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Why are young people dying of heart attacks these days: what is the evidence?

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Evidence in Context

Prior Evidence: Cardiovascular diseases were traditionally associated with older age groups. However, recent statistics show a concerning rise in heart attacks among younger individuals. The American Heart Association reported a 2% yearly increase in heart attacks in those under 40 over the past decade. Other studies revealed a 30% to 45% increase in heart attacks among adults aged 35-54 years. The European Society of Cardiology found a 74% rise in heart attacks in adults under 45 in the past decade. The CDC reported a 32% increase in heart attack hospitalizations among adults aged 18-34 between 2006 and 2016.

Evidence added by this study: This mini review article delves into the multifaceted reasons behind the surge in heart attacks among the youth. Factors include genetics, lifestyle choices like sedentary habits, unhealthy diets, smoking, and alcohol consumption, as well as stress and mental health challenges. Environmental factors, such as air pollution and exposure to toxins, also play a role. The article emphasizes the importance of understanding these factors to develop targeted interventions, raise awareness, and promote preventive measures. The study underscores the need for comprehensive strategies, including education, policy changes, and healthcare initiatives, to address this alarming trend.

To view Article

Abstract

Background: Traditionally, cardiovascular diseases have been associated with older age groups. However, recent observations indicate a shift, with a growing number of young individuals experiencing heart attacks.

Objectives: This study sought to explore the various factors contributing to this alarming trend and to understand the underlying causes.

Methods: A comprehensive review of available evidence was conducted to examine the factors contributing to the rise in heart attacks among the youth. The study delved into genetic predispositions, lifestyle choices, socioeconomic factors, and healthcare infrastructure. The research also considered the complex interplay of these factors and how they collectively influence heart health in younger populations.

Results: The review revealed a concerning global trend of increasing heart attacks among younger individuals. Several factors were identified as contributors to this trend. Genetics played a role, but lifestyle choices, including sedentary habits, unhealthy diets, and tobacco use, were significant contributors. Socioeconomic factors and disparities in healthcare infrastructure further exacerbated the issue. The study also highlighted the importance of understanding the interplay between these factors, as they often compound the risks associated with each other.

Conclusions: The rising incidence of heart attacks among the youth is a pressing global health concern. While genetics play a role, modifiable lifestyle factors are significant contributors. Addressing these factors, understanding their interplay, and implementing multifaceted approaches are crucial to tackling this issue effectively. The study underscores the need for comprehensive strategies, including public health campaigns, policy changes, and targeted interventions, to reverse this alarming trend.

Keywords: *Cardiovascular diseases, Young individuals, Heart attacks, Lifestyle choices, Sedentary habits, Unhealthy diets, Smoking, Stress, Environmental factors, Preventive measures*

Introduction

Recent years have seen an alarming increase in the incidence of coronary artery disease (CAD) among younger population[1-3]. Once considered a condition predominantly affecting the elderly, this shocking rise in fatalities among the younger population

Demands immediate attention and investigation. Understanding the increasing number of heart attacks among young people is crucial for public health. By unraveling the underlying causes, we can develop targeted interventions, raise awareness, and promote preventive measures to mitigate the impact on public health and ensure the well-being of future generations.

According to the American College of Cardiology, heart attacks in people under 40 years of age have increased by 2% each year over the past decade[4]. Furthermore, a study conducted by the American Heart Association revealed a 30% increase in heart attacks among adults aged 35-54 years[4]. These statistics underscore the urgent need to address this growing health issue among the younger population. A study published in Circulation, a journal of the American Heart Association, reported a 45% increase in heart attacks among individuals aged 35-54 years between 1995 and 2014[5]. A systematic review and meta-analysis revealed the declining age of onset for coronary artery disease (CAD) in Iran by comparing the prevalence of premature CAD (PCAD) risk factors in patients versus healthy individuals[2]. Data from various databases up to October 2017 revealed that risk factors like diabetes mellitus, family history of CAD, dyslipidaemia, smoking, and hypertension were significantly associated with PCAD[2]. Additionally, patients with PCAD showed notably lower levels of high-density lipoprotein cholesterol and higher triglyceride levels compared to healthy subjects. The study underscores the importance of these risk factors in the early onset of CAD among young Iranian adults[2]. In 2017, the NCD burden in India was studied using metrics like DALYs, YLL, and YLD[6]. The research showed that NCDs account for 16,939 DALYs per 100,000 people[6]. While 50-70% of patients sought treatment in private facilities, there was a notable variation in healthcare utilization, disease burden, and treatment costs across states. Karnataka had the highest DALY rate, Chandigarh the highest out-of-pocket expenses, and Arunachal Pradesh the highest catastrophic health expenditure. The data underscores the need for enhanced NCD management in economically challenged Indian states[6]. These statistics underline the concerning trend of heart attacks affecting younger individuals, emphasizing the urgency for further research and preventive measures to address this public health challenge.

