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## Original Article

# Cardiovascular risk reduction intervention among school-students in Kolkata, West Bengal – The CRRIS study protocol



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## ABSTRACT

**Background:** Increasing burden of cardiovascular risk-factors among adolescent school-children is a major concern in India. Dearth of information regarding the burden of these factors and the efficacy of educational intervention in minimizing them among urban school-students of India called for a school-based, educational intervention involving a representative sample of these students and their caregivers.

**Methodology:** Using a randomized-controlled design with stratified-random sampling, 1000 students (approximately 50/school) of 9th grade from 20 randomly selected schools (representing all socio-economic classes and school-types) and their caregivers (preferably mothers) will be recruited. Objectives of the study will include: estimation of the baseline burden and post-interventional change in cardiovascular risk-factors, related knowledge, perception and practice among participants in Kolkata.

**Data collection:** After obtaining appropriate consent (assent for adolescents), collection of the questionnaire-based data (regarding cardiovascular disease/risk-factor related knowledge, perception, practice), anthropometric measurements, stress assessment and cardiological check-up (pulse and blood pressure measurement along with auscultation for any abnormal heart sounds) will be conducted for each participating students twice at an interval of six months. In between 6 educational sessions will be administered in 10 of the 20 schools randomized to the intervention arm. After the follow-up data collection, same sessions will be conducted in the non-interventional schools.

**Data analyses and deliverable:** Descriptive and inferential analyses (using SAS 9.3) will be conducted to determine the distribution of the risk-factors and efficacy of the intervention

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in minimizing them so that policy-making can be guided appropriately to keep the adolescents healthy in their future life.

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## 1. Introduction

In the era of rapid epidemiological transition,<sup>1,2</sup> alike the global scenario, in India, proportional burden of non-communicable diseases (NCDs) is gradually overtaking the infectious diseases.<sup>1–4</sup> Being one of the principal contributors to these NCDs, cardiovascular diseases are among the leading causes of mortality and morbidities in both urban and rural areas of this country.<sup>5</sup>

Contextual scientific evidences from previous studies identified smoking, obesity, high blood pressure, high cholesterol, diabetes, low consumption of fruits and vegetables, sedentary lifestyles and stress as risk factors for cardiovascular diseases. Although the problems were more severe in urban areas, burden of these risk factors along with the relevant knowledge, perception, awareness and practice were understudied especially among urban adolescents of India.<sup>5</sup>

Recent studies in India revealed an alarming trend of sustained blood pressure elevation among Indian children and adolescents.<sup>6,7</sup> High burden of cardiovascular risk factors and inadequate knowledge regarding them were also evident in this population.<sup>8</sup> During 2006–2008, a multi-centric study also revealed considerably high burdens of obesity (5.3%) and overweight (18.5%) among 8–18 years old school children in India.<sup>9</sup>

Prior research has shown that prevalence of obesity among adolescent urban Indian can be minimized by early initiation of dietary and lifestyle modifications<sup>10</sup> along with measures to prevent other risk factors through development of knowledge and awareness.<sup>8</sup> For most children, atherosclerotic vascular changes are minor and can be minimized or even prevented with adherence to a healthy lifestyle. Thus, intervention must be implemented early enough in life to prevent or delay the onset of atherosclerosis and its clinical manifestations to decrease the risk of coronary artery disease in later life.

But unfortunately unlike developed countries, efforts to educate and motivate the adolescents to acquire healthy habits and avoid harmful exposures are nowadays scanty in India. Hence, armed with the knowledge that cardiovascular risk factors and atherosclerosis are likely to initiate their telling effects during adolescence, a change in the paradigm to initiate early diagnosis, treatment and prevention seemed to be the need of the hour.

## 2. Rationale

Dearth of information on the burden of socio-demographic and behavioral risk factors of cardiovascular diseases along with awareness regarding them among adolescent school-children was evident in urban India. The extent to which

improvement of the relevant knowledge, perception and awareness could be translated into healthy practice was also unclear. Together they called for a baseline estimation of the problems and evaluation of the efficacy of an educational intervention in solving the issues.

To address these, a multi-component, school-based, randomized controlled, educational intervention study with baseline estimation of the burden of cardiovascular risk, related knowledge, perception, awareness and practice among adolescent school-children of Kolkata has been contemplated to minimize the risk factors and improve related knowledge, perception, awareness and practice among them.

### Objectives

1. To estimate the burden of demographic, socio-economic, cultural, and behavioral risk factors among adolescent school-goers in urban India.
2. To estimate, the burden of diagnosed cardiovascular diseases among adolescent school-goers in urban India.
3. To assess the knowledge, perception, awareness and practice of adolescent school-goers and their caregivers in urban India regarding cardiovascular risk factors.
4. To measure the efficacy of a school-based multi-component educational interventional program in reducing the burden of these cardiovascular risk factors among urban adolescent school-children in India along with improving their (including parental) knowledge, perception, awareness and practice regarding these risk factors.

## 3. Material and methods

### 3.1. Study design

A Randomized Controlled Multi-component Educational Intervention Study spanning for one year has been planned to be conducted by Cardiological Society of India, West Bengal Branch and co-ordinated by Mission Arogya Health and Information Technology Research Foundation, Kolkata.

### 3.2. Study area

Kolkata, West Bengal.

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