

A REVIEW ON NEED OF RESEARCH AND CLOSE OBSERVATION ON CARDIOVASCULAR DISEASE IN INDIA

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ABSTRACT

Several surveys conducted across the country over the past two decades have shown a rising prevalence of major risk factors for CVD in urban and rural populations. The problem of increasing risk factor for CVD in India is because of lack of surveillance system and lack of proper diagnosis. These surveys are limited only to some parts of the country mostly developed and hence an action plan has to be initiated to improve its range in rural areas also. The burden of non-communicable diseases (NCDs) is causing increase in morbidity and premature mortality in developing countries. In 1990, cardiovascular diseases (CVD) accounted for 63 per cent of all deaths and India contributed to 17 per cent to the worldwide mortality. There was lack of an organized national system for monitoring these risk factors over time so as to inform policy and program for appropriate interventions and research. This survey paper provides the scenario of CVD in India.

KEYWORDS: *Non-communicable diseases (NCDs), Cardiovascular disease (CVD), Coronary heart disease (CHD) and World Health Organization (WHO).*

I. INTRODUCTION

The health care needs of the world's population are likely to undergo dramatic changes due to the ongoing demographic transition. Non-communicable diseases (NCDs), such as diabetes, cancer, depression and heart disease, are rapidly replacing infectious diseases and malnutrition as the leading causes of disability and premature death. Eighty per cent of total deaths due to non-communicable diseases occur in the low income countries (1-3). Men and women are equally affected. Cancer, cardiovascular diseases (CVD) and diabetes are becoming serious concern, accounting for 52 per cent of deaths and 38 per cent of disease burden in the South East Asia Region (SEAR). With the current trends, the top five causes of death by Disability Adjusted Life Years (DALYs) in 2020 are likely to be Ischemic heart disease, depression, road traffic injuries, Cerebra-vascular diseases, and chronic obstructive lung disease(4). It has been estimated that a 2 per cent reduction in chronic diseases death rates per year globally could result in saving about 36 million premature deaths by the year 2015. While mortality due to communicable diseases is decreasing, that for non-communicable diseases is rising at a very rapid rate (5-6). The health policy makers are faced with the burden of providing resources for the control and prevention of both the existing communicable diseases, and the increasing number of non-communicable diseases (7-8). Research and risk factor surveillance involves a systematic collection; analysis and interpretation of data and it identify the type of heart diseases (9-10). These data are used to inform the public and decision-makers for planning and evaluating prevention control program and designing health policy and legislation.

This paper is organized with a brief review of the ongoing surveillance system on CVD and probability of an adverse health outcome as a risk factor in section 2. Section 3 introduces the CVD, type of CVD, causes and fact about heart disease. Section 4. Discusses the risk factor for cardiovascular disease. Section 5 discusses the scope of surveillance. Section 6 and 7 discusses result and conclusion respectively.

II. CARDIOVASCULAR DISEASE: SURVEILLANCE & RISK FACTORS (INDIAN SCENARIO)

2.1 Surveillance:

The World Health Report 2002 identifies top 20 leading risk factors in terms of the burden of disease according to the mortality status in the population. The widely accepted concept of public health surveillance is the ongoing systematic collection, analysis and interpretation of health data essential for planning, implementing, and evaluating public health activities, closely integrated with timely dissemination of the data to enable effective and efficient action to be taken to prevent and control disease. It ranges from compulsory noticeable diseases, specific disease registries (population-based, hospital-based), continuous or repeated surveys of representative samples of the population, to aggregate data for recording trends on consumption patterns and economic activity. It is important to differentiate surveys from surveillance as the former does not imply data collection for action. The need for CVD surveillance arises from the demographic transition being accompanied by a “risk transition”. In the context of public health, population’s measurements of these risk factors are used to describe the distribution of future disease burden in a population, rather than predicting the health of a specific individual. Knowledge of risk factors can then be applied to shift population distributions of these factors. Information on disease occurrence is important in assisting health services planning, determining public health priorities, and monitoring the long term effectiveness of disease prevention activities. Thus, where resources permit, disease surveillance should also be included in the surveillance systems. Data collected from ongoing health information systems may be useful for surveillance when systematically analyzed and applied to policy in a timely manner. While surveys can be a one-off exercise, surveillance involves commitment to data collection on an ongoing (repeated, continuous) basis, as well use of the data for informing public health policies and program. There are different aspects of ongoing versus periodic data collections that need to be considered in planning NCD surveillance. Nevertheless, regional surveys undertaken on a periodic basis are more often seen as easier to implement than large-scale national surveys. Surveillance of cardiovascular diseases involves a lot of human and financial resources for its sustainability. Further focusing on disease results in identifying individuals at the downstream and potentially limits intervention. Risk factors are present for a long period of time during the natural history of CVD. It is now well established that a cluster of major risk factors (tobacco, alcohol, inappropriate diet, physical inactivity, obesity, hypertension, diabetes and dyslipidaemias) govern the occurrence of CVDs much before these are firmly established as diseases. Collecting data on these and monitoring their trends is a good beginning towards disease surveillance. It helps in making projections of trends of disease prevalence. Since these risk factors are amenable to interventions, efforts to tackle these would reduce the overall disease burden and promote health. Surveillance can be targeted at the entire population, at the high risk population, and special settings (workplace, schools, and hospitals). At the local level, surveillance alerts the public health authorities on the trends and impact of interventions, at State level it helps in evaluating policy and making the necessary changes, while at the national level it helps in program development and monitoring.

