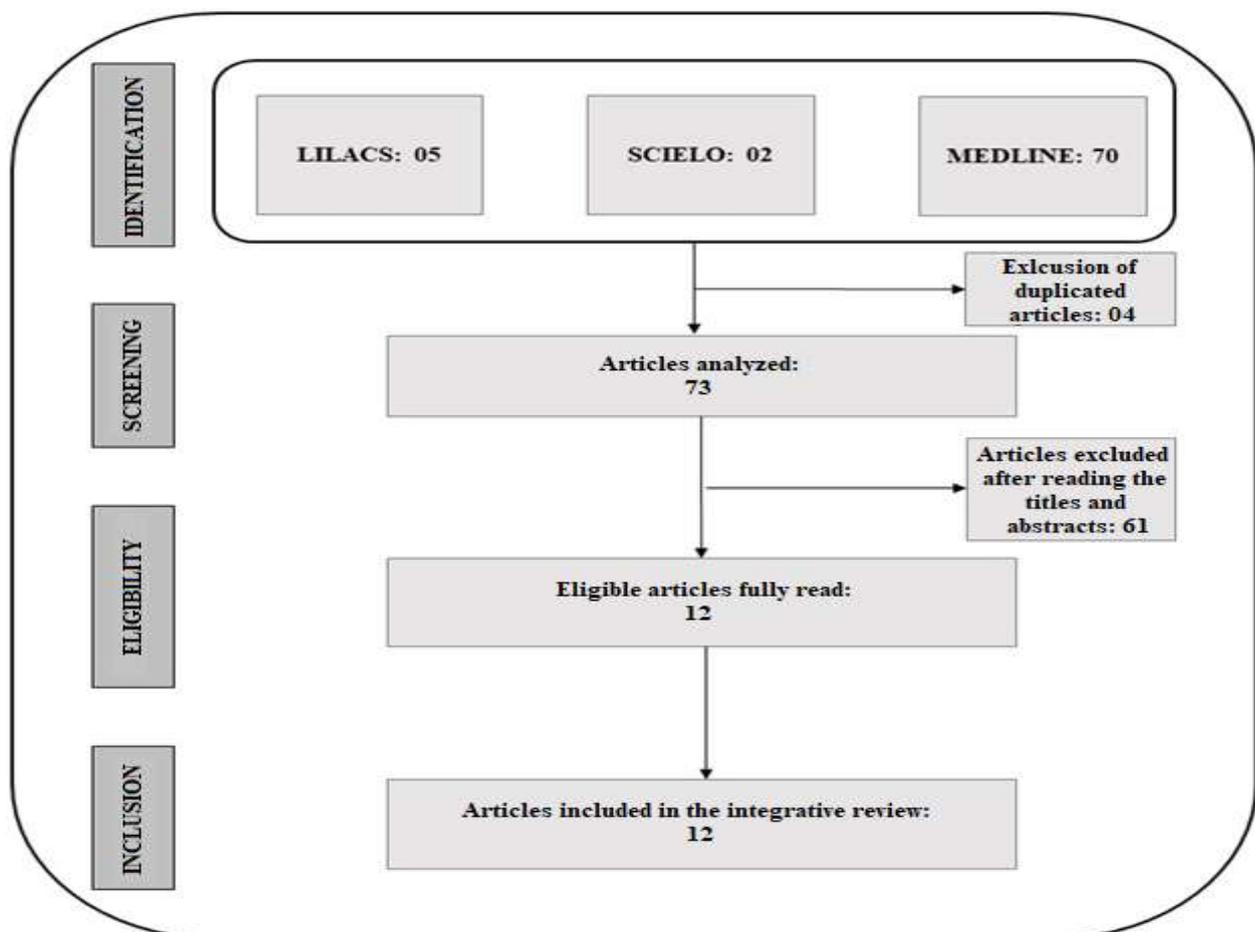| Database | Search strategy |
|---|---|
| LILACS | *knowledge OR "knowledge / evaluation" [Words] AND ("cardiovascular diseases" OR "risk factors") OR "prevention of diseases" [Words] AND "validation studies" [Words]* |
| MEDLINE | *(("Health Knowledge, Attitudes, Practice"[Mesh]) AND "Cardiovascular Diseases"[Mesh]) AND "Validation Studies" [Publication Type]* |
| SciELO | *(knowledge OR knowledge / assessment) AND (cardiovascular disease) AND (validation studies)* |

The sample included instrument validation studies published from 2005 to May 2019, available in the Portuguese, English and Spanish, which answered the guiding question established in this integrative literature review. Review articles, reflection, case study, incomplete texts, theses and dissertations were not included. Duplicate articles were excluded.

