

Coronary Artery Disease

PRESENTATION BASED ON
MANAGEMENT OF LONG-TERM CARDIO-
VASCULAR DISEASE

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What is coronary artery disease?

- Coronary Artery Disease (CAD) is most common type of Cardiovascular Disease (CVD) and leading cause of death worldwide. Coronary artery disease is also known as a **coronary heart disease**.

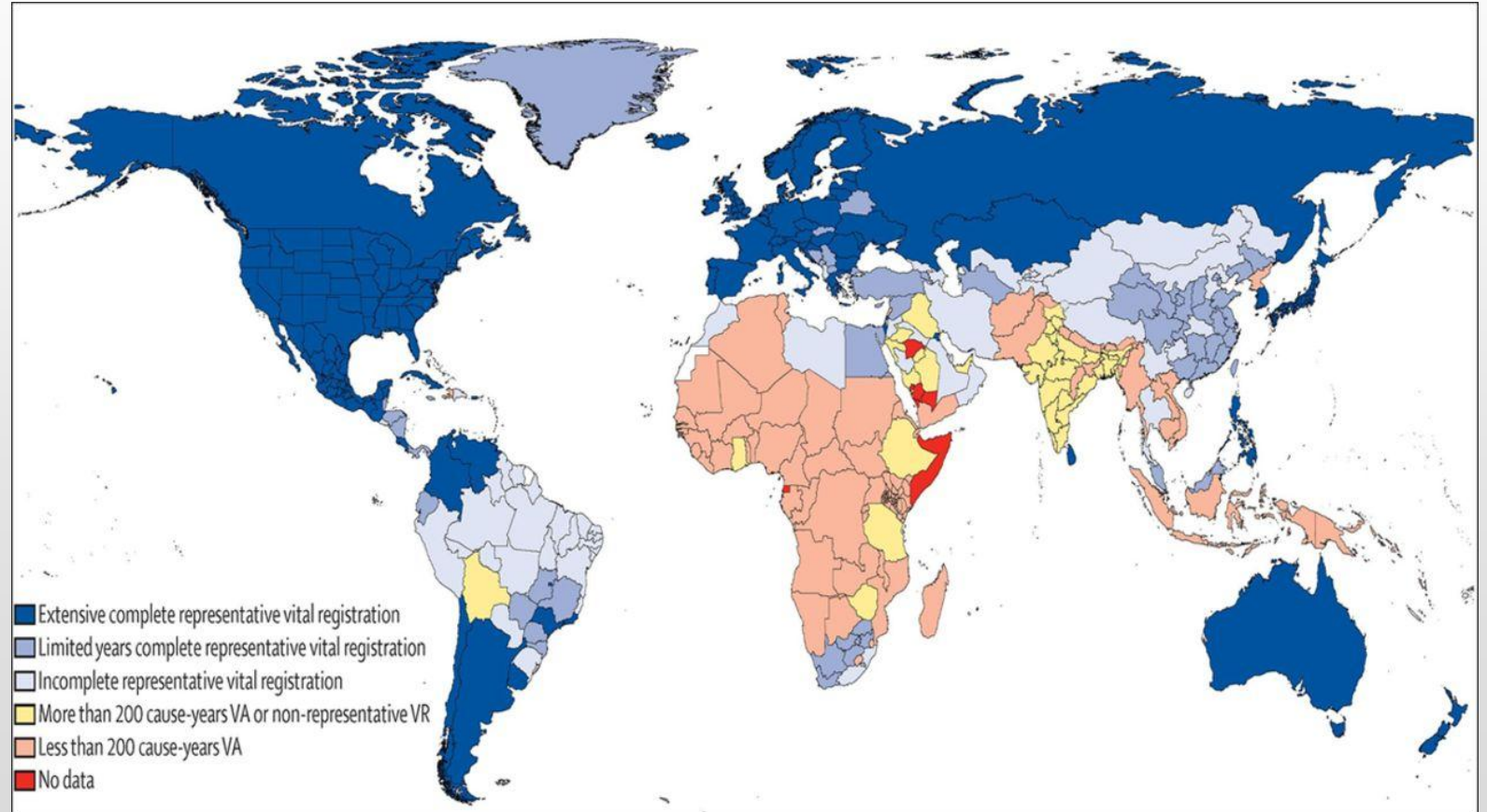
Definition

“It is a common heart condition where the major blood vessels to the heart (coronary arteries) become blocked and narrowed, that restricting the flow of oxygen-rich blood to the heart (Heart research institute-UK).”

