<25. 32.14% belonged to age group of 25–35 and 64.2% belonged to age group of 35–45.
53.5% were from rural areas and 56.5% cases were from urban area. In rural group 83.3% patients consumed tobacco and 48.1% consumed tobacco in urban group. 33.3% patients were alcoholic among rural group and 66.6% in urban group. 27% patients were hypertensive among rural group and 72.72% among urban group. 25% patients were diabetic among rural groups and 75% among urban group. 30% patients were obese among rural group and 69.23% among urban group. 36% patients had dyslipidemia among rural group and 52.63% patients among urban.
Conclusion: Family history of coronary artery disease, hypertension, diabetes mellitus, obesity, alcohol consumption, elevated lipoprotein a, and sedentary life style was more common in urban group than rural. Tobacco consumption and hyperhomocysteinemia was more common in rural group as compared to urban. Dyslipidemia was common both in urban and rural groups. Total serum cholesterol and LDL cholesterol was higher in urban group, elevated triglycerides and low HDL was higher in rural group.
Accurate determination of the risk factors for CAD in rural and urban populations will thus enable planning of population-based screening and intervention strategies for the prevention of CAD in rural and urban India. The risk factors are modifiable and can be corrected by changing the life styles therefore screening for these risk factors should be mandatory.

Cardiovascular health awareness among school-aged children in a rural district of India

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Background: India is the second most populous country in the world and two-thirds of its population is less than 35 years old. This survey was conducted to assess the level of health awareness about cardiovascular disease (CVD) in adolescent school-aged children 14–16 years old, with the goal of establishing school-based health education and development of heart-healthy lifestyle practices.
Methods: A school-based survey was conducted in the rural district of West Midnapore, India between June and July of 2014. This involved a pre-evaluation of CVD health awareness, a short presentation on CVD, and a post-evaluation of CVD health awareness.
Results: A total of 2995 students (48% response rate) from 20 schools participated in the survey. The mean age of the students in the study sample was 14.7 years, 46% were male, 53% were in the 9th grade, and the rest were in 10th grade. After assessing students' awareness in six domains with 20 multiple-choice questions with a maximum score of 100, the mean pre-test score was 41.1 (SD ± 10.5) and the mean post-test score was 48.1 (SD ± 16.9) ($p < 0.001$).
Conclusions: Awareness of CVD and its risk factors was far from optimal among the adolescent school-aged children in this study. A school-based educational program may help improve awareness of CVD and reduce the future disease burden in this community. The results of this study may be useful in formulating a nationwide school health program to deal with the emerging epidemic of CVD in countries such as India.

Vascular stiffness in both men and women with more than 3 risk factors from urban, semi-urban and rural areas of South India

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Background: With increasing acute vascular events involving vital organs at premature age in India, a part of South East Asia is a matter of concern since the incidence of ACS, stroke and PVD were 15%, 0.2% and 10% respectively. WHO repeatedly emphasize the use of biomarkers, surrogate markers at population level to identify risk factors and occult disease for appropriate intervention at early stage to prevent increasing mortality and morbidity to establish quality of life. The present study is envisaged to assess vascular stiffness of both sexes in the age group of 20–60 years with more than 3 risk factors to know the risk burden in South Indian population
Materials and methods: *Study design*: Multistage stratified randomised cluster sampling. *Study setting*: Urban (Chennai), semi-urban and rural areas from Thiruvallur and Kanchipuram districts of Tamil Nadu. *Sample size*: 8080, both gender, age 20–60 years.
Methods: Arterial pressure wave forms were obtained from radial artery, right common carotid artery and right femoral artery by applanation tonometer using SphygmoCor MM3®. ASP, APP, AAP, AAIx and PWV were recorded as determinants of vascular stiffness.
Results: Among the recruited 8080 study participants, 44.9% were males and 55.1% were female and 2221, 2821 and 3038 were from urban, semi-urban and rural regions respectively. Using 2 sampled test of proportion the following statistical significance is observed between urban and rural population.

Prevalence (in %) of high vascular stiffness parameters

	Male (m)				Female (f)				*p* value U(m) vs U(f)	*p* value R(m) vs R(f)
	Urban (U) *n* = 996	Semi urban *n* = 1251	Rural (R) *n* = 1314	*p* value (U vs R)	Urban (U) *n* = 1225	Semi urban *n* = 1570	Rural (R) *n* = 1724	*p* value (U vs R)		
ASP	32.9	31.33	24.80	<0.001	23.59	24.33	19.83	<0.001	<0.0001	0.001
AAP	23.79	25.74	29.14	<0.001	12.16	12.93	14.37	0.02	<0.0001	<0.0001
APP	28.41	26.77	26.94	0.25	19.10	21.21	18.73	0.76	<0.0001	<0.0001
AAIx	30.02	33.09	31.58	0.23	13.45	17.19	18.15	<0.001	<0.0001	<0.0001
PWV	27.71	19.10	13.47	<0.001	20.65	14.96	9.39	<0.001	0.0001	0.0005

ASP, central aortic systolic pressure; AAP, aortic augmented pressure; APP, aortic pulse pressure; AAIx, aortic augmentation index; PWV, arterial pulse wave velocity.

Conclusion: The data indicate nearly 1/3rd of population are at risk. The urban population is at higher risk than rural ($p < 0.001$). This data has social relevance for strategic planning at population level to prevent ACS.