To collect data from the articles, an instrument was elaborated, which contains the following items: authors of the article, place/year of the study, objective, type of validation, type of instrument, cardiovascular disease, target audience of the instrument, instrument title, description of the instrument. The information was synthesized and analyzed through a critical and detailed evaluation, seeking to make comparisons and conclusions with the pertinent literature.

# RESULTS

Of the 77 articles initially identified, four were excluded because they were repeated. Thus, titles and/or abstract of 73 articles were read. After this stage, 12 articles were selected for full reading and chosen to form the basis of analysis of this study, according to the sequematic flowchart described in Figure 1.

**Figure 1. Flowchart of the search and selection stages of the analyzed articles. Teresina/PI, Brazil, 2020.**



Source: the authors, 2020.

Regarding the year of publication, there was a higher frequency in 2009[10,11], 2010[12,13] and 2014[7,14]. Seven were performed in Brazil[7,12-17], two in the United States[18,19], two in the United Kingdom[11,20] and one in Turkey[10]. Five[10,11,14,18,20] studies developed and validated instruments to assess knowledge about CVD in general and the other studies focused on the evaluation of a specific CVD, with Coronary Artery Disease (CAD) being the most evaluated pathology[12,13,15,17]. Regarding the type of validation, nine[7,10,11,13,14,16,18,19,20] studies developed the instrument and performed content and construct validation, while three[12,15,17] performed translation, adaptation and validation of instruments to be used in Brazil (Chart 2).

There was a variation in the target audiences of the instruments. Four[12,13,15,17] instruments are intended for patients with CAD, and three[12,13,17] of these are specific to be used in coronary patients in Cardiac Rehabilitation (CR). Three[10,14,20] instruments are applied to healthy individuals, one[14] specific for use in schoolchildren. Four are aimed at people with diabetes[18], Rheumatoid Arthritis (RA)[11], Systemic Arterial Hypertension (SAH)[19], Heart Failure (HF)[7], and one[16] for people with SAH in CR (Chart 2).

**Chart 2. Characterization of studies on knowledge assessment instruments on risk factors and preventive measures for cardiovascular diseases. Teresina/PI, Brazil, 2020.**

| Studies | Author, Year | Country | Type of validation | Disease | Target audience |
|---------|--------------|---------|--------------------|---------|-----------------|
| E1 | Wagner et al., 2005[18] | United States | Content and construct | CVD | People with diabetes |
| E2 | Metintas et al., 2009[10] | Turkey | Content and construct | CVD | Adults |
| E3 | John et al., 2009[11] | United Kingdom | Content and construct | CVD | People with Rheumatoid Arthritis |
| E4 | Ghisi et al., 2010[12] | Brazil | Translation, adaptation and validation of content and construct | CAD | Coronary patients in CR |
| E5 | Ghisi et al., 2010[13] | Brazil | Content and construct | CAD | CAD patients in CR |
| E6 | Schapira et al., 2012[19] | United States | Content and construct | SAH | Patients with SAH |
| E7 | Saffi et al., 2013[15] | Brazil | Translation, cross-cultural adaptation and content and construct validation | CAD | CAD patients |
| E8 | Bonin et al., 2014[7] | Brazil | Content and construct | HF | HF patients in CR |
| E9 | Cecchetto e Pellanda, 2014[14] | Brazil | Content and construct | CVD | Schoolchildren aged 7 to 11 years |
| E10 | Woringer et al., 2017[20] | United Kingdom | Content and construct | CVD | NHS Health Check program participants |
| E11 | Santos et | Brazil | Content and construct | SAH | Hypertensive in |

| | al., 2018[16] | | | | RC program |
|---|---|---|---|---|---|
| E12 | Santos et al., 2019[17] | Brazil | Translation and adaptation | CAD | CAD patients in CR programs |

Source: the authors, 2020. CVD: Cardiovascular Diseases; CAD: Coronary Artery Disease; SAH: Systemic Arterial Hypertension; HF: Heart Failure; CR: Cardiac Rehabilitation.