2.2 Risk factors

‘Risk’ is defined as a probability of an adverse health outcome, whereas ‘risk factor’ refers to an attribute or characteristic or exposure of an individual whose presence or absence raises the probability of an adverse outcome. The World Health Report 2002 identifies top 20 leading risk factors in terms of the burden of disease according to the mortality status in the population cardiovascular diseases account for high morbidity and mortality all over the world. Countries where the epidemic began early are showing a decline due to major public health interventions. On the other

hand, cardiovascular diseases are contributing towards an ever-increasing proportion of the non-communicable diseases in the developing countries. Cardiovascular diseases have assumed epidemic proportions in India as well. The Global Burden of Diseases (GBD) study reported the estimated mortality from coronary heart disease (CHD) in India at 1.6 million in the year 2000-10. A total of nearly 64 million cases of CVD are likely in the year 2015, of which nearly 61 million would be CHD cases (the remaining would include stroke, rheumatic heart disease and congenital heart disease).(fig.1)

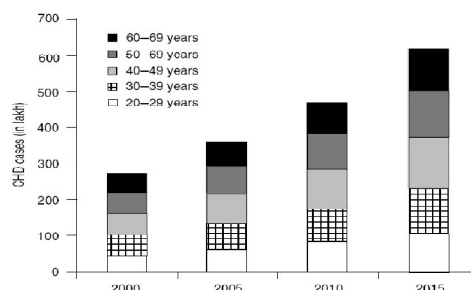


Figure 1.

Coronary heart disease is more prevalent in Indian urban populations and there is a clear declining gradient in its prevalence from semi-urban to rural populations. Epidemiological studies show a sizeable burden of CHD in adult rural (3-5%) and urban (7-10%) populations. Thus, of the 30 million patients with CHD in India, there would be 14 million of who are in urban and 16 million in rural areas. In India about 50 per cent of CHD-related deaths occur in people younger than 70 year (fig.2).

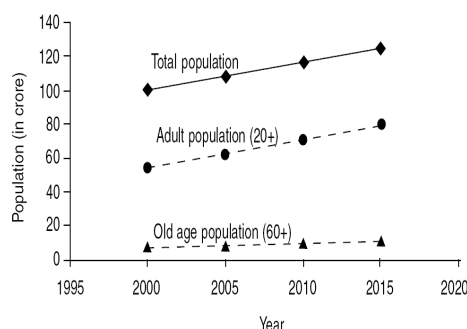


Figure 2.

Extrapolation of these numbers estimates the burden of CHD in India to be more than 32 million patients. The ICMR-WHO study on Burden of Disease reviewed literature till 2003 on NCDs¹³. The weighted average prevalence for ischemic heart disease was estimated to be 6.4 per cent in urban areas and 2.5 per cent in rural areas. Available evidence yielded that over 9 million stroke cases and about 6.4 million have been lost due to disability during 2004. Traditionally, risk factors for CVDs have been categorized as behavioral, anthropometric and biochemical. Several epidemiological studies conducted on the prevalence of CVD risk factors have indicated to an increasing trend. These are studies which have been done at several locations across the country, in different time periods and using varying study methodologies. These studies show that urban populations had higher prevalence of CVD risk factors as compared to rural populations.

