

Sudden Cardiac Arrest In Young Indians- A Comprehensive Review

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Abstract

In India, cardiac arrest in youth has become a serious public health concern. According to recent research, the number of sudden cardiac deaths (SCD) among those under 45 is rising. This study reviews 150 papers from Indian and International journals, as well as various articles from newspapers, to investigate the causes, risk factors, and trends related to cardiac arrest in young Indians. To analyse the demographic patterns, underlying medical issues, and lifestyle choices that contribute to this problem. The findings highlight how substance abuse, inactive lifestyles, undetected heart conditions, and genetic factors all contribute to increased cardiac risks. To address this growing health concern, preventive measures such as early screening and awareness campaigns are recommended.

Keywords- sudden cardiac arrest, risk factors, lifestyle choices, genetic factors, substance abuse

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INTRODUCTION

Cardiac arrest is a life-threatening disease that occurs when the heart stops pumping normally and systematically, which causes the stoppage or prevention of blood flow to the brain and other essential organs in the body (Singh A et. al (2025)). If the treatment for it is delayed, it can lead to the sudden death of an individual. The hallmark of cardiac arrest is an irregular heartbeat or cessation of heartbeat, which hinders the heart's ability to pump blood effectively. It happens abruptly, often without any prior notice (Singh G et. Al (2025)). When the heart stops pumping, blood flow to the brain is interrupted, which can result in unconsciousness or possibly stop breathing [American Heart Association (2022)]. Heart arrest is a medical emergency that requires immediate care, such as cardiopulmonary resuscitation and defibrillation, to restore a normal heart rhythm. While a heart attack (myocardial infarction) involves a blockage in the heart's arteries, a cardiac arrest happens when there is a problem with the heart's electrical system that causes the heart to stop beating or beat irregularly [Goldberger JJ (2022)]. Heart arrest can harm organs and the brain if it is not treated immediately. Causes someone to become unresponsive to yelling or shaking, which will ultimately lead to death. The person may faint and collapse. The person

may not be breathing at all or be gasping for air. There may be a weak, irregular pulse or none at all (Praloy Chakraborty et. al 2016).

Cardiovascular disease (CVD) primarily impacts older adults; however, sudden cardiac death (SCD) can also occur in younger individuals, though infrequently. Global studies estimate an SCD incidence of approximately 1.3 per 100,000 person-years among individuals under 35 years of age. The underlying causes vary by age: in individuals over 35 years, atherosclerotic coronary artery disease predominates, whereas in younger individuals (under 35 years), inherited cardiomyopathies and primary electrical disorders are comparatively more prevalent.

Acute coronary syndromes are occurring in younger people, and there are more CVD cases in India. Although there are few reliable epidemiological data on sudden cardiac death (SCD) in young people, anecdotal evidence has raised concerns about sudden deaths in young adults who appear to be in good health (National Institutes of Health (NIH)2022). For example, such reports prompted a multi-centre study in India to determine factors linked to sudden unexplained death in people between the ages of 18 and 40 (Kolkata: CSI Publications; 2022).

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Understanding the causes of cardiac arrest in the 15–40 age range is crucial in light of these findings and the high incidence of premature coronary artery disease (CAD) in India. This study looks at definitions, prevalence in India and around the world, and the variety of etiologies that affect this population.

Structural and Genetic Factors

SCA in young people without clear risk factors is primarily caused by inherited cardiomyopathies and channelopathies. The most common autopsy results in a recent Indian study of 18–45-year-olds (mean age 33.7 years) were cardiomyopathy (25.4%), acute CAD/MI (20.8%), and negative autopsy (no structural cause) (35.6%) (National Institutes of Health (NIH), 2022). Hypertrophic cardiomyopathy (HCM), the most prevalent cardiomyopathy, is known to be the cause of many athlete SCDs worldwide. Very uncommon causes (such as myocarditis, arrhythmogenic cardiomyopathy, and severe valvular disease) made up the remaining cases, with congenital coronary or cardiac anomalies accounting for 5% of cases.