- This process not only narrows the arteries but it also increase the risk of rupture plaque and develop thrombosis, which can lead to heart attacks .
- These plaques are composed of lipids, cholesterol, calcium, and inflammatory cells.
- This condition may present clinically as angina, myocardial infarction, or sudden cardiac death if its not treated on time.
- In UK alone, there are approximately 2.3 millions of individuals are living with Coronary Artery Disease (NICE).

Epidemiology & Public Health Burden

- According to World Health Organization (WHO), cardiovascular diseases are responsible for around 17.9 million deaths annually, which is approx 32% of all global deaths, and also in all these coronary artery disease contributing the largest proportion (WHO,2023).



(American heart association journals)

- In the United Kingdom, CAD is significant public health challenge.
- Around 2.3 million peoples in the UK are currently living with coronary heart disease, which is main cause of premature death in the UK (British Heart Foundation).
- In addition, CAD places a substantial economic burden on the National Health Service, with billions of pounds spent annually on hospitals, treatment, and long term care.
- The epidemiology of CAD is strongly influenced by socioeconomics and demographic factors. This prevalence is increasing with age and its higher in men than women. Also in that post-menopausal women experience with higher risk to develop CAD (Public Health England, 2020).
- This condition truly affects lives of peoples that reduces the quality of life and increases the risk of long-term disabilities.
- Many individuals with chronic symptoms like angina requiring ongoing management and support.
- This highlights plays a critical role of public health interventions and health care policies in reducing overall burden of the disease.

