



Contents lists available at ScienceDirect

Indian Heart Journal

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



Hypertension: The most important non communicable disease risk factor in India

Rajeev Gupta^{a,*}, Denis Xavier^b

^a Department of Preventive Cardiology and Internal Medicine, Eternal Heart Care Centre and Research Institute, Mount Sinai New York Affiliate, Jaipur 302017 India

^b Department of Pharmacology, St John's Medical College, Sarjapur Road, Bengaluru 560034 India

ARTICLE INFO

Article history:

Received 17 September 2017

Accepted 10 February 2018

Available online xxx

Keywords:

Hypertension

India

Cardiovascular disease

Global burden of disease study

Non-Communicable disease

ABSTRACT

Non-communicable diseases are important causes of mortality and morbidity in India. Data from the Registrar General of India, World Health Organization and Global Burden of Disease (GBD) Study have reported that cardiovascular diseases (CVD) are the most important causes of death and disability. Age-adjusted mortality from these conditions has increased by 31% in last 25 years. Case-control studies have reported that hypertension is most important risk factor for CVD in India. GBD Study has estimated that hypertension led to 1.6 million deaths and 33.9 million disability-adjusted life years in 2015 and is most important cause of disease burden in India. Intensive public health effort is required to increase its awareness, treatment and control. UN Sustainable Development Goals highlight the importance of high rates of hypertension control for achieving target of 1/3 reduction in non-communicable disease mortality by 2030. It is estimated that better hypertension control can prevent 400–500,000 premature deaths in India.

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1. Introduction

Morbidity and mortality data in India have always highlighted primacy of communicable diseases and maternal and childhood conditions as leading causes.^{1,2} Indeed, up to end of the last century acute and chronic infections, e.g., neonatal and childhood gastrointestinal infections, viral and bacterial lower respiratory

* Corresponding author at: Eternal Heart Care Centre & Research Institute, Jagatpura Road, Jawahar Circle, Jaipur 302017 India.
E-mail address: drrajeev.gupta@eternalheart.org (R. Gupta).

<https://doi.org/10.1016/j.ihj.2018.02.003>

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infections, poliomyelitis, malaria and tuberculosis along with neonatal sepsis, childhood malnutrition and maternal mortality were important causes.¹ Public health measures focused on these conditions, along with overall socioeconomic change have led to a remarkable decline in death rates from these conditions.³ This has been due to focus on preventive measures directed towards these conditions- better hygiene, immunization, improved maternal and childhood nutrition and health systems focused on health during pregnancy and management of acute and chronic infections.³

Chronic non-communicable diseases have emerged as leading causes of mortality and morbidity only at the turn of the present century in India.⁴ Registrar General of India first reported this transition while enumerating causes of deaths in the country for years 2001–2003.⁵ Non-communicable diseases (NCD's), also known as chronic diseases and better as socially transmitted diseases, caused more than 50% of deaths in these years and cardiovascular diseases (CVDs) emerged as the most important cause. Increasing proportion of NCD's as cause of deaths has been reported in the latest Registrar General of India report also.⁶ Serial data from the Census of India have also reported increasing proportionate mortality from CVD in India.⁷

The present article summarizes trends in major vascular CVD's (ischemic heart disease-IHD and stroke) in terms of absolute numbers and age-adjusted rates in India using the World Health Organization (WHO) and Global Burden of Diseases (GBD) Study data. We used previous studies to identify CVD risk factors of importance in Indians.^{8,9} We then summarized the trends in CVD risk factors in India using previous reviews.^{7,10–15} Using GBD study data along with risk factor prevalence trends have highlighted the observation that hypertension is the most important risk factor for CVD, non-communicable diseases as well as overall diseases in India. Public health, health systems based as well as clinic-based interventions are needed to increase awareness, treatment and control of hypertension.¹⁶ It is well known that up to a third of cardiovascular deaths can be avoided by proper treatment and control of hypertension¹⁷ and by addressing this risk factor we can significantly prevent premature CVD mortality in India.

