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Cardiac Rehabilitation in India

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ARTICLE INFO

Keywords:
Cardiovascular diseases
Cardiac rehabilitation
Secondary prevention

ABSTRACT

Cardiovascular diseases (CVDs) are the leading cause of death and disability in India. Moreover, mortality following an acute myocardial infarction is high, which may be due to gaps in secondary prevention in general and a lack of cardiac rehabilitation (CR) services in particular. This review discusses the availability of CR in India, its putative role in reducing adverse outcomes over the long-term and suggests a road map for future research to enhance CR in this country. Currently, there is limited evidence, conducted in India, demonstrating CR efficacy. Moreover, there is currently limited availability of outpatient CR programs in India. Even so, there is consensus that CR is effective and essential in the CVD population. Therefore, efforts are needed to continue CR research in India and facilitate clinical implementation.

Cardiovascular disease incidence and prevalence in India

Cardiovascular (CV) disease (CVD) is the leading cause of mortality worldwide, with the majority of these deaths occurring in low to middle income countries.[1,2] The 2010 Global Burden of Diseases (GBD) Study reported that coronary heart disease (CHD) and stroke are the top 2 causes of deaths globally.[3] From years 1990 to 2010 mortality from these diseases has increased by 35% for CHD and 26% for stroke.[3] In terms of years of life lost (YLL), a measure of loss of lives during the productive years, CHD and stroke have risen from being the fourth and fifth leading contributors in 1990 to being the first and third leading contributors in 2010.[3] In South Asia (India), CHD and stroke are the fourth and ninth leading contributors to YLL, respectively. Four unique features of CVD in India are; 1) high mortality rates, 2) premature mortality, 3) increased disease burden on society as a whole and, 4) regional variation.

With demographic shifts, epidemiological transition and increasing urbanization and associated unhealthy lifestyles, there has been an increase in CVD risk factors (i.e. smoking, sedentary lifestyle, obesity, hypertension/HTN and hypercholesterolemia) in India. These factors have also contributed to CVD becoming more prevalent in rural areas of the country.[4] Overall, increasing risk factor prevalence and a lack of systematic preventive approaches have been primary factors in the currently accelerating CVD epidemic in India.[5]

Statement of Conflict of Interest: see page 549.

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0033-0620/$ – see front matter © 2014 Elsevier Inc. All rights reserved.
http://dx.doi.org/10.1016/j.pcad.2013.11.001

Abbreviations and Acronyms

ACS = acute coronary syndromes

CHD = coronary heart disease

CR = cardiac rehabilitation

CREATE = Treatment and Outcomes of Acute Coronary Syndromes in India

CV = cardiovascular

CVD = cardiovascular disease

DREAM = diet relaxation, exercise, attitude and motivation

ECG = electrocardiographic

ET = exercise training

GBD = Global Burden of Diseases

HF = heart failure

HTN = hypertension

METs = metabolic equivalents

MI = myocardial infarction

OASIS = Organization to Assess Strategies for Ischemic Syndromes

PA = physical activity

PCI = percutaneous coronary intervention

PPYLL = potentially productive years of life lost

PURE = Prospective Urban Rural Epidemiological

QoL = quality of life

STEMI = ST-elevation myocardial infarction

US = United States

WHO = World Health Organization

YLL = years of life lost

Epidemiology of CVD in India

The World Health Organization (WHO) reports the annual age-adjusted CVD mortality rate in men and women to be 386/ and 283/100,000 respectively.[1] These rates are similar to other South Asian countries but much greater than that observed in the United States (US) and most European countries.[1] The WHO reported mortality from CVD to be between 15% and 17% between 1980 and 1990 with significant regional variations across India (i.e. high CVD mortality in Goa, Tamil Nadu, Andhra Pradesh and Punjab and low mortality in central Indian states of Uttar Pradesh, Madhya Pradesh and Rajasthan).[6] Data from India show large regional variations with annual mortality rates greater than 250/100,000 in southern and eastern regions of the country and less than 100/100,000 in central India.[7] There are large rural–urban differences in CVD mortality with rates of less than 200/100,000 in rural areas and 450–500/100,000 in urban locations. Only a few prospective studies of CVD mortality are available. A small study in rural Gujarat[8] and a larger study in rural Andhra Pradesh[9] reported age-adjusted annual mortality rates of 200–250/100,000 while studies in urban Kerala[10] and Mumbai[11] have reported age-adjusted mortality rates approaching 500/100,000 for men and 250/100,000 for women. These rates are almost twice that observed in the US and 3–5 times greater than many European countries.[1]

The potentially productive YLL (PPYLL) is extremely high for India as compared to countries such as China and the US. For example in the year 2000, PPYYL was estimated to be 9.2 million in India as compared to 6.7 and 1.6 million in China and the US, respectively. In addition, PPYYL is expected to rise to 17.9 million by 2030 in India as compared to China and US, where values are expected to increase to 10.5 and 2 million, respectively. [12]

In the last 50 years there have been multiple CV epidemiological studies in India that have defined prevalence of CHD and stroke and identified burden of disease.[4] A meta-analysis of these studies reported that prevalence rates have more than tripled in the Indian population.[13] Increase in CHD has historically been an urban phenomenon with a recent and rapid rise in rural populations being reported.[14] Studies in the middle of the last century reported a CHD prevalence of 1%–2% in urban locations and 0.5%–1% in rural locations, with a low urban–rural difference. In the intervening years, CHD prevalence in urban areas increased to 10%–12% while it increased to 4%–5% in rural areas.[4] Stroke is also increasing in India and incidence registries using population-based surveillance data have reported the annual incidence of stroke varies from 100 to 150/100,000 of the Indian population in urban locations with greater incidence in rural regions.[15]

Few epidemiological studies report CHD prevalence; however, the criteria that have been used are not uniform. Most studies have used diagnostic criteria of known CHD, Rose/Modified Rose angina questionnaire, or pathological electrocardiographic (ECG)-Q waves to identify the prevalence. The Prospective Urban Rural Epidemiological (PURE) Study recently reported prevalence of known CHD, stroke or either in 153,996 participants as 3.7%, 1.5% and 4.9%, respectively.[16] In high income, upper middle income, lower middle income and low income (mainly India) countries, respectively, the prevalence of CHD was 4.2%, 3.2%, 4.8% and 2.1% while the prevalence of stroke was 1.3%, 1.6%, 1.7% and 1.0%, and either condition was 5.2%, 4.5%, 6.1% and 3.0%. Prevalence of CHD in India was significantly lower than in high and middle income countries. The India Heart Watch study in 11 cities reported a known CHD prevalence of 2.5% (men 2.8, women 2.2).[17] The Global Aging and Adult Health survey of the WHO reported a 3.1% prevalence of angina in a nationally representative adult population in five Indian states.[18] Similar data have been reported from previous surveillance studies in India.[15,16] However, there are significant knowledge gaps in existing CV epidemiological research in India[19] and there is need for better designed prospective studies to better determine incidence, prevalence and trends.

There have been three large registry studies reporting outcomes after acute coronary syndrome (ACS) admissions in India.[20–22] The Organization to Assess Strategies for Ischemic Syndromes (OASIS) registry reported substantially higher death or myocardial infarction (MI) rates at 2 years in India as compared to several other countries including China, the US and Russia. The Treatment and Outcomes of ACS in India (CREATE) registry reported that those who have an ACS in India have a higher rate of ST-elevation MI (STEMI) than do patients in developed countries and also poor people who are admitted with an episode of ACS frequently miss out on evidence-based treatments and experience higher death rates.

Results from the Kerala ACS registry demonstrate opportunities for improving the quality of ACS management by