Available online at www.sciencedirect.com

SciVerse ScienceDirect

journal homepage: www.elsevier.com/locate/jicc

Original article

Prevalence and associated risk factors of coronary artery disease in a rural south Indian population on a governmental health insurance scheme

M. Sriharibabu [a,*], Y. Himabindu [b], Zubair Kabir [c], T. Sivakumar [d]

[a] Associate Professor, Department Medicine, GSL Medical College & General Hospital, N.H 216 Rajahmundry, East Godavari District, Andhra Pradesh 533296, India

[b] Associate Professor, GSL Medical College & General Hospital, Rajahmundry, East Godavari District, Andhra Pradesh 533296, India

[c] Senior Researcher/Epidemiologist, Tobacco Free Research Institute, The Digital Depot, Thomas Street, Dublin 8, Ireland

[d] Associate Professor, Department of Medicine, Division of Cardiology, GSL Medical College & General Hospital, Rajahmundry, East Godavari District, Andhra Pradesh 533296, India

ARTICLE INFO

Article history:
Received 13 July 2012
Accepted 6 September 2012
Available online 12 September 2012

Keywords:
South Asians
Prevalence
Coronary heart disease

ABSTRACT

Objectives: To examine the prevalence of Coronary heart disease (CHD) and associated risk factors based on coronary angiography among a geographically well-defined rural population of south India having an access to a governmental health insurance scheme.

Study design: Observational cross-sectional study.

Methods: This study in rural Andhra Pradesh covers 413 rural primary health centers each catering for 30,000 people was conducted between December 2007 and November 2011. From an eligible population of 43,025 subjects screened through health camps and clinically assessed for CHD based on (1) History of angina or myocardial infarction (2) ECG changes suggestive of Ischemic heart disease, 3692 subjects were CHD-diagnosed but 3248 got admitted as inpatients for additional clinical ascertainment before 3050 in-patients were studied finally based on angiographic findings.

Results: 8.58% were diagnosed as CHD; all the conventional risk factors were significantly associated with CHD risk except BMI. 2005 subjects (65.7%) of those with diagnosed CHD had hypertension, 1013 (33.2%) had diabetes, 1292 (42.4%) were smokers (current and former), 938(30.8%) had Dyslipidemia and 848 (28%) had BMI >25 kg/m^2 (Table 1) 0.1171 (38.4%) had single vessel disease, 1452 (47.6%) had two vessel disease and 427 (14%) had triple vessel disease (Table 3). Left ventricular dysfunction was found in 1187 (38.9%) patients and renal impairment was seen in 519 (17%) patients.

Conclusions: This study shows that CHD and associated cardio-metabolic risk factors are growing concerns in rural India even in rural populations. Both community based strategies and clinic based targeted approach to high risk patients are necessary to address such a public-health problem.

* *Corresponding author*. Tel.: +91 9440331624.
E-mail address: manne.sappu@gmail.com (M. Sriharibabu).

1561-8811/$ – see front matter
http://dx.doi.org/10.1016/j.jicc.2012.09.002

1. Introduction

Despite a large public and even larger private health sector, appropriate and affordable health care remained in accessible to several millions in India due to lack of community based health insurance schemes. Health care spending in India is around 6% of GDP out of which ¾ th is borne by the individuals. Inspite of such high share of expenditure by individuals the provision of health care is inadequate in terms of quality and access. Community based health insurance programs offer the best hope for reducing financial burdens caused by sickness to a large segment of the low income population. A revamp of the health system with expanded and improved health insurance facilities is essential.[1]

Cardiac care is expensive and beyond the reach of many people below the poverty line. As was previously thought it is not a disease of the rich and equally affects poor. BY the year 2020 India will bear 60% of the world's cardiovascular disease burden.[1,3,4] There were 2.3 million CVD-related deaths in India in 1990, 2.8 millions in 2002 and it is expected to cause an alarming 5 million deaths by 2020. This is perhaps due to rapid epidemiological transition, increased life expectancy, lifestyle changes and genetic predisposition of Indians to atherosclerotic coronary heart disease (CHD).[4,5] The risk of CHD in Indians is 3–4 times higher than white Americans, 6 times higher than Chinese and 20 times higher than Japanese. The average age of the patients with cardiac disease is lower among Indians and Indians are more likely to have cardiac disease types that are associated with poor treatment outcomes.[6]

