Comparison of laboratory-based and non-laboratory-based WHO cardiovascular disease risk charts: a population-based study

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Abstract:

Background

Determining the risk of Cardiovascular Disease (CVD) is a necessity for timely preventive interventions in high-risk groups. However, laboratory testing may be impractical in countries with limited resources. This study aimed at comparison and assessment of the agreement between laboratory-based and non-laboratory-based WHO risk charts models.

Methods

This study was performed using the baseline data of 8138 participants in the pars cohort study who had no history of CVD and stroke. The updated 2019 WHO model was used to determine the 10-year fatal and non-fatal CVD risks. In general, there are two types of new WHO risk prediction models for CVD. The scores were determined based on age, sex, smoking status, diabetes, Systolic Blood Pressure (SBP), and total cholesterol for the laboratory-based model and age, sex, smoking status, SBP, and Body Mass Index (BMI) for the non-laboratory-based model. The agreement of these two models was determined via kappa statistics for the classified risk (low: $< 10\%$, moderate: $10 - < 20\%$, high: $\geq 20\%$). Correlation coefficients (r) and scatter plots was used for correlation between scores.

Results

The results revealed very strong correlation coefficients for all sex and age groups ($r = 0.84$ for males < 60 years old, 0.93 for males ≥ 60 years old, 0.85 for females < 60 years old, and 0.88 for females ≥ 60 years old). In the laboratory-based model, low, moderate, and high risks were 76.10%, 18.17%, and 5.73%, respectively. These measures were respectively obtained as 77.00%, 18.08%, and 4.92% in the non-laboratory-based model. Based on risk classification, the agreement was substantial for males < 60 years old and for both males and females aged ≥ 60 years (kappa values: 0.79 for males < 60 years old, 0.65 for males ≥ 60 years old, and 0.66 for females ≥ 60 years old) and moderate for females < 60 years old (kappa = 0.46).

ConclusionsThe non-laboratory-based risk prediction model, which is simple, inexpensive, and non-invasive, classifies individuals almost identically to the laboratory-based model. Therefore, in countries with limited resources, these two models can be used interchangeably.

Keywords: Agreement; Cardiovascular diseases; Iran; Risk assessment; WHO risk chart.