The causes identified in that Indian study are broken down in the table below. Keep in mind that a significant portion of "negative autopsy" cases most likely indicate primary electrical disorders (channelopathies) that do not leave behind any obvious pathology.

Environmental and Lifestyle Factors

Lifestyle has a significant impact in addition to genetics. Even among young Indians, obesity, diabetes, and hypertension are on the rise due to sedentary lifestyles, rapid urbanisation, and dietary changes. According to studies, physical inactivity and rising obesity rates are major causes of early-onset CAD and SCA (National Heart, Lung, and Blood Institute, 2023; and Madhavan et al., 2011). For instance, young Indians are more likely than Westerners of the same age to have abdominal obesity and hypertension [Rural Health Initiative]. In people as young as their 20s or 30s, these metabolic risk factors can cause silent atherosclerosis, which can result in unexpected MI and arrest.

Another issue is substance abuse. Stimulants and recreational drugs can cause acute coronary events or deadly arrhythmias. About one-third of young SCD victims had evidence of illicit drug use, most commonly cannabis but also amphetamines and cocaine, according to a recent Australian study. The increasing availability of amphetamine-type stimulants and unregulated performance-enhancing supplements raises serious concerns, despite the paucity of data in India. Chronic heavy drinking and smoking, which are prevalent among young Indians, increase the risk of sudden death by causing ischemia and cardiomyopathy, unexpected MI and arrest in individuals in their 20s or 30s.

Environmental factors

Environmental hazards matter too. **Air pollution** in India is among the worst in the world. Particulate matter (PM_{2.5}) and toxins induce endothelial damage and autonomic imbalance, acutely raising the risk of

myocardial infarction and arrhythmia (Patil, R.S. et al., 2020). Indeed, studies link short-term pollution spikes to increases in out-of-hospital cardiac arrests and SCD deaths. For instance, breathing highly polluted air causes vascular dysfunction even in healthy individuals and has been associated with a statistically higher incidence of sudden cardiac events (Krishnan, S., et al., 2020). Given that 14 of the world's 20 most polluted cities are in India, this likely exacerbates youth cardiac risk, especially in northern industrial regions. Reducing pollution and personal exposure (e.g. masks, indoor air purifiers) is increasingly viewed as a public health priority for heart health.

Psychosocial Stress:

Long-term stress, restless nights, and mental health problems have also been linked. Stress-related cardiometabolic risk is exacerbated in India by the country's competitive academic and professional landscape, urbanisation, and economic strains. Although difficult to measure, clinical experience indicates that stress-related hypertension and anxiety are frequent predisposing factors for SCA events.

Dietary Elements

Dyslipidaemias and metabolic syndrome are exacerbated by a high intake of refined carbohydrates and oils (such as trans fats) and a low intake of fruits and vegetables. Atherosclerosis is accelerated in South Asians due to their unique inclination for insulin resistance, also known as the "thin-fat" phenotype. According to a discussion article, these dietary and lifestyle changes cause heart attacks in Indian youth about ten years earlier than in Westerners (Ponnaiah et al., 2023).

Socioeconomic and Regional Inequalities

India's diversity implies varied SCA patterns by region and socioeconomic status. Urban areas and a few states provide the majority of the available data. With a high SCD burden (50 per cent of CVD deaths) and risk factors like hypertension and previous heart attacks, the rural Andhra Pradesh study (Srivatsa et al. 2016). Offers valuable insights for poorer, agrarian regions. Young CAD is on the rise in urban/metropolitan India (Delhi, Mumbai, Bengaluru), fuelled by affluent lifestyles. North vs. South: While some research on Indians overseas indicates that South Asians (from India, Pakistan, and Bangladesh) are more insulin resistant, there are some differences between the cardiovascular risk factor profiles of North and South India (one diaspora study found higher hypertension in North Indian descent vs. more dyslipidaemia in South Indian descent (Wilde, 2013).