2.3 Surveillance for cardiovascular disease: The ICMR initiative in India

The ICMR conducted a multi-centric study at Ballabgarh (Haryana), Chennai (Tamil Nadu), Dibrugarh (Assam), Delhi, Nagpur (Maharashtra) and Thiruvananthapuram (Kerala) on risk factors for non-communicable diseases with WHO support (unpublished data). The number of cardiac surgery

is increasing every year(fig.3). It was aimed at developing sentinel sites for NCD risk factor surveillance across the country as well as assessing the feasibility of adapting the WHO STEPS instrument for use in surveillance in the country. The sites and investigators were purposefully selected so as to include interest, expertise, institutional support and regional variability into the study design. The questionnaire was piloted and translated into the local languages by the selected investigators. A common study protocol was developed and the study was centrally co-ordinate at the Division of NCD, Indian Council of Medical Research (ICMR) and New Delhi. A common training program was conducted and monitoring visits were undertaken by an expert team for assessment of situation in the field area and providing technical support to the site teams. The behavioral and anthropometric risk factor study was done between 2003-2005 (Phase I) and in a sub-sample (20%) of Phase I participants, biochemical risk factors were estimated in 2005-2006 (Phase II). The study adapted the WHO STEPS approach, and the questionnaire was accordingly modified. The study participants included men and women aged 15-64 yr, residing in the selected urban, rural and slum areas.

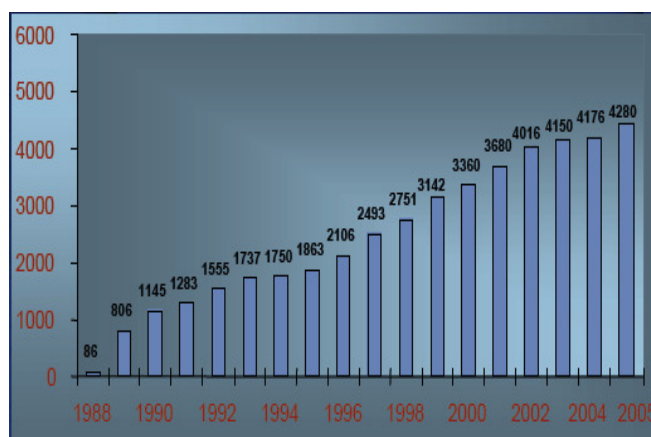


Figure 3: Cardiac surgeries / Year

III. CARDIOVASCULAR DISEASE

Cardiovascular disease or heart disease is a class of diseases that involve the heart or blood vessels (arteries and veins). While the term technically refers to any disease that affects the cardiovascular system .It is usually used to refer to those related to atherosclerosis (arterial disease). Cardiovascular diseases remain the biggest cause of deaths worldwide, though over the last two decades (fig 4). Cardiovascular mortality rates have declined in many high-income countries but have increased at an astonishingly fast rate in low- and middle-income countries. More than 17 million people died from cardiovascular diseases in 2008. Each year, heart disease kills more Americans than cancer. In recent years, cardiovascular risk in women has been increasing and has killed more women than breast cancer.

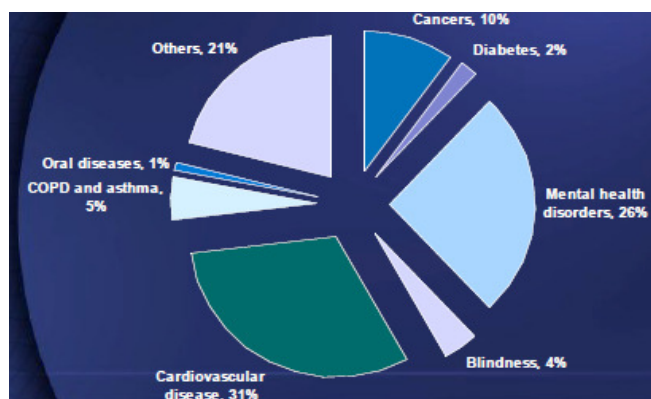


Figure.4 pi chart of different disease.

