

# Prevention of Cardio Vascular Diseases in Community

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## **Learning outcomes**

- At the end of this lecture the student will be able to:
- Describe primordial, primary, secondary and tertiary prevention of CV diseases in community
- Describe the preventive strategies of hypertension
- Identify the major risk factors which contribute to common diseases of the cardiovascular system
- Enumerate modifiable and non-modifiable risk factors of CV diseases
- Apply primordial, primary, secondary and tertiary prevention of CV diseases in community

# Cardiovascular Disease

- Comprise of a group of diseases of the heart and blood vessels . Includes
- coronary heart disease (heart attacks),
- cerebrovascular disease (stroke),
- raised blood pressure (hypertension),
- rheumatic heart disease,
- congenital heart disease and heart failure.
- Ischemic heart diseases

# Epidemiology

- CVDs are the number 1 cause of death globally: more people die annually from CVDs than from any other cause.
- An estimated 17.5 million people died from CVDs in 2012, representing 31% of all global deaths. Of these deaths, an estimated 7.4 million were due to coronary heart disease and 6.7 million were due to stroke.
- Over three quarters of CVD deaths take place in low- and middle-income countries

- Pakistani population has one of the highest risks of coronary heart disease (CHD) in the world. In Pakistan, 30 to 40 per cent of all deaths are due to cardiovascular diseases (CVD).
- The CHD deaths in Pakistan has reached about 200,000 per year that is 410/100,000 of the population

- Most cardiovascular diseases can be prevented by addressing behavioral risk factors such as tobacco use, unhealthy diet and obesity, physical inactivity and harmful use of alcohol .
- People with cardiovascular disease or who are at high cardiovascular risk (due to the presence of one or more risk factors such as hypertension, diabetes, hyperlipidemia or already established disease) need early detection and management using counseling and medicines, as appropriate.

- Coronary vascular disease is decreasing in many developed countries, but is increasing in developing, as a result of urbanization, and lifestyle changes

**WORLD  
HEART  
DAY**

**29 SEPTEMBER**

- World Heart Day takes place on 29 September every year and is a chance for people across the globe to take part in the world's biggest intervention against cardiovascular disease (CVD).



