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Sudden Cardiac Death
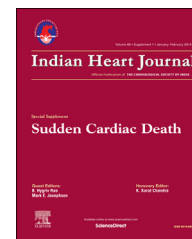
Review Article

Global burden of Sudden Cardiac Death and insights from India

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ABSTRACT

Sudden Cardiac death (SCD) is a major clinical event causing adverse impact on global economy. This review summarizes the available epidemiological data on SCD from different parts of the world. It contrasts the Indian and global perception on the issues influencing data collection, burden of SCD and sudden deaths occurring following Myocardial Infarction. The differences in data from India and rest of the world are highlighted.

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1. Introduction

Sudden Cardiac Death (SCD) is a catastrophic event, which has a huge adverse impact on the health care system. The ubiquitous distribution of this clinical syndrome mandates it being recognized as a worldwide phenomenon with the realization that a rising incidence negatively affects global economy. There is an evident geographical imbalance in the currently available statistical figures on the global burden of SCD as practically almost entire published literature in this area is from North America, Western Europe and few countries of the Asia pacific. This fact assumes significance as the perception of the practicing clinician towards this problem and prioritizing of health care resources in the community are invariably influenced by this data. In this review, I would like to present an overview of data collection tools, the global burden of sudden death, the epidemiology of post Myocardial Infarction (MI) SCD and would make an attempt to contrast the global and Indian perception on issues related to these areas.

2. Data collection tools

Compiling accurate data of SCD even when a standard definition is used is a challenging task as categorizing a death as sudden is mostly retrospective and clarity of the circumstances leading to the terminal event is often lacking. Ideally long-term population based prospective mortality surveillance methods should be employed to obtain reliable statistical data, however these are difficult to conduct and hence different methodologies have been used to obtain the currently available epidemiological figures. Death certificates are commonly used for SCD surveillance as they provide objective documented mortality information. They are

particularly useful in generating uniform data when standard disease codes are used. The accuracy of information however depends on the physician completing the document. The time interval between onset of symptoms and death is not recorded and often deaths occurring after prolonged chronic pathologies are misclassified as SCD. They thus suffer from several flaws and hence SCD statistics relying solely on retrospective death certificates are likely to be an overestimate.[1] To improve reliability of data, information from other sources like hospital records, forensic documents and questionnaires are used to supplement facts obtained from death certificates.[2,3] Data obtained from first responders is useful as onsite information can be obtained, but unwitnessed deaths are missed and in absence of detailed clinical records, non-cardiac deaths are sometimes counted amongst SCD cases. Autopsy data is a meager resource of information as in general autopsy rates are low and moreover it alone cannot conclusively diagnose an arrhythmic death. To overcome the limitations of each of these methodologies, a multiple source method of ascertainment has been used in a few studies in order to capture all the SCD cases.[4,5] While initial recruitment of cases was achieved by emergency medical personnel, medical examiner, or hospitals, information obtained from medical records, death certificates and autopsy was also used for analyzing data. It is increasingly realized that these proven conventional tools used in developing countries may not be feasible or reliable in collecting mortality data from developing countries. Verbal autopsy has evolved as a new tool to circumvent the epidemiological constraints prevalent in these countries. Though

initially developed as a tool to be used in acquiring data on child and maternal deaths, it has subsequently been validated as a reliable mortality surveillance system in other age groups too.[6,7] Using a questionnaire based approach many large studies have successfully employed this methodology to gather data on mortality and SCD.[8–10]

3.   Burden of SCD in the population

True incidence of SCD in the community is difficult to ascertain in view of varied definitions and methodologies employed in different studies. The population included in each of these studies is dissimilar, making generalized inferences difficult. Further, in many of the studies the figures available are an estimate rather than exact data obtained from a prospective population based assessment. Table 1 highlights these facts and gives a summary of data obtained from different parts of the world. One of the earliest long-term systematic studies on SCD was the Paris Prospective Study.[3] The factors influencing sudden death in a cohort of about 7000 middle aged working male population followed up for 23 years were analyzed in this study. SCD constituted 5.6% of total mortality and about 1/5th of all the cardiovascular deaths. The analysis of the United States vital statistics mortality data from 1989 to 1998 showed that 63% of the 7 lakh cardiac deaths in the country were sudden.[11] This surveillance report from the US center for disease control and prevention is the basis for the estimated annual SCD figures of about 4.5–5 lakhs in the United States.

Country	Year	Population studied (n =)	Population characteristics	Method of assessment	SCD statistics
USA[11]	2001	719,456	Deceased US residents aged ≥35 years, with underlying cardiac disease	Death certificates	456,076 (63% of cardiac deaths)
USA[1]	2004	6, 60,486	Multnomah county residents	Multiple sources ascertainment	53/100,000
France[3]	1999	7079	Male workers aged 43–52 years followed up for a mean of 23 years	Medical examination, blood reports, hospital records, death certificates	5.6% of total mortality
Netherlands[12]	1997	133000	SCD cases in the age group 20–75 years over a period of 3 years (1991–1994)	GPs, ambulance personnel, and hospital records	97/100,000
Ireland[5]	2008	414,277	Population in 3 counties in west of Ireland in the year 2005	Multiple sources ascertainment	51.5/100,000
Japan[14]	2013	1934	Subjects in Hisayama town aged >25 years from 1962 –2009	Autopsy	Prevalence in the four, 12 year periods was 4%, 6.2%, 8.6% and 9.7% respectively
China[15]	2009	678,718	Prospective study of 4 regions for 1 year	Death certificates, hospital records, Interview of relatives and witnesses	41.8/100,000
India[19]	2012	22,724	Kindreds of medical students in the state of Andhra Pradesh who died due to any cause	Verbal autopsy	10% of total mortality
Thailand[33]	1993	316,931	20–49 years from 401 villages in 4 districts who died suddenly in the year 1990	Mailed questionnaires and direct interview of relatives	38/100,000

Table 1 – The figures of Sudden Cardiac Death obtained from studies conducted in various countries are summarized. These are variously expressed as incidence, prevalence or proportion of total mortality.