3.1. Types of Heart Diseases

Cardiovascular diseases can be categorized into four types. These are heart failure, arrhythmia, heart valve disease and stroke:

- Heart failure is a kind of heart diseases that occurs when inadequate supply of blood is pumped into the heart or to the rest of the body. This causes the heart to work double time. Over a number of years, the heart will slow down due to overwork. Treatment includes ensuring better health by eating the proper foods and exercising.
- Arrhythmia is a medical condition where the heart does not beat normally. It can either be too slow or too fast. This too will affect how the heart pumps blood in and out. Irregular heart movements also lend to formation of blood clots. Treatment for arrhythmia includes lifestyle changes and undergoing medical surgery.
- Heart valve disease is when one or more of the heart's valves do not function as it should be. The four major heart valves have tissue flaps that open and close with every heartbeat. These flaps ensure that the right amount of blood supply is sent to different parts of the body. When this does not happen, blood will leak back into the heart chambers. This will cause blood clots and stroke.
- A heart attack occurs when the blood flow to a section of heart muscle gets blocked for a long enough time. If the blood flow isn't restored quickly, the part of the heart muscle starts to die.

3.2 Causes of Heart Disease

The most common cause of cardiovascular diseases -

Cholesterol - There are two types of cholesterol. These are Low Density Lipoproteins (LDL) and High Density Lipoproteins (HDL). Too much of LDL and too little HDL can cause CVD. Having low levels of HDL too puts you at risk of having a heart attack as HDL helps to remove LDL from plaque and send it back to the liver.

High blood pressure - This is another reason for heart attacks or strokes. High blood pressure place increased strain on the heart organ as an increased volume of blood is pumped through the heart. High blood pressure can also cause the arteries to rupture, especially if they are hardened with plaque build-up. This result causes a stroke or a heart attack.

Smoking - This also contributes to cardiovascular diseases. Smoking increases risk of atherosclerosis not only in the arteries leading to the heart, but also to the legs and the aorta.

3.3. Facts about Heart Diseases

There are several facts about heart disease that one should be aware. Being aware of it will help you be more careful with how you live your life and look after your health. Below are a few heart disease facts (Based on the NHLBI's Framingham Heart Study, or FHS):

- CVD is one of the leading causes of death in the United States and India.
- The most common cause of heart disease is Coronary Artery Disease (also called Coronary Heart Disease or CHD).
- A person with a family history of heart disease is ten times more likely to have any cardiovascular disease.
- Smoking, fast food, inadequate exercise all contribute to heart disease.
- Dinner with high fat and high carbohydrates will increase the risk of blood clotting.
- Brain death from cardiac arrest can be experienced in just four minutes.
- Depression is also a common contributor to heart diseases.

The above mentioned is not a full list of heart disease facts. There are many more to be aware of.

IV. TEN RISK FACTORS FOR CARDIOVASCULAR DISEASE

- **Age:** More than 83% of people who die from coronary heart disease are 65 or older. Older women are more likely to die of heart attacks within a few weeks of the attack than older men.
- **Being male:** Men have a greater risk of heart attack than women do, and they have attacks earlier in life (fig.2). Even after menopause, when women's death rate from heart disease increases, it's not as great as men's.
- **Family history.** Those with parents or close relatives with heart disease are more likely to develop it themselves.
- **Race:** Heart disease risk is higher among Asians, African Americans, Mexican Americans, American Indians, native Hawaiians, and some Asian Americans compared to Caucasians.
- **Smoking:** Cigarette smoking increases risk of developing heart disease by two to four times.
- **High cholesterol:** As blood cholesterol rises, so does risk of coronary heart disease.
- **High blood pressure:** High blood pressure increases the heart's workload, causing the heart to thicken and become stiffer. It also increases your risk of stroke, heart attack, kidney failure, and congestive heart failure. When high blood pressure exists with obesity, smoking, high blood cholesterol levels, or diabetes, the risk of heart attack or stroke increases several times.
- **Sedentary lifestyle.** Inactivity is a risk factor for coronary heart disease.
- **Excess weight:** People who have excess body fat especially if a lot of it is at the waist are more likely to develop heart disease and stroke even if they have no other risk factors.
- **Diabetes:** Having diabetes seriously increases your risk of developing cardiovascular disease. About three-quarters of people with diabetes die from some form of heart or blood vessel disease.