Key Findings

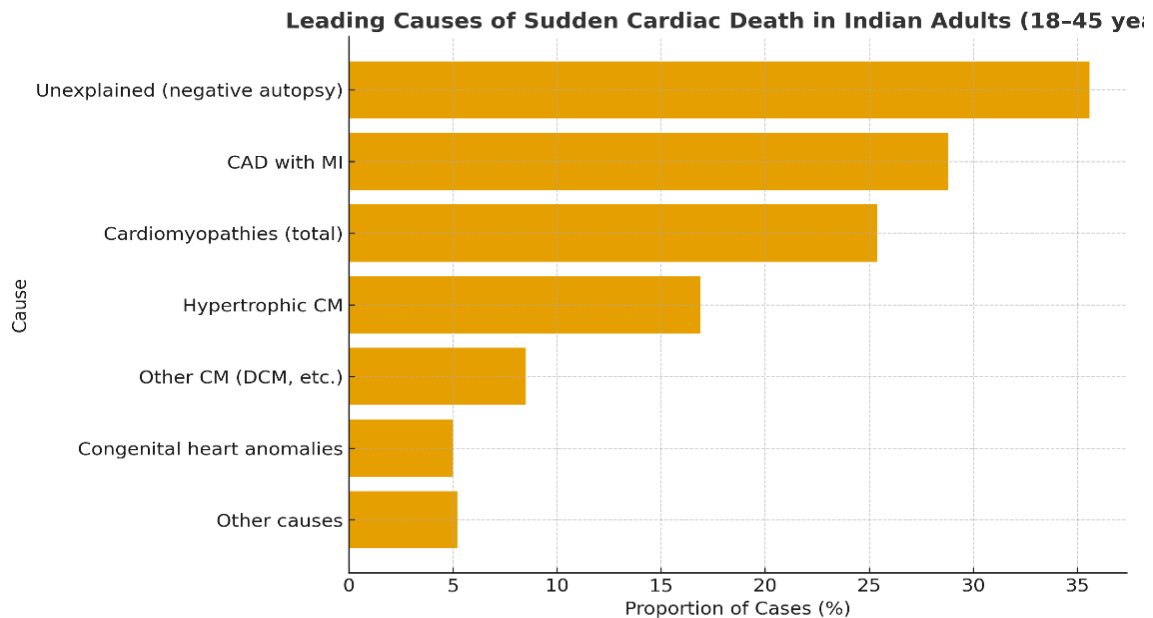
Epidemiological Trends

A 2022 study by the Cardiological Society of India (CSI) found that over the previous ten years, there has been a 30% increase in cardiac arrests among people under 40 (Cardiological Society of India, 2022).

Major cities like Delhi, Mumbai, and Bengaluru have high incidence rates, which could be linked to urban pressures and pollution (Kumar S, 2022).

Leading Factors Aetiology	Prevalence (%)
Hypertrophic Cardiomyopathy	32%
Coronary Artery Anomalies	22%
Myocarditis (post-viral)	16%
Substance Abuse (Steroids, Cocaine)	11%
Unknown (No Prior Diagnosis)	19%

Source: (International Journal of Cardiology Sciences 2025)



Congenital and Genetic Factors

- The primary cause of SCD in young athletes is hypertrophic cardiomyopathy (HCM).
- Brugada syndrome and long QT syndrome: inherited arrhythmias that raise the chance of SCD.
- Coronary Artery Anomalies: Congenital abnormalities that go unnoticed.

Environmental and lifestyle considerations

- Obesity & Sedentary Lifestyle: Young individuals are increasingly developing diabetes and hypertension.
- Stress & Mental Health: academic stress, work-related stress, and irregular sleep schedules. Smoking, binge drinking, and performance-enhancing drugs are examples of substance abuse.
- Air pollution: associated with a higher incidence of CVD (Mehta R (2023).