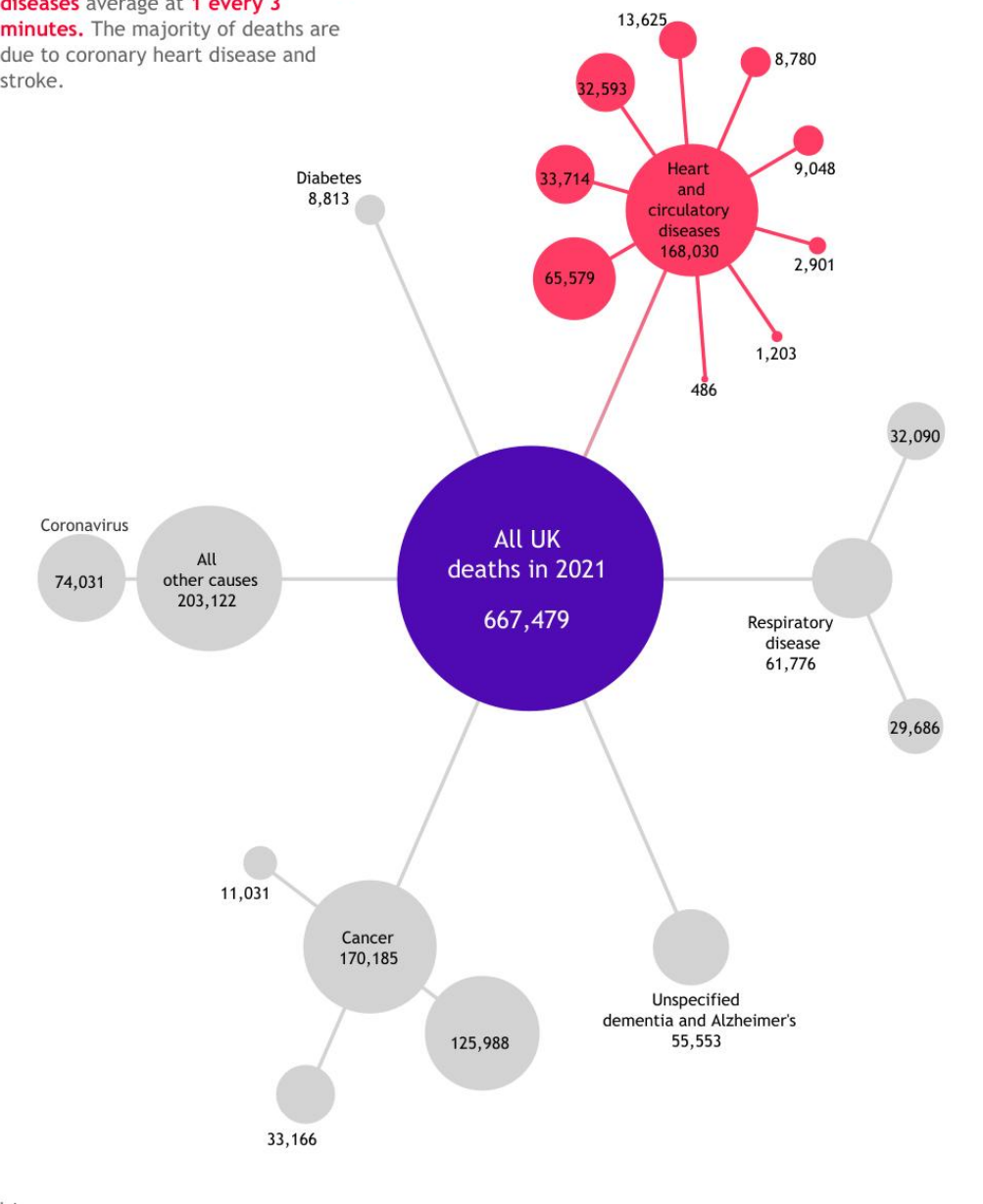
Risk Factors

- The combination of modifiable and non-modifiable risk factors strongly associated with the development of coronary artery diseases (CAD). Understanding these factors are essential for their effective prevention and their long-term management, particularly within community care settings.
- The non-modifiable risk factors are gender, age, and genetic predisposition. The risk of CAD can increase significantly with advancing age due to progressive arterial changes. Men are generally have higher chances to develop CAD in their younger age compared to women. However, there is also high risk in women increases after menopause due to hormonal changes. But in all of that the individuals who has family history of cardiovascular disease are more likely to develop CAD, which is indicating a genetic component (NICE,2016).
- In both the development and progression of CAD, the modifiable risk factor plays a crucial role. One of the most significant risk factor to develop CAD is smoking, which develops endothelial damage and accelerates atherosclerosis. Hypertension (high blood pressure) increases the work-load on the heart, which results into damages of arterial walls. While increases cholesterol levels, particularly low-density lipoprotein (LDL) promote plaque formation in the coronary arteries. The diabetic patients are also more likely to develop CAD, especially diabetes mellitus significantly increases the risk of CAD due to its impact on the vascular health and metabolic function (WHO,2023).

- Further compounds are lifestyle related main risk factors such as physical inactivity, unhealthy diet, and obesity. Highly saturated foods with fats, salt, and sugar are directly linked to increased cholesterol levels and hypertension. Obesity is associated with metabolic syndrome, which includes insulin resistance, hypertension, and dyslipidaemia. These interconnected conditions are likely to develop CAD.
- On the look of public health perspectives, the modifiable risk factors are particularly important, because, these risk factors are preventable and can be managed. We can also think of some of the health promotion strategies which play a crucial role in reducing disease incidence such as smoking cessation programs, dietary education, and physical activity.

