ABSTRACT

Cardio Metabolic Risk is a construct that comprises a cluster of risk factors that are good indicators of a patient's overall risk for developing Cardio Metabolic Disease such as Diabetes mellitus, cardio vascular disease (CVD), cerebro vascular disease (CVD) including myocardial infarction (MI) and stroke, respiratory disease and renal disease. Due to the complex nature of its construct and the multitude of established and postulated risk entities of CMR, ranging from hypertension, dyslipidemia, Diabetes mellitus , obesity to inflammatory markers , mediators of inflammation, hormonal imbalance and sleep pathologies, CMR exerts its influences on a plethora of disease conditions and disease indicators. The CMR related lifestyle practices broadly comprise of dietary intake, physical activity, alcohol consumption, tobacco smoking and sleep.

Present study was executed with the objective to assess the prevalence of selected CMR indicators, CMR related lifestyle practices and to describe the social and environmental correlates in an adult population aged 35 to 64 years in Colombo Municipal Council (CMC) area. Colombo Municipal Council is the most urbanized and industrialized metropolis in Sri Lanka with an ethnically, economically culturally diverse population. The study consisted of 3 components. Component 1 consisted of adaptation and validation of the **CA**rdiometabolic **R**isk **R**eduction **S**outh Asia (CARRS) questionnaire developed by the All India Institute of Medical Sciences,India to the Sri Lankan socio cultural context. Following the translation of the questionnaire to Sinhala and Tamil languages by a panel of experts and linguists, the questionnaire was validated through a meticulous Modified Delphi Technique. Component 2 consisted implementing a cross sectional analytical study in the CMC. A sample of 1350 men and women were selected by a multi staged cluster sampling method where a Grama Niladhari Division within the CMC was considered a cluster. Forty five clusters spreading across CMC consisting 30 participants were utilized for data collection to describe the CMR

related lifestyle practices for assessment of diet, physical activity, tobacco smoking, and alcohol consumption and sleep utilizing the Modified CARRS questionnaire. Estimation of the prevalence of selected CMR indicators, namely, hypertension, Diabetes mellitus, dyslipidemia was carried out by bio physical measurements and bio chemical testing. The social and environmental correlates of CMR related lifestyle and CMR indicators were assessed and presented with bivariate and multivariable analysis. Component 3 consisted a Geographical Information System (GIS) mapping where geospatial clustering of CMC was carried out following a software based weighting process. Geospatial clusters were risk ranked for CMR and Grama Niladhari Divisions were named through the geospatial analysis utilizing Arc GIS software.

The estimated prevalence of CMR indicators among adults aged 35-65 years in the CMC are: hypertension 32.5% (95% CI, 29.7- 33.9), Diabetes mellitus 17% (95% CI, 14.5-19.4), dyslipidemia 49.2% (95%CI 45.7-52.8) and obesity 58.9% (95% CI, 56.1-61.6). Estimated prevalence of CMR related lifestyle practices were: consumption of suboptimal diet 52.9% (95% CI, 50.0-55.5), no or low physical activity 33.4% (95% CI 30.9-36.0), current use of alcohol 35.6 % (95% CI, 33.3- 38.6) current tobacco smoking 27.4% (95%, 25.0- 29.9) and suboptimal sleep 19.4% (95% CI 17.2-21.5).

The association of CMR related indicators with their social and environmental correlates were: **for hypertension-** being 50-64 years of age ($p<0.001$), being currently unemployed ($p<0.05$); **for diabetes mellitus** :being female ($p<0.05$), being non-Sinhala ($p<0.05$)) and being currently unemployed ($p<0.05$): **for dyslipidemia**: being female ($p<0.05$) , being currently unemployed ($p<0.01$), unsatisfactory domestic wealth ($p<0.05$); **for obesity**- female sex ($p<0.001$) and being non Sinhala ($p<0.05$), and monthly household income less than SLR 20 000 ($p<0.001$).

The association of CMR related lifestyle practices with their social and environmental correlates were: **for consumption of sub optimal diet** : female sex ($p<0.001$), non-Sinhalese ($p<0.001$), education level of primary education or lower ($p<0.01$), household income less than SLR 20 000 ($p <0.01$) , **for no or low physical activity**: being aged 50-64 years ($p<0.001$)and female sex ($p<0.001$), **for current users of alcohol:** male sex ($p<0.001$), being Sinhalese ($p< 0.001$),being currently unemployed ($p<0.001$), level of education of primary education or lower ($p<0.001$), unsatisfactory domestic wealth ($p<0.001$), **for current smoker-** male sex ($p<0.001$), being Sinhala ($p<0.001$), currently unemployed($p<0.001$), unsatisfactory domestic wealth ($p<0.001$): **for suboptimal sleep** :unsatisfactory domestic wealth ($p<0.05$).

Multivariable analysis done to statistically model the association of CMR indicators with CMR related lifestyle practices and social and environmental correlates revealed the following association. **For hypertension** :male sex (AOR= 1.7; 95% CI, 1.2-2.4; $p< 0.001$), being aged 50-64 years (AOR= 1.6; 95% CI, 1.3-2.1; $p<0.001$), being current smoker (AOR= 1.7; 95% CI, 1.1-2.4; $p<0.01$); **for Diabetes mellitus**: being aged 50-64 years (AOR=1.8; 95%CI, 1.2-2.6; $p<0.001$); **for dyslipidemia:** satisfactory domestic wealth(AOR= 1.5; 95%CI, 1.1-1.9; $p<0.05$), ;being currently unemployed (AOR= 0.5; 95%CI, 0.4-0.8 $p<0.001$);being current smoker (AOR= 1.4; 95% CI, 95%; $p<0.001$); **for obesity**: female sex(AOR= 0.5; 95% CI, 0.4-0.7; $p<0.05$); being current user of alcohol (AOR= 2.0; 95%CI, 1.4-2.6; $p<0.001$); inadequate physical activity (AOR= 1.1; 95% CI, 1.1-1.7;$p<0.05$);monthly household income less than SLR 20 000 (AOR= 1.7; 95%CI, 1.3-2.3; $p<0.001$) were found to be significantly associated when controlled for other factors in the respective models.

The geo spatial analysis did not reveal convergence of CMR related lifestyle, CMR indicators and their social and environmental correlates in uni direction in all geospatial clusters, it identified a risk ranking for the geo spatial clusters and real time geographic clusters for each

risk domain for public health action. The clustering of CMR risk in industrialized and underserved locations were the relatively poor and populations live was observed.

The modifiable CMR related lifestyle practices need addressing and considering the high prevalence of CMR indicators, urgent public health action is recommended beginning with the identified high risk locations.