According to the study report "India: Health of the Nation's States"- The India State-Level Disease Burden Initiative in 2017 by Indian Council of Medical Research (ICMR), it is estimated that the proportion of deaths due to Non-Communicable Diseases (NCDs) in India have increased from 37.9% in 1990 to 61.8% in 2016. The four major NCDs are cardiovascular diseases (CVDs), cancers, chronic respiratory diseases (CRDs) and diabetes which share four behavioral risk factors –unhealthy diet, lack of physical activity, and use of tobacco and alcohol. The number of deaths due to heart attacks in India has remained consistently over 25,000 in the last four years, and over 28,000 in the last three years, according to data on "Accidental Deaths & Suicides in India" (ADSI) compiled by the National Crime Records Bureau (NCRB).

Traditionally, heart attacks have been associated with older adults due to several reasons. First, age is a well-established risk factor for cardiovascular diseases, including heart attacks. As individuals age, their arteries tend to become narrower and less flexible, increasing the likelihood of plaque build-up and the risk of a heart attack. Secondly, older adults often have a longer exposure to other risk factors such as high blood pressure, high cholesterol levels, and diabetes, which can contribute to the development of heart disease over time. Moreover, lifestyle factors such as sedentary habits, unhealthy diets, and tobacco use tend to accumulate over the years, increasing the risk of heart disease among older adults.

The perception that heart attacks primarily affect older adults has been reinforced by public health campaigns and medical education that have primarily focused on this age group. As a result, symptoms of heart attacks may be overlooked or misinterpreted in younger individuals, leading to delayed medical intervention. However, the rising incidence of heart attacks among younger people challenges this traditional perception and highlights the need for increased awareness, prevention, and timely medical attention for all age groups. A comprehensive investigation into the factors underlying heart attacks in younger populations is vital to improve prevention, early detection, and treatment strategies, ultimately safeguarding the cardiovascular health of younger individuals and the overall well-being of our society.

Lifestyle factors

Lifestyle factors play a significant role in the rising prevalence of heart attacks among young people[5]. Sedentary lifestyle and the lack of physical activity have become all too common in today's society. With the rise of technology and sedentary occupations, young individuals spend prolonged periods sitting and engaging in minimal physical activity [5]. This lack of exercise contributes to weight gain, obesity, high blood pressure, and elevated cholesterol levels, all of which are risk factors for heart disease. Encouraging regular physical activity, promoting active lifestyles, and creating opportunities for exercise are essential in combatting this issue and reducing the incidence of heart attacks among the younger population.

Unhealthy diets and the widespread consumption of processed foods have also emerged as major contributors to this alarming trend[5]. The prevalence of fast food, sugary beverages, and high-calorie snacks has led to a rise in obesity rates and unfavorable lipid profiles, both of which are associated with an elevated risk of heart disease. A catena of studies have been conducted in human subjects to unravel the possible associations between the consumption of fried foods and the incidence of prevalent diseases, mainly cancer, metabolic syndrome and CAD. Repeated heating of oils at high temperatures (160–190 °C) over a long period of time predisposes the oil to thermal oxidation, hydrolysis and polymerization with a configuration change of fatty acid from cis

To trans isomers and accelerates the formation of oxidized and polymerized lipid species in the frying medium. These poor dietary choices, coupled with sedentary lifestyles and lack of physical activity, create a perfect storm for cardiovascular problems. Addressing these lifestyle factors through education, promoting nutritious diets, and encouraging regular exercise is crucial to mitigating the impact of heart attacks among the younger population[7-9].

