Validation of the Short-Version of Rose Angina Questionnaire in Brazil

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Abstract

Background: Stable angina pectoris is a serious condition with few epidemiological studies in Brazil.

Objective: To validate the short-version of the Rose angina questionnaire in Brazilian Portuguese for its implementation in surveys and longitudinal studies.

Methods: A total of 116 consecutive patients from an outpatient clinic without prior myocardial infarction and/or coronary revascularization were enrolled for application of three questions of the Rose angina questionnaire addressing chest pain after exertion. We used the treadmill test as the gold standard with the Ellestad protocol.

Results: The short-version of the Rose angina questionnaire of the 116 subjects submitted to the exercise treadmill test disclosed 89.7% of accuracy, 25% of sensitivity, 92.0% of specificity, 10.0% of positive predictive value, 97.2% of negative predictive value, and 3.1 of positive likelihood ratio and 0.82 of negative likelihood ratio.

Conclusion: The Portuguese version with three items of the Rose angina questionnaire is suitable for epidemiological purposes. (Arq Bras Cardiol 2012;99(5):1056-1059)

Keywords: Questionnaires; angina pectoris / epidemiology; cardiovascular diseases; coronary artery disease.

Introduction

The estimation of prevalence and incidence of angina pectoris has been a challenge for cardiovascular epidemiology. Epidemiological studies addressing temporal trends and international comparison of mortality death rates are a relevant and low-cost tool for estimation of the burden of Coronary Heart Disease (CHD), such as sudden death and myocardial infarction[1]. However, these descriptions of death rates do not permit to measure one pivotal point of the broad spectrum of CHD: stable angina pectoris. Nowadays, there are some instruments to quantify angina pectoris as primary-care medical records; frequency of prescription of nitrates; self-report of current or ever-experienced angina, and the "Rose Angina Questionnaire"[2]. In 1962, Geoffrey A. Rose (*1926-†1993), a British physician and professor of epidemiology developed a new tool for surveys and epidemiological studies –but not for clinical use–: one test with seven questions including the diagram of a male thorax. It allowed estimating the prevalence of stable angina pectoris. For validation, he compared the answers from volunteers with a clinical evaluation of two senior cardiologists as the gold standard (reference test). Later, this questionnaire was recommended by the World Health Organization (WHO) as a general instrument for the determination of angina prevalence, and since then it has been known as "WHO-Rose Angina Questionnaire"[3].

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Until the year 2005, the application of the Rose questionnaire was identified in 74 studies of 13,331 angina cases in women and 11,511 cases in men from 31 countries. Angina prevalence varied widely across these different settings from 0.73% to 14.4% in women and from 0.76% to 15.1% in men[4]. In Brazil, the full version of the Rose questionnaire was applied in Pelotas, Rio Grande do Sul to 1680 individuals older than 40 years showing a prevalence of angina of 8.2%[5].

In 2003, Lawlor et al.[6] proposed a short-version of the WHO-Rose angina questionnaire that focused on only three questions dealing with chest pain after exertion. They compared the two questionnaires in women using as the gold standard data from a primary care consultation for angina symptoms within the past five years. The short-questionnaire was more sensitive (from 33% to 51.8%) and slightly less specific (from 93.8% to 89.4%) than the original version of the Rose questionnaire. They concluded that applying the three-item Rose angina questionnaire can be suitable for epidemiological studies[6]. More recently, the SMART study in Netherlands, a 4.6-year follow-up of 7,916 consecutive patients with clinically diagnosed disease or cardiovascular risk factors, compared the standard Rose questionnaire and its short-version. Discriminatory ability of both approaches for coronary events was assessed with areas under the receiver-operator characteristics (ROC) curves with similar range (0.708-0.726)[7]. During a 23-year evaluation, in a cohort of 30,000 middle-aged apparently healthy Norwegians, the three-item Rose questionnaire identified unknown CHD at baseline with hazard ratios to predict acute coronary syndrome that were similar to increase in total cholesterol and systolic blood pressure levels[8].

The aim of this study is to validate of the Portuguese short-version of "WHO Rose angina questionnaire" in a sample using the exercise treadmill test as the gold standard for future application in surveys and cohort studies as in the ongoing Brazilian Longitudinal Study of Adult Health (ELSA-Brazil)[9].

Methods

A total of 126 consecutive patients from an outpatient clinic in the city of Sao Paulo, aged 40-74 years with an indication for a treadmill test were invited to participate in the study. Exclusion criteria were self-report of ever-experienced angina, hospitalization due to acute coronary syndrome and refusal to participate. As the researchers did not interfere in the selection of subjects treated at an academic community-based hospital, we expected a good external validity of the results. The sample included patients with different probabilities of having angina; the number of participants was calculated considering an expected sensitivity of 30%, a total width of 0.30 and a 95% confidence interval; number of participants of the sample was calculated considering an expected sensitivity of 30%, a total width of 0.30 and a 95% confidence interval; considering these parameters, a sample size of 72 patients was estimated[10].

