Accuracy of 10 Year-Risk Estimation for Cardiovascular Events from Thai CV Risk Score in Lansaka Patients

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Background: Cardiovascular diseases (CVDs) are the number one causes of death globally. Most CVDs can be prevented by modifying life style to avoid risk factors. Therefore, it is essential to have a model that can predict CVDs’ risk of individual. Thai CV Risk Score has been developed based on findings from The Electricity Generating Authority of Thailand (EGAT) study. The model is derived from the 1st EGAT cohort comprising from 3,499 EGAT’s employees in Bangkok in 1985. The model is adjusted and validated using 2nd and 3rd EGAT cohorts comprising 2,999 and 2,584 samples from northwestern and central areas of Thailand, respectively. However, we do not know how well the score predicts the CVDs risk for people from other parts of the country. Today, it is convenient to gather a large set of patients’ medical records from hospitals. Since characteristics of this large dataset are deviated from traditional cohort, suitable methods to apply it in medical research need to be developed. This work is our 1st step to use big data in the development of CVDs Risk Score in Thailand.

Objective: To determine the accuracy of 10 year-risk estimation for cardiovascular events from Thai CV risk score.

Methods: This work studied the use of the Thai CV Risk Score on patients at Lansaka Hospital. The dataset contained records of 1,025 patients (319 male, 35-70 years) with no CVDs event prior to 2008. We calculated 10-years CVDs risk of all patients in 2008 and observed their actual CVD event from 2008 - 2017. CVDs event was defined as a composite of fatal and non-fatal myocardial infarction or stroke.

Results: The score indicated chances of having CVDs event in 10-year time. The score below 0.1, between 0.1 and 0.2, and more than 0.2 were interpreted as low, medium, and high risks, respectively. Therefore, we grouped Lansaka’s patients into 3 groups based on their predicted risk level and calculated actual risk for each group from CVDs events found between 2008 and 2017. In low risk group, on average, the risk score slightly underestimated the actual risk by 0.0068, a negligible error margin. However, in both medium and high risk groups, the score, on average, overestimated the actual risk by 0.037 and 0.088, respectively.

Conclusion: Thai CV Risk Score works well for people with low CVDs risk, including southern population and patients in hospital. However, score tends to overestimate medium and high risks and the error goes up as the risk increases. This is not a big problem for general public as it only makes people be more careful about lifestyle. The doctor should be careful when using the score with other factors to make treatment decision.

Keywords: CV risk score, Lansaka patients, Accuracy