Ten[7,11-18,20] studies developed and validated questionnaires and the other studies constructed and validated scales[13,19]. The number of items of the instruments ranged from 12 to 31 questions. Regarding the objectives and characteristics of the instruments, six[10,11,14,18,20] sought to evaluate knowledge about CVD in general, further investigating risk factors and lifestyle; three[12,13,17] questionnaires evaluated coronary patients' knowledge about CAD, risk factors and physical exercise; two[16,19] instruments sought to evaluate the knowledge of hypertensive patients about their disease and self-management of hypertension; and one[7] questionnaire sought to evaluate the knowledge of patients with heart failure about this pathology, risk factors and treatment (Chart 3).

**Chart 3. Description of knowledge assessment instruments on risk factors and preventive measures for cardiovascular diseases. Teresina/PI, Brazil, 2020.**

| Studies | Instrument | Number of items | Objective | Characteristics |
|---|---|---|---|---|
| E1 | The Heart Disease Fact Questionnaire (HDFQ)[18] | 25 | To assess knowledge of heart disease risk among people with diabetes. | The risk domains assessed include family history, age, sex, smoking, physical activity, glycemic control, lipids, blood pressure, weight, and whether the person necessarily knows whether heart disease is present. |
| E2 | Cardiovascular Disease Risk Factors Knowledge Level (CARRF-KL)[10] | 28 | To measure adults' level of knowledge about CVD risk factors. | It questions the characteristics of CVD in the first four items, risk factors in 15 items, and the results of adopting a risk-free attitude in nine items. |
| E3 | Heart Disease Fact Questionnaire-Rheumatoid Arthritis (HDFQ-RA)[11] | 26 | To measure the knowledge of heart disease in RA patients. | There are two parallel questionnaires: HDFQ-RA-1 and HDFQ-RA-2; each questionnaire contained 13 questions: eight questions from the original HDFQ on generic CVD risk factors and five on specific CVD risk factors for RA patients. |

| | | | | |
|---|---|---|---|---|
| E4 | Maugerl CaRdiac preventiOn-Questionnaire (MICRO-Q)[12] | 25 | To assess the knowledge of the coronary patient on aspects related to secondary prevention of CAD. | 25 questions covering 4 domains of knowledge: risk factors and lifestyle; diet; pre-hospital admission; and physical exercise. |
| E5 | Coronary Patient Education Questionnaire (CADE-Q)[13] | 19 | To assess the knowledge of coronary patients undergoing cardiac rehabilitation. | The questions were divided into 4 areas of knowledge: A1, related to coronary artery disease; A2, on diagnosis and drugs; A3, on risk factors and lifestyle; and A4, related to physical exercise. |
| E6 | The Hypertension Evaluation Lifestyle and Management knowledge scale (HELM)[19] | 14 | To assess relevant knowledge for self-management of hypertension. | Domains include general knowledge about hypertension, lifestyle and medication management, and blood pressure measurement and treatment goals. |
| E7 | Cardiovascular Risk Factors Questionnaire (Q-FARCS)[15] | 28 | To evaluate the knowledge of patients with CAD about cardiovascular risk factors. | The 28 items are intended to assess general knowledge about cardiovascular risk factors (obesity, cholesterol and blood glucose, physical activity, stress, smoking, eating habits, heredity and blood pressure) in direct relation to CAD progression (Score 1); specific knowledge of these risk factors, except heredity, in direct relation to the patient's own CAD (Score 2); and style changes in life after the event (Score 3). |
| E8 | Disease knowledge questionnaire for heart failure patients[7] | 19 | To evaluate the knowledge of heart failure patients participating in cardiac rehabilitation programs. | The items were divided according to the content proposed in the pathophysiology of the syndrome, concept of the syndrome, risk factors, signs and symptoms, lifestyle, diagnosis, |