The short version of "WHO Rose Angina Questionnaire" was applied with the first three questions of the original version[4] translated and adapted to Brazilian Portuguese for use in the Brazilian Longitudinal Study of Adult Health (ELSA-Brasil)[9]. Angina was positive when the answer was positive for the question: *"Do you ever have any pain or discomfort in your chest?"* and when the answer was affirmative for one of the following questions: *"Do you get it when you walk at an ordinary pace on the level?"* or "*Do you get it when you walk up hill or hurry?"*

All participants were submitted to an exercise treadmill testing performed with the use of the Ellestad protocol[10]. The test was considered as acceptable if the subject achieved 85% of the age-predicted maximum heart rate and it was positive for ischemia when there was horizontal ST segment depression, measured on Y point, ≥1.0mm in men e 1.5 mm in women, or descendent, measured on J point, ≥1.0mm in men and 1.5 mm in women, or slow ascending, measured at the Y point, ≥ 1.5 mm in men e ≥ 2.0 mm in women.

Sensitivity, specificity, positive and negative predictive values, positive and negative likelihood ratios and accuracy of the short form of the WHO Rose angina questionnaire were calculated using the exercise treadmill test as the gold standard for angina pectoris in a 2x2 table.

The study was approved by the Institutional Boarding Committee, and all participants agreed to participate and signed the informed consent.

Results

Among the 126 subjects with a mean age of 53.6 (standard deviation ±7.0) years submitted to treadmill test, 116 (92.1%) presented a conclusive test. Men were 57% of the sample. One third of the sample had a 10-year risk of CHD higher than 10% by the Framingham Score Risk. Mean time between angina questionnaire and exercise treadmill test was 42.2 (standard deviation ±38.8) days. Ten people (8.6%) answered the questionnaire positively for the presence of angina, and four subjects (3.4%) had ischemia detected at the treadmill test. Table 1 shows that the angina questionnaire of the 116 subjects submitted to exercise treadmill test disclosing 89.7% of accuracy (95% CI, 84.2% - 95.2%), 25% of sensitivity (95% CI, 17.2%-32.8%), 92.0% of specificity (95% CI, 88.1%-95,.9%), 10.0% of positive predictive value , 97.2% (95% CI, 94.2% - 100%) of negative predictive value (95% CI, 96.9% - 97.5%), 3.1 of positive likelihood ratio (95% CI, 2.1 - 16.6) and 0.82 of negative likelihood ratio (95% CI, 0.75 – 4.43).

Discussion

This study evaluated the validity of "WHO Rose angina questionnaire" for the diagnosis of coronary heart disease for individuals without clinically apparent cardiovascular disease. Our findings, the sensitivity of 25% and specificity of 92% is very similar to previous data reported by Lawlor et al. with a female population[6]. There were differences between these two studies related to sampling and reference test. Our sample is younger, and it consisted of individuals of both genders. We used the treadmill test as reference and they considered the medical records within the last five-years as the gold standard. However, in this validation, WHO Rose angina questionnaire showed high specificity and low sensitivity, as expected for a questionnaire used in epidemiologic research.

Every time a questionnaire is applied to a large sample, the objective is to decrease costs and safety concerns. It is impracticable to refer thousands of participants to cardiologist

Table 1 - Sensitivity, specificity, accuracy, positive and negative predictive value, positive and negative likelihood ratio of angina questionnaire by ischemia during exercise treadmill testing in 116 subjects

		Exercise Treadmill Testing		
		Positive	Negative	Total
Rose Questionnaire	Positive	1	9	10
	Negative	3	103	106
	total	4	112	116

Note: sensitivity 25.0% (95% CI, 17.2%-32.8%), specificity 92.0% (95% CI, 88.1%-95.9%), accuracy 89.7% (95% CI, 84.2% - 95.2%), positive predictive value 10.0% (95% CI, 94.2% - 100%) negative predictive value 97.2% (95% CI, 96.9% - 97.5%), positive likelihood ratio 3.3 (95% CI, 2.1 - 16.6), negative likelihood ratio 0.82 (95% CI, 0.75 – 4.43).

assessment and scintigraphy. Based on this assumption, the prevalence of disease in the population sampled and the gold standard used are the critical points for evaluation of a questionnaire for epidemiological purposes. It is appropriate to emphasize that both physicians and epidemiologists need an accurate disease definition; however they are addressing different goals with individuals, and population, respectively. Physicians work with a great variety of symptoms for the same disease, and they use broad definitions of diseases that try to cover all clinical presentations. Epidemiologists use a more restricted definition of diseases, as they want to compare their results with data obtained in different places and periods. Thus, physicians try to work with highly sensitive definitions of disease and epidemiologists try to work with more specific definitions. This explains why questionnaires used in epidemiological studies often have high specificity and low sensitivity[2]. We chose a relatively homogenous population that consisted of patients who had not had confirmed CHD - previous myocardial infarction and/or coronary revascularization - and apparently healthy volunteers.

Our study was the first in Brazil that used the short version of Rose angina questionnaire, the same that has been applied in the Brazilian Longitudinal Study of Adult Health (ELSA-Brasil)[9]. It can be used to evaluate prevalence in surveys and for incidence of angina in longitudinal studies[2].

Conclusion

A short-version of the "WHO-Rose Angina Questionnaire" with three questions about chest pain after exertion can be applied in epidemiological studies.

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