Discussion

Trends in urban and rural areas: The risk profiles for cardiovascular disease vary depending on the location. As lifestyles change, rural populations show rising rates of obesity and smoking, while urban Indians have historically had higher rates of diabetes, dyslipidaemia, and hypertension. Premature CAD incidence is being

driven by the "urbanisation of the rural lifestyle," which includes processed diets and sedentary habits, according to a study of young people in rural areas. Given that urban youth face ongoing metabolic risks and rural communities are picking up urban risk behaviours, it appears that the gap between the two may be closing. Rural areas with fewer resources also typically have larger awareness and screening gaps. However, as a result of changes across the country, both settings now report a sizable number of young people experiencing acute coronary events.

Differences by gender: The majority of research indicates a significant male preponderance. For instance, the autopsy SCD series showed a mean age of mid-30s with a male preponderance (Arava, S et al., 2025) and approximately 90% of the young CAD patients in rural areas were male. Young men are more likely than women to be impacted by SCD worldwide (Madhavan, S.R. et al., 2011). Males are more likely to smoke, cardiac electrophysiology differs between sexes, and female CAD is not as well-known. Significantly, although fewer young women develop sickle cell disease (SCD), their prognosis is frequently worse after it happens, indicating gender differences in prompt diagnosis and treatment.

The results indicate that genetic factors (such as Brugada syndrome) and lifestyle decisions (including substance abuse and insufficient physical activity) play significant roles. In contrast to Western nations, India does not have extensive cardiac screening initiatives for young adults, resulting in unrecognised health issues [Risk of sudden cardiac death and preventive measures in athletes].

Socioeconomic factors: Risks may be increased by a lower socioeconomic status (SES). Young people from underprivileged backgrounds may have undiagnosed heart defects or uncontrolled hypertension due to limited access to healthcare and preventive services. Environmental factors like pollution and occupational stressors like long hours and hard work can also play a role. On the other hand, sedentary lifestyles and high-calorie diets are frequently associated with higher SES in urban areas. Because poverty and wealth have different cardiac risks, the aetiology of SCD in young people is therefore influenced by social context. However, there is a dearth of thorough SES data for young Indian SCD victims, suggesting that more research is necessary.

Recommendations for prevention

1. Compulsory ECG evaluations for athletes and individuals at high risk.
2. Public awareness initiatives regarding substance misuse and cardiovascular health.
3. Programs for stress management in educational institutions and professional environments (Sharma M et.al, 2021).
4. Protection from polluted air by wearing masks.
5. proper dietary follow, avoiding oily foods which can lead to high cholesterol.

Conclusion

There is an urgent need to address the growing pandemic of cardiac arrest among young Indians. Mortality rates can be significantly reduced by prompt identification through routine cardiac testing and lifestyle modifications. To address this pressing issue, policymakers must give preventive cardiology programs top priority.

There are several reasons why young Indians (18–45 years old) experience cardiac arrest. Congenital abnormalities, early-onset atherosclerotic CAD, and structural heart disease—particularly hypertrophic cardiomyopathy—are important categories. Nonetheless, a significant portion of cases are left "unexplained" upon autopsy, frequently due to hidden genetic cardiac disorders. Risk is significantly influenced by family history and lifestyle factors such as smoking, obesity, and alcohol and drug use. Based on these results, we advise strengthening autopsy/genetic evaluation of sudden deaths to uncover hidden causes; routine cardiac screening (ECG, Echo) for at-risk individuals (positive family history or early cardiovascular risk factors); and aggressive primary prevention (tobacco cessation, healthy diet, exercise) beginning in adolescence. Public health initiatives must

target modifiable risks and reach both urban and rural populations.

After reviewing 150 research papers number one reason that is not commonly talked about, which is also a serious issue in the rise of cardio problems, is Air pollution in India. Not only heart-related issues, but also lung-related problems are on the rise. Socio-economic factors also play a role in cardiac-related problems as their economic conditions are worse, which results in vitamins and minerals deficiency, causing serious harm to the heart, which in future can lead to a heart attack or even cardiac arrest.

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