Smoking, alcohol consumption, and substance abuse significantly contribute to the increased risk of heart attacks. Smoking tobacco damages blood vessels, reduces oxygen supply, and accelerates the development of atherosclerosis. It also increases blood clotting, heightening the chances of heart attacks. Similarly, excessive alcohol intake raises blood pressure, disrupts heart rhythm, and weakens the heart muscle, leading to cardiac events. Substance abuse, including illicit drugs like cocaine or methamphetamines, can cause coronary artery spasms, irregular heart rhythms, and sudden cardiac arrest. Understanding and addressing these modifiable risk factors is crucial in preventing heart attacks, emphasizing the importance of smoking cessation, moderate alcohol consumption, and drug abuse prevention strategies[8, 10, 11].

Stress and mental health

Young individuals today face unprecedented levels of stress and pressure, which can contribute to an increased risk of heart attacks[12]. Academic demands, career uncertainties, financial pressures, and the constant presence of social media create a perfect storm for heightened stress levels. Further, the advent of corporate culture and growing competition in all field has severely disturbed the work life balance adversely affecting the mental health. Chronic stress has been linked to various pathological changes, including raised blood pressure, inflammation, and impaired cardiovascular function. Moreover, rising prevalence of mental health issues like anxiety and depression, can further exacerbate the risk. It is imperative to address the rising levels of stress and prioritize mental health support to mitigate the adverse effects on cardiovascular health among young individuals.

Prolonged stress triggers the release of stress hormones, elevating blood pressure, and increasing the workload on the heart. Over time, this can lead to the development of hypertension, a major risk factor for heart disease. Moreover, chronic stress has been linked to unhealthy coping mechanisms such as overeating, smoking, and sedentary behavior, further exacerbating the risk of heart attacks. Additionally, stress can contribute to the development of inflammation, arterial plaque formation, and the disruption of normal heart rhythms, all of which can increase the likelihood of a cardiovascular diseases including CAD and Sudden Cardiac Death. Recognizing and addressing mental health issues is imperative not only for psychological well-being but also for reducing the risk of heart disease and promoting overall cardiovascular health.