Heart and circulatory disease in context

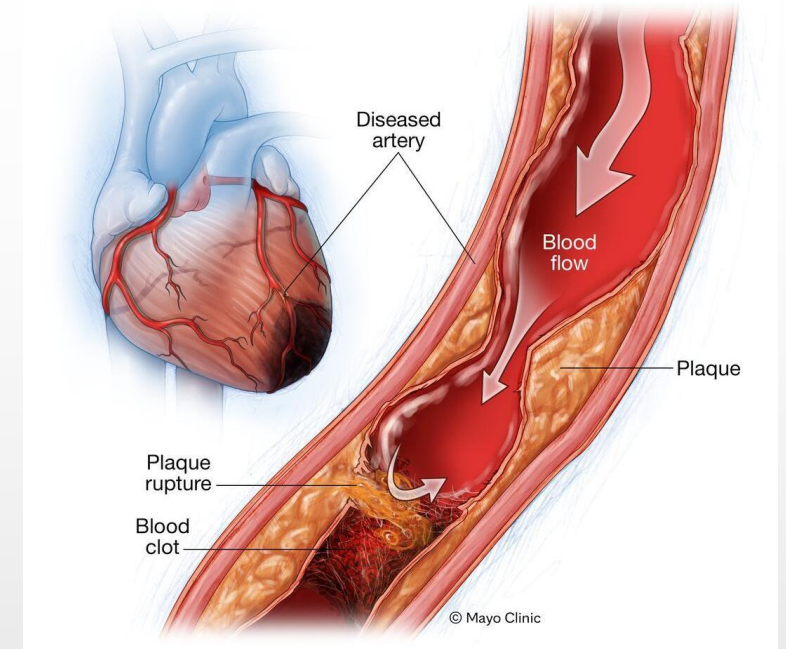
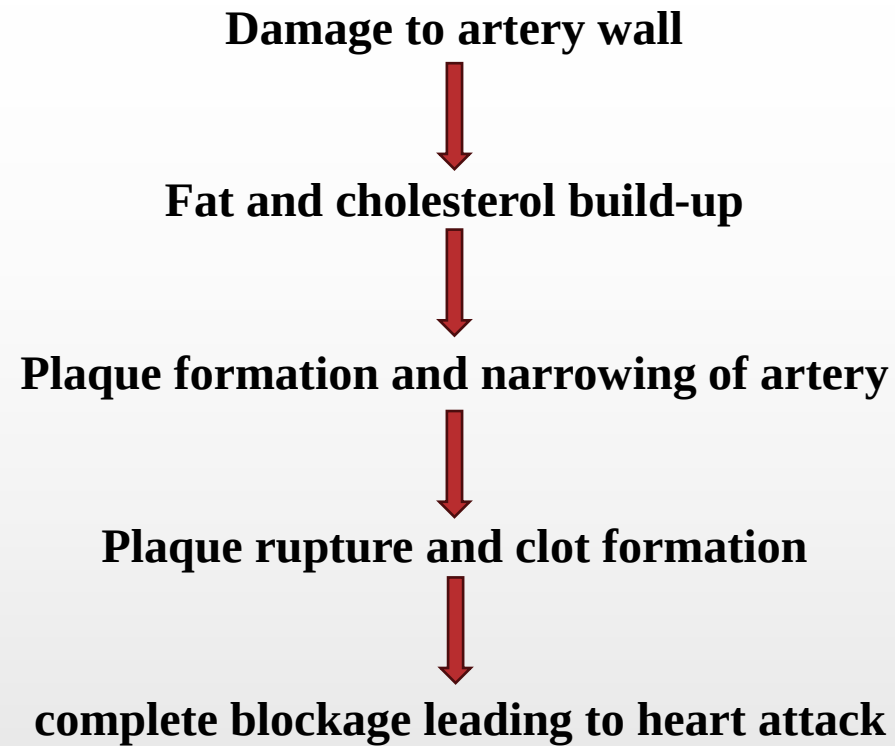
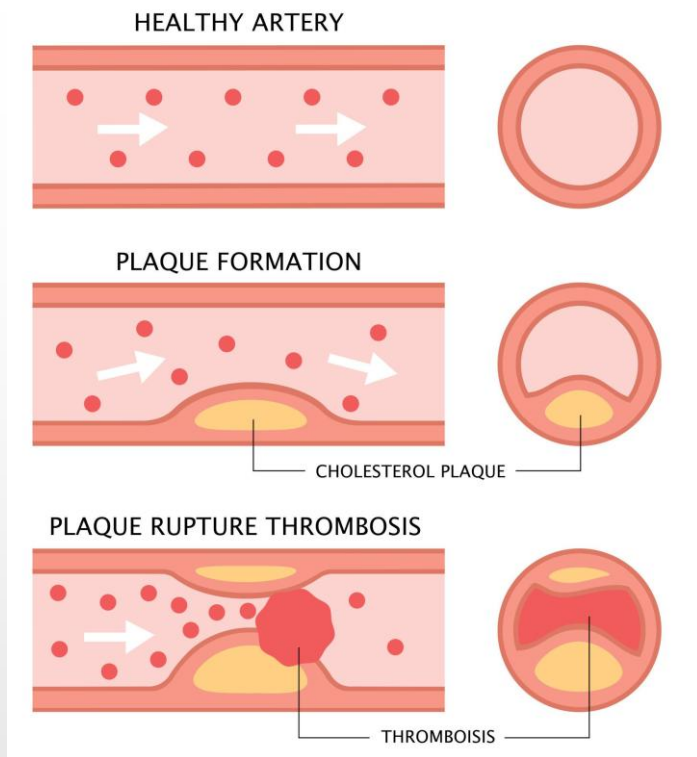
UK deaths from **heart and circulatory diseases** average at **1 every 3 minutes**. The majority of deaths are due to coronary heart disease and stroke.