| | | | | medication, treatment, self-care and physical exercise. |
|---|---|---|---|---|
| E9 | Questionnaire on knowledge of healthy habits and risk factors for cardiovascular diseases (CARDIOKID)[14] | 12 | To verify children's knowledge about healthy habits and risk factors for cardiovascular diseases. | The instrument consisted of 12 questions about knowledge of healthy habits and risk factors for cardiovascular diseases. |
| E10 | ABCD Risk Questionnaire[20] | 26 | To assess patients' understanding of CVD risk. | It consists of four scales: Knowledge about CVD Risk and Prevention, Perceived Risk of Heart Attack/Stroke, Perceived Benefits and Intention to Change Behavior and Healthy Eating Intentions. |
| E11 | Instrument to assess knowledge about their disease in hypertensive patients participating in CR programs (HIPER-Q)[16] | 17 | To assess the knowledge of patients with SAH in CR programs. | Seven areas of importance for patient education: self-care, treatment, diagnosis, physical exercise, concept and pathophysiology, signs and symptoms and risk factors. |
| E12 | Coronary Patient Education Questionnaire II (CADE-Q II)[17] | 31 | To verify the level of knowledge about CAD of patients participating in CR programs. | CADE-Q II assesses the knowledge of these patients in five theoretical constructs or areas: medical condition, risk factors, physical exercise, nutrition and psychosocial risk, based on official documents, references in the area. |

Source: authors, 2020. CVD: Cardiovascular Diseases; CAD: Coronary Artery Disease; SAH: Systemic Arterial Hypertension; HF: Heart Failure; CR: Cardiac Rehabilitation.

# DISCUSSION

Most of the instruments were questionnaires that addressed cardiovascular risk factors and lifestyle. Four of the instruments analyzed are intended for people diagnosed with CAD and were created to investigate users' knowledge about their disease, medical condition, cardiovascular treatment, risk factors, lifestyle, among others[12,13,15,17].

The considerable number of instruments for people with CAD can be explained by representing one of the most relevant forms of presentation of CVD, which is the main

cause of death in Brazil and worldwide[21]. Based on estimates from the Global Burden of Disease study[22], there was a reduction in mortality from CVD in recent decades in Brazil; however, the same did not occur with its morbidity, which is the reason for the greatest impact on the cost of hospitalizations at the national level[23].

Thus, it is important to control risk factors to reduce CVD, and, in this sense, health professionals should add efforts, with interventions that ensure an improvement in quality of life and control of the incidence of these diseases in the population. Therefore, the applicability of these instruments can support the individualized treatment of patients with CAD, contribute to health education practices, plan, propose and evaluate educational interventions in CR programs and clinical practice[12,13,15,17].

The Heart Disease Fact Questionnaire (HDFQ) proved to be valid and reliable to assess knowledge about the risk of heart disease among people with diabetes, and can be used in the adaptation of health education to meet the users' needs, in research and clinical care[18]. The use of this instrument[18] is relevant, since diabetes mellitus is an important cause of morbidity and mortality worldwide, representing a public health problem. The main cause of death and disability among people with diabetes is CVD, accounting for approximately half of diabetes mortality in most countries[24].

In general, individuals with diabetes have other associated comorbidities, such as obesity, SAH and dyslipidemia that also contribute to increase cardiovascular risk[25], thus, such risk factors are addressed in the questionnaire. Moreover, there are questions about the importance of ceasing tobacco use, performing physical activity and having a healthy diet to reduce the risk of developing heart disease [18].

The evaluation of knowledge about the risk factors associated with diabetes and the importance of control through health promotion measures can contribute to reduce the incidence of the disease and its complications, as well as to reduce the costs generated on the health system[26].

The HDFQ[18] questionnaire was used to develop and validate two other instruments: a scale to measure the level of knowledge of adults about risk factors for CVD (Cardiovascular Disease Risk Factors Knowledge Level-CARRF-KL)[10] and two parallel versions of the Heart Disease Fact Questionnaire-Rheumatoid Arthritis (HDFQ-RA)[11], which measures the knowledge of heart disease in patients with Rheumatoid Arthritis (RA).

CARRF-KL was considered reliable, valid, easy to fill and effective to identify the impact of education programs on the prevention of CVD risk factors and can be applied to high-risk individuals attending primary health care and individuals in the general population[10].

HDFQ-RA also demonstrates reliability and validity. It was developed in response to the clinical need to address the risk of CVD associated with RA and can be applied in clinical and research environments. The use of the two parallel versions are appropriate to evaluate a new educational intervention or the progress of a participant in a health education course[11].

The approach of cardiovascular risk factors in patients with RA is relevant, because the presence of RA increases about 30 to 60% the chance of developing CVD, which is the most important cause of morbidity and mortality in patients with RA[27].