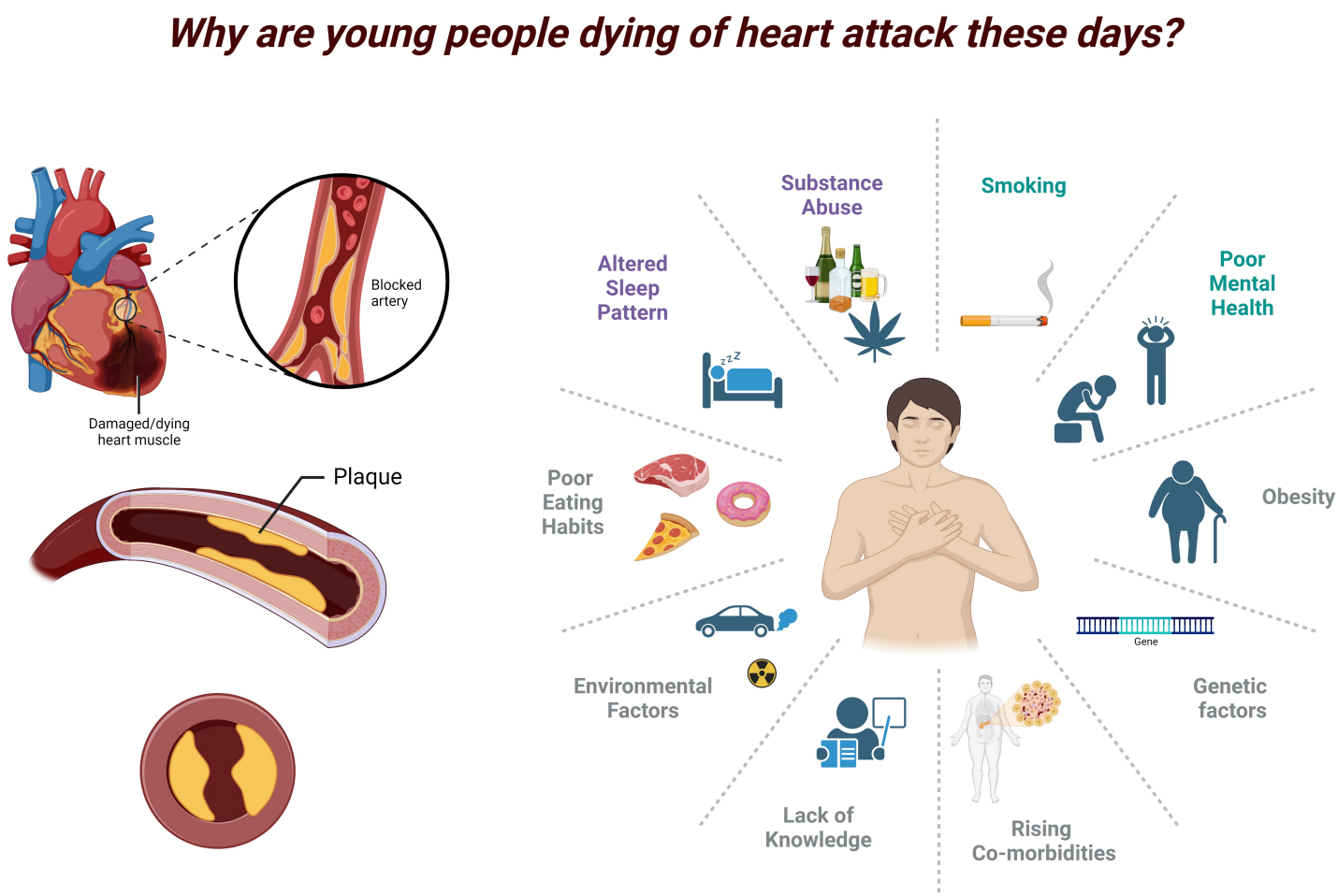

Figure 1: Graphical summary (Created using Biorender)

Emerging risk factors

Investigating the influence of obesity and metabolic syndrome on rising incidence of cardiovascular diseases among young people is crucial. The rising prevalence of obesity, often accompanied by metabolic syndrome, poses a significant risk to cardiovascular health. These conditions contribute to the development of atherosclerosis, high blood pressure, and insulin resistance, all of which increase the likelihood of heart attacks. Moreover, young individuals with obesity and metabolic syndrome may experience early onset of cardiovascular disease, leading to severe consequences later in life. Further, recent times have also seen a rising incidence of other lifestyle diseases, like Diabetes Mellitus - which by affecting the vascular and lipid health can be independent factors for increasing risk of cardiovascular diseases. By understanding and addressing these factors, including promoting healthy weight management and lifestyle changes, we can potentially reduce heart attack rates among the younger population and improve their long-term cardiovascular health outcomes.

Sleep deprivation and irregular sleep patterns have a significant impact on cardiovascular health. Studies have shown that inadequate sleep duration and poor sleep quality are associated with an increased risk of developing heart disease, including heart attacks. Sleep deprivation disrupts key physiological processes, such as blood pressure regulation, glucose metabolism, and inflammation control, all of which play crucial roles in maintaining cardiovascular health. Moreover, irregular sleep patterns, such as shift work or frequent changes in sleep schedules, can disrupt the body's internal clock and lead to circadian rhythm disturbances, further compromising cardiovascular function. Addressing sleep disorders, promoting healthy sleep habits, and prioritizing sufficient and consistent sleep are essential for preserving heart health in individuals, particularly the younger population.

The role of environmental factors, including air pollution and exposure to toxins, in the development of cardiovascular diseases is an important area of exploration[13]. Numerous studies have linked high levels of air pollution, particularly fine particulate matter (PM2.5) and nitrogen dioxide (NO2), with an increased risk of heart attacks, stroke, and other cardiovascular conditions. These pollutants can trigger inflammation, oxidative stress, and the formation of atherosclerotic plaques, contributing to the development and progression of heart disease. Additionally, exposure to environmental toxins like heavy metals, pesticides, and industrial chemicals has been associated with adverse cardiovascular effects. Understanding and mitigating the impact of these environmental factors is crucial for promoting heart health and developing effective public health policies. There are many incidents in recent years of fairly healthy, active, young people succumbing in gyms etc. That may need some exploration.

What can be done?

Increase awareness: Emphasizing the importance of educating young individuals about heart health is paramount. By equipping them with knowledge and awareness, we empower them to make informed lifestyle choices that promote cardiovascular well-being. Educating young people about the risk factors associated with heart disease, such as unhealthy diets, physical inactivity, smoking, and stress, can help them adopt healthier habits from an early age. Teaching them about the importance of regular exercise, balanced nutrition, stress management, and the early recognition of symptoms can significantly reduce their risk of developing heart disease. By investing in heart health education, we empower young individuals to take charge of their well-being and build a foundation of lifelong cardiovascular health.