2. Methods

Data for this narrative review have been obtained from multiple sources. Mortality data for India were obtained from the Government of India and Registrar General of India using previous publications and websites of the Census of India and Registrar General of India.^{5,6} These data were also used to determine the proportionate mortality from various disease conditions in India. We used electronic databases of WHO^{18,19} and GBD Study 2015²⁰ to identify absolute number of deaths from CVD in India. In the GBD Study annual data on absolute numbers of CVD deaths including deaths from major CVD types- IHD, stroke (hemorrhagic and ischemic), rheumatic heart disease and others are available. We retrieved data of major CVD causes at 5-year time points (1990, 1995, 2000, 2005, 2010 and 2015) to simplify evaluation of the trends.²⁰ We also obtained age-adjusted death rates per 100,000 persons for CVD and its subtypes from the GBD Study. Finally, data on the top ten Category 2 (broad category of risk factors) and Category 3 (specific risk factors) factors responsible for disease burden in India were obtained from GBD study and tabulated according to absolute mortality as well as disability adjusted life years (DALY's).²⁰ Data regarding hypertension prevalence, awareness, treatment and control have been obtained from previously published reviews.^{7,10–12,21,22} Trends in other CVD risk factors have been obtained from previous publications^{7,10,11,13–15} and GBD 2015 study.²⁰ The data are presented as a narrative review and not as a systematic review, both are equally important as discussed recently.²³ Descriptive statistics are presented.

3. Cardiovascular mortality in india

3.1. Registrar General of India

Mortality data has been collected by Registrar General of India based on hospital records at limited urban and rural sites in the country. There has also been a vast schism between actual causes of deaths in India and those reported by various agencies. These data are reported as proportionate mortality from various causes.⁶ Accordingly CVD caused about 12–15% of all deaths in India in 1980s to 1990's.²⁴ As the number of deaths has been increasing in each year, these proportions would result in escalating absolute number of deaths from CVD in the country. Since 2001–2003 the Registrar General of India has developed a verbal autopsy based system to assess causes of deaths in the country within the Indian Sample Registration System.²⁵ Between 2001–2003 trained census enumerators obtained details of events leading to death (verbal autopsy narrative) at more than 600,000 households spread across all the districts in the country. Ascertainment of causes of deaths was performed independently by two trained physicians for each narrative and cross-checked for consensus. Validation protocol was used to ensure agreement and International Classification of Diseases (ICD)-10 codes were used. Cardiovascular diseases were diagnosed with codes G45, G46, G81-83, 100-128, 131,134-184, 186-199 and R00-R01, R03, R55 and R96.^{5,6,26} Proportionate mortality from cardiovascular diseases was calculated for different age-groups and has been reported.^{5,6}

In 2001–2003 the top five causes of deaths, as percent of total mortality were cardiovascular diseases (males 20.3, females 16.9), respiratory diseases (males 9.3, females 8.0), diarrheal diseases (males 6.7, females 9.9), perinatal problems (males 6.4, females 6.2), and chest infections (males 5.4, females 7.1).⁵ This exercise has been periodically repeated at various sample registration system sites and the latest data are available for the years 2010–2013.⁶ At this time-period the top five causes of deaths were cardiovascular diseases (males 25.1, females 20.8), respiratory diseases (males 7.8, females 7.5), cancer (males 5.8, females 6.6), diarrheal diseases (males 5.3, females 5.8) and perinatal problems (males 4.2, females 6.3). Cardiovascular diseases retain the top position while cancer related mortality has increased. On the other hand, proportionate mortality from respiratory diseases, perinatal causes and diarrheal diseases has shown a significant decline (Fig. 1). Increasing proportionate mortality (% of all deaths) from cardiovascular diseases in India has also been reported by the GBD Study (Fig. 2). There are large regional variations in CVD's in India^{10,11} and a major limitation of these mortality data is lack of state-level statistics. The Indian Burden of Diseases Investigators have recently published state level mortality data.²⁷ The study has

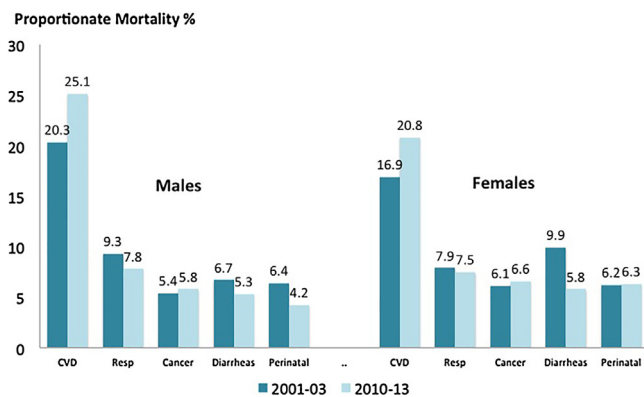


Fig. 1. Change in proportionate mortality form the top 5 causes of deaths in India according to Registrar General of India reports in years 2001–03 and 2010–13.

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