Abstract

Introduction: Carotid artery Intima Media Thickness (CIMT) is an important biomarker for assessing coronary heart disease (CHD) risk. Despite its importance, the application of CIMT in South Asian populations, remains under-explored. In this study, a systematic review and meta-analysis of global literature on CIMT to clarify its demographic and regional variation was conducted and CIMT values were assessed in a specific Sri Lankan cohort.

Methods: Phase 1 involved a systematic review and meta-analysis conducted according to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines and the Meta-analysis of Observational Studies in Epidemiology (MOOSE) criteria. A comprehensive search for relevant studies was performed to evaluate the global applicability of CIMT as a prognostic tool for CHD risk. Phase 2 comprised a comparative study conducted from November 2019 to October 2020 at Nawaloka Hospital PLC in Colombo. This phase examined two cohorts of participants aged 40-74 years: those with coronary heart disease (CHD) (n=338) and those without (non-CHD) (n=356). Data collection included socio-demographic information, anthropometric measurements, clinical evaluations, biochemical analyses, and CIMT assessments. The original Framingham Risk Scores-(oFRS) and recalibrated Framingham Risk Scores- (rFRS) were calculated for the non-CHD group.

Results: There were significant differences in mean CIMT between the CHD and non-CHD cohorts, with notable variations across WHO regions. After adjusting for age, region, and ultrasound equipment, the CHD group exhibited a significantly thicker mean-CIMT. Segment-specific CIMT variations were also observed. A total of 694 participants (male n=399, 57.5%) were enrolled, with a mean age of 60.2 (±9.86) years. The composite mean CIMT for the CHD group was significantly greater than that of the non-CHD group. Statistical evaluations indicated disparities in participant distribution across 10-year CHD-risk categories based on both oFRS and rFRS, with rFRS model classifying individuals in less risk categories as compared to oFRS.

Conclusions: CIMT measurements are influenced by regional, age, sex and disease-specific factors. CIMT was higher in subjects having CHD as compared to the control group. CIMT increased with groups with increased CHD risk. The rFRS model consistently classified subjects in lower risk categories as compared to oFRS.

Key words: CIMT, WHO regions, composite CIMT score, Framingham Risk Scores, Recalibrated Framingham Risk Scores