Another disease that represents an important risk factor for CVD is SAH, which is characterized by a multifactorial clinical condition associated with functional, structural and metabolic alterations, with consequent association with fatal and non-fatal cardiovascular events, such as sudden death, cerebrovascular accident, acute myocardial infarction, heart failure, peripheral arterial disease and chronic kidney disease[28].

Two of the studies analyzed developed and validated instruments to assess knowledge about SAH in hypertensive people. In the study by Schapira et al. (2012)[19], the Hypertension Evaluation Lifestyle and Management Knowledge Scale was developed and validated in order to be used to evaluate studies of effectiveness of interventions to improve the treatment of chronic diseases. The Instrument to assess knowledge about their disease in hypertensive patients participating in CR programs (HIPER-Q)[16] is a valid, useful and easy-to-understand questionnaire that allows establishing educational strategies aimed at the patients' real needs. It assists health professionals in the evaluation and planning of health education practices for hypertensive patients in CR programs, aiming at controlling the disease and reducing cardiovascular comorbidities[16].

Another instrument that was developed and validated to be applied to patients in CR programs was the Knowledge Questionnaire for Patients with Heart Failure, which seeks to evaluate patients' knowledge about the subjects that the CR program encompasses in its educational process, such as basic information on the pathophysiology of their disease, relationship of the disease with physical exercise, mechanisms of action of drugs and reformulation of life habits[7].

The analysis of the studies presented revealed the importance of applying specific instruments to measure the patient's knowledge about his/her pathology, considering that patients' inadequate understanding about their disease and risk factors can cause emotional changes, non-adherence to treatment and disease progression[7].

Thus, using instruments to assess knowledge about CVD allows pointing out the needs of individuals and intensifying health prevention, control and education programs on risk factors associated with the disease, contributing to the dissemination of knowledge, behavior change and reduction of the burden of morbidity and mortality from CVD[29].

Two of the twelve instruments analyzed are intended to audiences who do not have any diagnosis of CVD and aim to prevent the occurrence of these diseases[16,20].
One of these questionnaires was constructed and validated with the objective of verifying the knowledge of students aged seven to 11 years about healthy habits and risk factors for CVD (CARDIOKID), which is brief and easily applicable, and may contribute to the elaboration of preventive strategies and evaluation of the effectiveness of intervention programs[14].

The use of these instruments for children and adolescents is relevant since the determination of risk factors for CVD may start in childhood, as a result of lifestyle and

personal habits that are learned and initiated at this stage of life, influencing the onset of these diseases[30]. Therefore, it is important to measure the knowledge of this population about the determinants that influence the development of CVD to allow the development of early effective disease prevention measures.

The ABCD Risk Questionnaire[20] was developed and validated to assess the accuracy of perceived risk and general knowledge of CVD and the intention to change behavior in relation to diet and exercise among participants of the cardiovascular preventive program of the National Health Service Health Check. This program aims to asses and manage the risk for CVD in England and aims to increase knowledge about cardiovascular risks among adults at high risk for CVD. The application of this questionnaire helps determine whether the program is effective to enable users to make informed choices about their lifestyle and health[20].

The analysis of the studies showed that the use of these instruments are indispensable strategies to measure the level of knowledge of individuals, direct interventions to the needs detected, support the clinical treatment of patients, plan and evaluate the effectiveness of health educational programs and actions.

# CONCLUSION

The integrative review allowed identifying validated instruments available in the literature that assess knowledge about risk factors and prevention of CVD. Most instruments are intended to evaluate the knowledge of individuals diagnosed with some CVD, emphasizing the evaluation of patients' knowledge about the management of their disease, risk factors and the behavior changes necessary to prevent the progression of cardiovascular problems.

There is a need to develop validation studies of instruments aimed primarily at populations that have not yet been diagnosed with these diseases, especially for children and adolescents, aiming to evaluate health programs and technologies that are developed to promote cardiovascular health education.

These findings show that the development and use of these knowledge assessment instruments can contribute to preventing and reducing risk factors and morbidity and mortality from CVD in the population.

A limitation of this study is the absence of a detailed description of the items that make up the instruments in some studies, hindering in-depth investigations of the main risk factors and disease prevention measures that are being evaluated. Even with this limitation, this study describes the instruments for evaluating knowledge on risk factors and prevention of cardiovascular diseases validated with publication carried out between 2005 and 2019, contributing to consolidating the information on the subject.

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