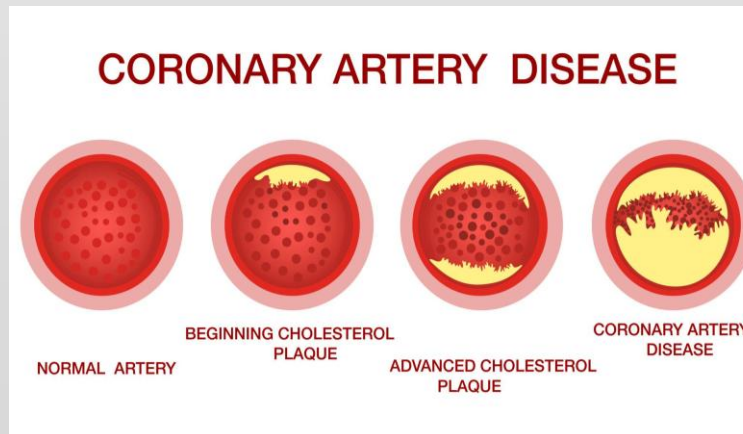
British Heart Foundation (2024)

Pathophysiology of Coronary Artery Disease

- One of the main cause of Coronary artery Disease is a long term process called atherosclerosis, which develops slowly over time.
- When the inner lining of the coronary arteries becomes damaged, it starts usually some of the leading risk factors such as smoking, hypertension, increasing in cholesterol, and diabetes causes this damage. Fatty substances – especially low-density lipoprotein (LDL) cholesterol starts to build up inside the wall when once the artery wall is damaged (Libby, 2021).
- By the time these fatty deposits create a structure called a plaque. The plaque continues to grow and makes the artery narrower. It reduces the flow of oxygenated blood to the heart. It results in to the chest pain when the heart does not get enough oxygen, known as angina (kumar et al., 2020).
- Sometimes, the plaque becomes unstable and it ruptures. When this happens, the body reacts to create a blood clot to repair the damage. This clot can block the artery completely and it stops blood going to the heart. This leads to a heart attack. Which is known as myocardial infarction (AHA, 2022).



- This process clearly shows that why managing risk factors such as High Cholesterol levels, Hypertension, and other lifestyle habits is very important. Early prevention of these factors can slow down the process or even stop the progression of CAD.



National Heart Lung and Blood Institute (NHLBI)

Clinical features & diagnosis of CAD

- The symptoms of coronary artery only shown when the heart does not get enough oxygenated blood.
- Here, the most common symptom is angina, which is chest pain, or discomfort. Patient always describe it as pressure, tightness of chest or heaviness in the chest. The pain of angina may spread to the left arm, neck, jaw, or back. It more develops or triggered when there is physical activity or stress and it improves with rest. The other symptoms are shortness of breath, fatigue, dizziness, and nausea (Mayo clinic, 2023).
- When the symptoms becomes intense and prolonged, then CAD can lead to a heart attack (Myocardial Infarction) in some cases. Which always need emergency treatment.
- Several tests are used to diagnosis CAD. One of the first and main tests is an electrocardiogram (ECG), Which records the electrical activity of the heart and it shows abnormal patterns. Blood tests are also require here. (European society of cardiology, 2021).
- Further investigations include stress testing, where there is monitoring the heart during exercise to detect reduce blood flow. The most effective test is **Coronary Angiography**. Here, a special dye is injected into the Coronary Arteries to see the blockages using imaging techniques.
- Previous diagnosis is always essential in managing CAD effectively. It helps to reduces risk and preventing the complications such as heart attacks and allows you timely prevention by medications and lifestyle changes.

Management of CAD

- The management of CAD always focuses on to the reducing symptoms, preventing the complications like heart attacks, and improving the patient's quality of persons life. There is usually a combination type of treatment includes medications, lifestyle changes, and sometime surgical procedures.