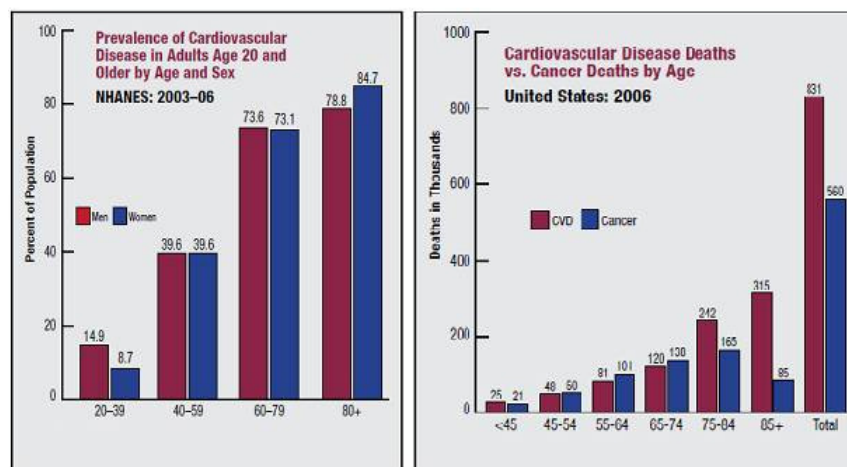


Figure 5.

V. DISCUSSION

The scope for success of a surveillance program relies on its sustainability, flexibility, appropriateness of data collected and timely dissemination to its users for action. In India, several reports on CVD risk factors have been brought out in different regions and populations. Many of these are repeated surveys in the same population at random time intervals. There are surveys conducted by various agencies, but the information remains un-utilized for action related to CVD risk factors. These surveys have been able to demonstrate changes in the risk factor profile. Collectively, these have been useful in raising an alarm amongst health planners and policy makers, and for making a case for initiating interventions. Efforts to harmonize these local surveys so as to make them useful for surveillance systems would improve efficiency. It would help in overcoming the limitation. Surveillance can be established at the National, Regional, State and Local levels by linking the data collection activities to policy development and interventions. How can the stakeholders (government, local authorities, public health workers, academicians and researchers) benefit from a partnership

exercise? It could be considered as an interaction between the givers and takers, with reversal of roles from time to time. A constant dialogue to assess the needs should be formalized so that surveillance systems can adapt to the requirements. Although the authorities would give the 'field' for data collection to the investigators, but in return will expect results, assistance in developing and implementing intervention activities for the population under consideration, *e.g.*, the industries would agree to do risk factor surveys, but they will look towards to the researcher for guidance on how and what actions to be taken, so that this becomes a mutually beneficial exercise. The success of this partnership will be reflected in the participation of the community in such program. A need for more rapid and advance data collecting tools would be required, such as telephone surveys, e-mail and internet surveys. The use of technology needs to be evaluated against identity protection, costs and validity of information collected. Surveys should be designed in cost effective manner if rapid information is required. Multi-modal methods would require an understanding of local literacy, awareness, cultural contexts, *etc.*

VI. RESULT

From the Statical data shown by World Health Organization it has been concluded that CVD itself contributes 31% as compared to other diseases. Percentage of CVD in men and women are more or less same and is found to be increasing age wise i.e. at the age between 20-39 the average percentage of CVD is 11.8%, between 40-59 the average percentage of CVD is 38.55%, between 60-79 the average percentage of CVD is 73.3% and at the age above 80 the average percentage of CVD is 81.75%. Also age wise death due to CVD is high as compared to Cancer. In total, death due to CVD is 681 thousand in comparison to 540 thousand due to Cancer. CVD cases in year 2010 is found to be around 500 lakh and is estimated to be around 650 lakh in the year 2015. In India about 50 per cent of CVD-related deaths occur in people younger than 70 year and these numbers estimates the burden of CHD in India to be more than 32 million patients. Cardiac surgery done in India is around 4500 in the year 2005 and is estimated to be around 8000 in the year 2015.

VII. CONCLUSIONS

Above data shows that the burden of CVD and its risk factors is increasing at an alarming rate. And therefore there is a need not only for a sound public health approach to stem the epidemic but also a research on proper study of ECG (electrical signal generated by heart) as well as to develop some advanced diagnosis system for proper diagnosis of CVD especially in the rural area where cardiologist are not available. Efforts to put an intervention program should be complemented with a robust surveillance mechanism so as to monitor, evaluate and guide policies. It has to be scaled up to the community level from national level and is to be included in the National Program for Prevention and Control of Cardiovascular Diseases and Stroke.

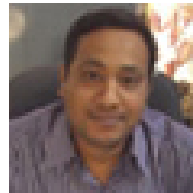
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Biography

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