Studies from urban Chennai and rural Andhra Pradesh have revealed that Cardiovascular disorders are the leading cause of death in India and account for 40% of mortality in urban areas and 30% of deaths in rural areas.[7,8] Major differences in cardiovascular disease mortality rates in different Indian states were reported varying from 75 to 100 in sub-Himalayan states of Nagaland, Meghalaya, Himachal Pradesh and Sikkim to a high of 360–430 in Andhra Pradesh, Tamil Nadu, Punjab and Goa.[9] The projected cumulative loss of national income for India due to non-communicable mortality for 2006–2015will be 237 billion US dollars.[10]

Table 1 – Prevalence of risk factors in the CHD subjects (n = 3050).

Risk factors	Frequency
AGE (Yrs.)	54.5 ± 10.0
SEX	Male 2006 (65.7%)
	Female 1044 (34.3%)
Hypertension	2005 (65.7%)
Diabetes mellitus	1013 (33.2%)
Smoking	1292 (42.4%)
Dyslipidemia (TC/HDL >=4.5)	938 (30.8%)
BMI (>=25 m^2)	848 (28%)
Creatinine	519 (17%)
LV dysfunction EF <50%	1187 (38.9%)

CHD: Coronary heart disease, EF: Ejection fraction, BMI: Body Mass Index, TC: Total cholesterol, HDL: High density lipoprotein.

The six leading risk factors associated with cardiovascular diseases in India are Tobacco Use, Physical Inactivity, overweight/obesity, High blood pressure, high cholesterol levels and high blood glucose levels.[4] Risk factor prevalence rates may not be uniform throughout the country as the dietary habits and cultural practices vary in a vast country like India.[11]

Coronary angiography is commonly used to determine the presence and extent of obstructive coronary artery disease and to assess the feasibility and appropriateness of various forms of therapy. It is also used when the diagnosis of coronary disease is uncertain and coronary disease cannot be reasonably excluded. Even with the advent of new noninvasive imaging modalities such as cardiac CT and MRI, Coronary angiography (CAG) remains the gold standard for detecting clinically significant coronary heart disease.[12,13] No prospective national cohort registries of CVD in India have published CVD incidence rates.[2] There is a shortage of good quality comparable epidemiological data in India. There is need for further epidemiological research in India.[14]

Rajiv Arogyasri is a community health insurance scheme launched by the government of Andhra Pradesh for people below poverty line. Under this scheme an insurance cover of two lakhs is provided to the families below poverty line to cover health care expenses in a year. The families are identified through a white ration card or Rajiv Arogyasri card issued by the government of Andhra Pradesh. Hospitals with more than 50 beds were identified and included in the list of network hospitals provided they have necessary infrastructure and interest in the scheme. Under this scheme 900 diseases in 30 broad specialties were covered and the network hospitals were paid by the insurance company. The insurance premium was borne by the government of Andhra Pradesh.

The Objective of this study was to examine the prevalence of Coronary heart disease (CHD) and associated risk factors based on Coronary angiography among a geographically well-defined rural population of south India having an access to a governmental health insurance scheme.

2. Methods

This cross-sectional study in rural Southern India of Andhra Pradesh covers 413 rural primary health centers each catering for 30,000 people was conducted between December 2007 and November 2011. From an eligible population of 43,025 subjects screened through health camps and clinically assessed for CHD based on (1) History of angina or myocardial infarction and or on drug treatment for coronary heart disease (2) ECG changes suggestive of Q-wave changes (Minnesota codes 1-1-1–1-1-7) or ST-segment depression (Minnesota codes 4-1–4-2) or T-wave changes (Minnesota codes 5-1–5-3), 3692 subjects were CHD-diagnosed but 3248 got admitted as inpatients for additional clinical ascertainment (haemogram, blood urea, serum creatinine, Fasting and post prandial blood glucose, lipid profile, stress test and Echocardiography) before 3050 inpatients were studied finally based on angiographic findings.[15]

Approval for the project was received from the Ethics Committee of the GSL medical college and General hospital, Rajahmundry, India. Informed consent was obtained from