➡ Medical Management

- Medications are the first line of treatment which are used to long-term control of the disease.
- **Antiplatelet drugs:** (e.g., Aspirin) helps to prevent the blood clots from forming it in the arteries.
- **Statins:** these are always used to lower the Cholesterol levels and slow down the formation process of plaque.
- **Beta-blockers:** these reduces the heart rate and blood pressure, and also decreasing the heart's workload.
- **ACE inhibitors:** it relaxes blood vessels and improve blood flow.
- These medications are used for both, symptoms control and prevention of the disease (British National Formulary-2024).

➡ Surgical & Interventional Management

- When medications are not enough in developed conditions, advanced procedures may be required to restore the blood flow to the heart.
- **Percutaneous Coronary Intervention (PCI) (Angioplasty) :** Here, a small balloon is inserted into the blocked artery and

Inflated to open it. Usually, a stent is placed here to keep the artery open.

- **Coronary Artery Bypass Grafting (CABG)** : This is a surgical procedure where healthy blood vessel is taken from another part of the body and it used to bypass the blocked artery.
- These surgical procedure are usually recommended in sever cases only, or when there is a high risk of heart attack (NHS, 2023).

➡ **Long-term Management Approach**

- CAD is long term condition, so the treatment is not just upon the medications and immediate care, patients need:
- Life long medication adherence.
- Regular follow up with healthcare professionals.
- Continuous monitoring of risk factors (BP, Cholesterol, Diabetes).

Community care & long term management of CAD

- The management of coronary artery disease extends beyond clinical based treatment and always require a comprehensive and community focused approaches.

➡ Role of primary care

- Primary care always plays a central role in the long-term management of CAD. GPs, nurses and community pharmacists are responsible, for regular monitoring of patients, including blood pressure, cholesterol levels, and medications. Early identification of the disease and timely intervention are key to preventing complications (NICE, 2016).

➡ Cardiac Rehabilitation

- It is a structured programme that involves supervised exercise, education and psychological support. It helps patients to recover after cardiac events and reduces the risk of future complications. Moreover, evidence shows that those who are participate in rehabilitation programmes. Significantly improves their quality of life and lowers mortality rates (Anderson et al., 2016).

➡ Lifestyle modification

Lifestyle changes plays major role in long-term management and prevention.

- Healthy diet (e.g., Low salt, Low fat).
- Smoking cessation
- Regular physical activity
- Weight management

These interventions are given through community based programmes and public health centers, making them easier and cost effective.

➡ Medication adherence & self management

Patients are always on life long medication for CAD. Here, non-adherence is a major factor that can lead to disease development and hospital readmission. Therefor, patient education and self-management are always important. Patient should be aware about,

- Understand their disease and current condition
- Regularly monitor their symptoms
- Take medicines regularly and correctly
- Ask for help when they needed

➡ Psychological & Social support

- The patients who are living with CAD can lead to Anxiety, depression, and reduced quality of life. Community care involves in mental health support, counselling, and support groups. Family involvement also plays a major role in

improving life and emotional well-being.

➡ **Role of health policy**

- In the UK, the national health service (NHS) has long term plan to emphasises prevention, early intervention and community based care for cardiovascular diseases. Also integrated care system (ICS) has aim to provide coordinated services across primary, secondary and community care services.

➡ **Multidisciplinary approach**

Effective management of CAD often requires the collaboration between,

- doctors
- Nurses
- Dieticians
- Physiotherapists
- Pharmacists

This approach ensures holistic care, focuses on both medical and social needs of patients.

Public health strategies & prevention of CAD

- Prevention of CAD is a major priority in public health. Because it is largely influenced by modifiable risk factors. That's why public health strategies aim to reduce the incidence at individual, community, and population levels.

Primary prevention

- Primary prevention focuses on reducing the risk of developing CAD in healthy peoples. This includes promoting the healthy lifestyles such as balanced diets, regular physical activity, smoking cessation, and also weight management. Public health campaigns play a key role in this. They raising awareness and encouraging behaviour change.
- In the UK, national health service (NHS) and government bodies promote healthier eating and active lifestyles, other factors like policies such as **Sugar Tax** (soft drinks industry levy) have been introduced to reduce sugar consumption and tackle the condition like obesity, which is a major risk factor for CAD (HM Government, 2018).