Results of a comprehensive coronary heart disease prevention program in South India

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Objective: Coronary heart disease (CHD) is a major cause for mortality and morbidity among Indians. However, the focus on lifestyle measures in the prevention of CHD in the country is abysmally low. We aimed to analyse the outcomes of a comprehensive CHD prevention/rehabilitation program in South India.
Methods: All patients enrolled between May 2014 and April 2015 with established CHD ($n = 32$) or with documented risk-factors and no CHD ($n = 28$) were included in the study. Patients attended 1–2 sessions per week for 6–12 weeks. Each session lasted 90–100 min and included an exercise component and an education/counselling component on diet, activity, compliance to therapy, risk-factor modification and psychosocial aspects. Apart from clinical and family history, resting heart rate (HR), systolic blood pressure (SBP), diastolic blood pressure (DBP), body mass index (BMI), waist–hip ratio and functional capacity using treadmill test (TMT) or 6 min walk test (6MWT) were documented before (pre) and after (post) the program. Adherence was considered good if a patient attended >50% of the sessions enrolled and poor if ≤50%. Fischer's exact test and student's *t*-test were used to compare categorical and continuous variables respectively; p value < 0.05 was considered statistically significant.
Results: Subjects with CHD were older (61 ± 10 years vs 50 ± 15 years, $p = 0.002$), predominantly males (84% vs 57%, $p = 0.02$), showed better adherence (84% vs 61%, $p = 0.046$) and attended more sessions (11.1 ± 6.4 vs 6.9 ± 3.6, $p = 0.03$) than non-CHD subjects. In the CHD group, medical therapy was documented in all (100%), CABG in 4 (12%), PTCA in 3 (9%) and heart failure in 5 (16%) subjects. Among all ($n = 60$) enrolled subjects, 37 (62%) completed their program and 23 (38%) could not complete due to various reasons. Post-program evaluation showed significant improvement in cardiac symptoms, BMI, SBP and functional capacity (Table 1). The 6MWT seems to be an efficient and reliable tool for functional capacity assessment in our setting.
Conclusion: Cardiac rehabilitation, a key component in the management of CHD, is under-utilised in India. This study shows that an exercise-cum-education program has significant benefits in a South Indian cohort and can potentially be incorporated in the routine management of all patients with (risk of) CHD.

Table 1 – Outcomes of the CHD prevention program.

Characteristics	Pre-program ($n = 37$)	Post-program ($n = 37$)	p
Effort angina, n (%)	8 (22)	1 (3)	0.03
Heart rate (bpm)	77 ± 11	75 ± 14	0.44
SBP (mmHg)	135 ± 16	127 ± 13	0.03
DBP (mmHg)	78 ± 10	81 ± 9	0.16
BMI (kg/m^2)	27.2 ± 5.8	26.9 ± 5.7	0.01
WHR	0.99 ± 0.05	0.98 ± 0.04	0.79
Functional capacity[a]			
6MWD (m, $n = 29$)	416 ± 120	488 ± 143	<0.001
TMT, METS ($n = 6$)	6.1 ± 1.9	7.8 ± 1.9	0.047

[a] Functional capacity could not be evaluated in 2 patients.
6MWD, 6 min walk distance; BMI, body mass index; DBP, diastolic blood pressure, METS, metabolic equivalents; SBP, systolic blood pressure; TMT, treadmill test; WHR, waist hip ratio.

Burden of cardiovascular risk in young, apparently healthy individuals in the Indian sub-continent: Time for intervention?

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Purpose: The majority of sudden cardiac deaths (SCD) are attributed to atherosclerosis and affect the older section of the population. Ischaemic heart disease in India accounts for 61,000,000 deaths per year, despite the youth of its population, with 65% of individuals aged <35 years. Although a high prevalence of cardiovascular risk factors in the young appears the most plausible explanation, there are no supporting data. The study aimed to define the prevalence of cardiovascular risk factors & quiescent heart disease in a cohort of young, apparently healthy Indians.
Methods: A cohort of 751 consecutive individuals (69% male) with a mean age 21 years (range 15–40 years) underwent screening with a health questionnaire relating to cardiac symptoms, cardiovascular risk factors and family history of cardiovascular disease or premature (<40 years) SCD and physical examination. All participants underwent a blood pressure (BP) measurement, capillary blood glucose, lipid profile analysis and 12-lead ECG. Individuals with ECG anomalies or a murmur underwent transthoracic echocardiography on site. All participants received life style modification advice. Individuals with abnormal results were referred for further investigations as per local protocols.
Results: During initial evaluation 63 (8.4%) individuals demonstrated a positive finding: 20 (2.7%) had elevated total cholesterol levels defined as >6 mmol/l, 13 (1.8%) had elevated BP defined as systolic BP >140 mmHg and 15 (2%) had elevated fasting glucose levels defined as >7 mmol/l. Echocardiography was performed on 15 (2%) individuals who exhibited a cardiac murmur or an abnormal ECG. Echocardiography revealed moderate mitral stenosis ($n = 4$), mild aortic stenosis ($n = 3$) and hypertrophic cardiomyopathy ($n = 2$). An additional 9 (1.2%) individuals were classed as obese (BMI > 30). On follow-up, all diagnoses were confirmed by respective physicians and individuals received treatment and follow-up as appropriate.
Conclusion: Our results indicate a high burden of cardiovascular risk factors and quiescent heart disease in an unselected population of young Indians. This is in excess of what is reported in Caucasian populations and the most plausible explanation for the high cardiovascular morbidity and mortality in the Indian sub-continent. A large-scale population screening program is likely to identify a considerable proportion of young individuals at risk, however, its feasibility and cost-effectiveness remains to be defined.

Study on clinical profile of metabolic syndrome in elderly and its relation with highly sensitive C-reactive protein (hs CRP)

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