Role of health care-giver: Healthcare providers play a crucial role in identifying and addressing risk factors among young patients susceptible to heart attacks. Through routine check-ups and screenings, providers can assess key indicators such as blood pressure, cholesterol levels, and body mass index. They can also evaluate lifestyle choices, including physical activity, diet, and tobacco or substance use. By identifying these risk factors early on, healthcare providers can educate young patients about the importance of adopting healthy habits and provide personalized guidance for risk reduction. Moreover, they can offer targeted interventions, such as medication or referral to specialists, if necessary. Empowering healthcare providers to prioritize cardiovascular health in young patients can lead to improved outcomes and help stem the tide of heart attacks in this vulnerable population.

Role of policy makers: It is imperative to advocate for the implementation of policies and programs that promote healthy lifestyles among young people. Such initiatives can play a crucial role in reducing the incidence of heart attacks in this population. By focusing on preventive measures, such as promoting physical activity, encouraging a nutritious diet, and discouraging smoking and substance abuse, we can empower young individuals to adopt healthier habits. Additionally, educational campaigns and school-based interventions can raise awareness about the importance of cardiovascular health and provide young people with the knowledge and tools to make informed choices. By prioritizing and investing in these policies and programs, we can create a supportive environment that fosters a generation of heart-healthy individuals.

Preventive clinic: Concept of health prevention is very poorly understood in community and even among health workers, there is no emphasis on prevention through lifestyle changes during health visits. While in western countries dedicated preventive clinics are there to focus on preventive aspects of health care. Common man does not know where to consult for such issues even wishes. Now there is urgent need to establish dedicated Preventive Clinics at various level of health care system to promote health and prevent disease thus disease free population .

Role of government: Smoking and air pollution is major contributor of increase incidence of myocardial infarction in young adults .Policies targeting decrease smoking and minimise air pollution should be made and implemented strictly.

The increasing number of heart attacks among young people demands our immediate attention and action. We have explored the evidence and key factors contributing to this concerning trend. It is clear that heart attacks are no longer solely confined to older adults, and young individuals are facing a growing risk. We have highlighted the importance of understanding the factors behind this shift in demographics, which include lifestyle choices, stress, mental health, emerging risk factors, and environmental influences. Recognizing these factors allows us to develop targeted interventions and preventive measures to address the rising rates of heart attacks among the younger population.

It is crucial to reiterate the urgency of the situation. The statistics and evidence presented in this article should serve as a wake-up call to individuals, communities, and policymakers. We cannot afford to ignore the increasing burden of heart disease in the younger generation. Individuals must prioritize their heart health by adopting healthy lifestyles, including regular exercise, balanced diets, and avoiding harmful habits like smoking or excessive alcohol consumption. Communities need to foster an environment that supports heart-healthy choices, providing access to nutritious food, safe recreational spaces, and stress management resources.

Policymakers have a vital role to play as well. They must allocate resources for research, awareness campaigns, and preventive healthcare initiatives specifically tailored to young individuals. Furthermore, policies should promote healthier environments, such as reducing air pollution and implementing regulations to encourage healthier food options in schools and public places. Addressing the rising rates of heart attacks among young people requires a comprehensive and collaborative approach. By prioritizing heart health, taking proactive steps, and working together, we can make significant strides in preventing heart disease in the younger population and securing a healthier future for all.

Setting up a public health management cadre & promoting multidisciplinary research approach with use of artificial intelligence in seamless delivery of healthcare services through public and a viable private sector is the key of future model health care system.

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None

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None

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Neelam Dahiya: Conceptualization (lead); writing – original draft (lead); formal analysis (lead); writing – review and editing (equal). **Yashendra Sethi**: conceptualization, Software (lead); writing – review and editing (equal). **Vineet Rajagopal**: Methodology (lead); writing – review and editing (equal). **Anil Kumar Choudhary**: Conceptualization (supporting); Writing – original draft (supporting); Writing – review and editing (equal). **Sourabh Agstam**: Conceptualization (supporting); Writing – original draft (supporting); Writing – review and editing (equal).

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Additional information
No additional information is available for this paper.

Declaration of competing interest
The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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