Secondary prevention

- Secondary prevention represents to detect disease early and prevention of progression of disease. This includes screening of programmes for high-risk individuals. Such as blood pressure checks, testing of cholesterol, and diabetes screening.
- The NHS health check programme plays important role that targets adults aged 40-74 years to identifying early signs of cardiovascular disease and provide advice (Public Health England, 2019).

Tertiary prevention

- Tertiary prevention focuses on the managing patients who already suffering from CAD to prevent their complications and improve their qualities of life. This includes cardiac rehabilitation, medication management and ongoing support within community care settings.

Health promotion & policy interventions

Public health policies are require for creating environment that support healthy choices. These includes,

- Smoking bans in public places
- restrictions on advertising unhealthy foods.
- Urban planning to promote physical activity (e.g., parks, cycling lanes)
- The world health organisation (WHO) represents a “**whole population approach**” targeting social determinants of health such as education, income, and environment to reduce health inequalities (WHO, 2023).

Importance of population-based approach

- A main strength of public health strategies is their ability to reach it occurs. Here, prevention is more cost effective and essential compared to individual treatment. However, the challenges such as health inequalities, cultural barriers, and low health literacy can limit the effectiveness of these interventions.

Health inequalities & barriers to care in CAD

- Health inequalities play a critical role in the development and management of coronary artery disease (CAD). These inequalities are linked to socioeconomic status, ethnicity, geographic location, and access to health care services, which is leading to inequalities in diseases outcomes across major populations.
- There is a higher risk of developing CAD in the individuals from lower socioeconomics backgrounds due to increased exposure to risk factors such as poor diet, smoking, physical inactivity, and limited access to health care services. According to the **Office for National Statistics**, people living in more destitute areas of the UK experience higher rates of cardiovascular disease and premature death (ONS, 2022).

Barriers to accessing health care are

- Limited health literacy
- Language difference
- Financial constraints
- Cultural beliefs and stigma
- Delayed help-seeking behaviours

The other geographical factors are living in rural or underserved areas can limit access to specialised cardiac services and timely treatment.

- In the form of public health perspective, addressing these inequalities are targeted interventions. This includes culturally sensitive of health promotion, improved all the access to screening programmes, and policies aimed to the reducing social determinants of health such as poverty and education.

Future directions & innovations in CAD

- Advanced technology and healthcare innovations are transforming the management and prevention of coronary artery disease. These developments Represents to improve early diagnosis, enhance patient monitoring, and supporting long term disease management.
- One of the main significant innovations in the use of digital health technologies, including wearable devices such as smartwatches. Which can monitor heart rate, detect irregular rhythms, and also track Physical activity. These tools are continuous monitoring and early identification of potential heart problems, allowing them timely management (steinhubl et al., 2015).
- Telemedicine is also another important development. Especially in improving access of care remote consultations helps patients to connect with healthcare professionals like doctors without the need for hospital visits, which is beneficial for individuals with long-term conditions like CAD. This strategies becomes more important during the covid-19 pandemic and continuous to help community-based care (Keesara et al., 2020).
- AI is also used to assuming cardiovascular risk and assist in clinical decision making. It can analyse large amounts of patient data to identify patterns and their risk factors, helping health providers to deliver more effective care.
- At last, there is growing interest in personalised medicine, where the treatment is noticed to an individual's genetic profile, lifestyle, and risk factors.

Conclusion

- In conclusion, CAD is very common and majorly serious health problem worldwide. It occurs due to blockage of heart arteries, by the reasoning of fat and cholesterol build-up . It may lead to serious condition angina and heart attack. Which can affect majorly to a person's life.
- This presentation shows that CAD is not only a medical condition but it is also a public health issue. Which is mainly developed by the risk factors such as smoking, unhealthy diet, lack of exercise, and obesity. Many of these factors can be prevented or controlled.
- The management of CAD is not only clinical treatment, because it is a long-term condition. So, patients need continuous proper care. Here, GPs, nurses, and rehabilitation programmes plays major supportive role. In more other things like taking medicines regularly, lifestyle changes, and proper follow up can help.
- Public health strategies also play an important role in management of CAD. The campaigns, screening programmes, and government policies help to reduce and manage risk factors. However, the barriers like low income, lack of awareness, and limited access to healthcare still affect many people.
- In future, the new technologies like wearable devices and telemedicine can help to monitor and manage CAD. Overall, a combined approach of treatment, prevention, and community care is necessary.

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