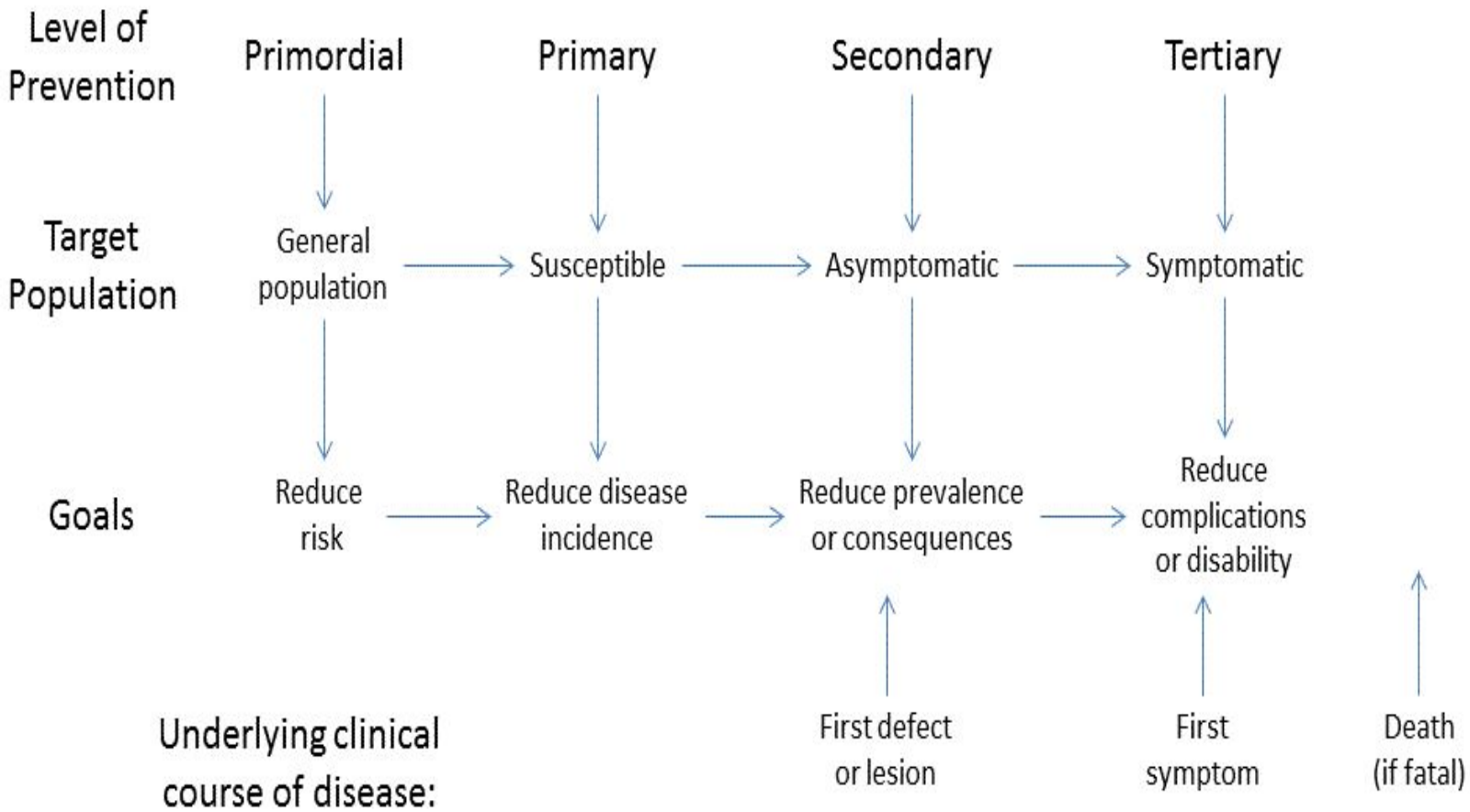
# Stages Development of Natural Disease

- 0th stage = health
- 1/2 stage = borderline or mildly elevated levels of certain risk factors
- First stage of disease = stage preclinical alterations (changes in the subcellular level)
- Second stage of disease = (laboratory methods, cellular or physiological changes)
- Third stage of disease = stage clinical manifestation (the first symptoms leading to diagnosis)
- 4th stage of disease = stage organ complications
- 5th stage of disease = death

# PREVENTION LEVEL

- Primordial
- Primary
- Secondary
- Tertiary prevention

# A Classification of Preventive Strategies



# Primordial Prevention

- This kind of prevention is concerned 0th up to 1/2 stage development stages of the disease. The purpose is to reduce the incidence of disease by **preventing the emergence of increased risk**. Primordial prevention may relate to the whole population or only its selected groups.
- These include measures relating to proper diet, adequate physical activity, relaxation and the fight against smoking and other addictions to drugs. Efficiency is increasing application of these principles since childhood.

# Primary Prevention

- Primary prevention is concerned with 1/2 stage to 1st development stage of the disease. **The aim is to reduce the incidence of disease** by removing risk factors. This type of prevention concerns again the whole population or groups at increased risk, but still without evidence of the disease.
- The procedures consist of regime change through intervention or medication. Trying to reduce the influence of risk factors while increasing protective factors of influence. Prevention here again depends entirely on the activities of individuals at risk - his lifestyle choices and motivation

- Current knowledge has thus established the value of **primordial prevention** actions, which aim **to prevent the development of disease risk factors,**
- and of **primary prevention** actions, which aim to modify existing risk factors to **prevent the development of diseases.**

# Secondary Prevention

- It concerns the first to 3rd development stages of the disease.
- Its principle is early diagnosis, which leads to prevent the progression or cure of asymptomatic or early stage development of the disease. The target group are patients in the lightest stage of clinical manifestations of disease.
- **The methods are mainly early detection of disease through screening programs and preventive examinations.**

# Tertiary Prevention

- This kind of prevention deals with third to 4th stage of disease. The aim is to limit disease progression , prevention of recurrence of clinical events and prevent disability.
- This prevention is aimed at patients in the developed stage of the disease.
- By filling it comes to treatment and rehabilitation effort to restore the patient ,maintain quality of life.



# **Prevention of Cardio Vascular Diseases**

## **a ) Population strategy**

- Prevention in whole populations
- Primordial prevention in whole populations

## **b) High risk strategy**

## **c) Secondary prevention**

# A. Population strategy

1. Focus on risk factors in **whole populations.**

## Specific interventions

### □ **Dietary changes**

- Reduction of fat intake to 20-30 %
- Saturated fats limited to less than 10 %
- Dietary cholesterol to below 100mg per 1000kcal per day.
- Increase in carbohydrate consumption
- Avoidance of alcohol consumption
- Reduction of salt intake to 5g daily or less.

## □ **Smoking:**

For smoke free society, comprehensive health programme required such as effective information and education activities, legislative restrictions ,smoking cessation programmes.

□ **Blood pressure:** small reduction in average BP of the whole population by 2or3 mmHg would produce a large reduction in the incidence of CVD. This involve a multifactorial approach based on the diet (reduce salt intake, avoidance of alcohol intake) regular physical activity and wt control.

its low cost activity

□ **Physical activity:** should be a part of life. Encourage children to take part and continue through out life

2.

**Primordial prevention:** in whole population

is a approach to primary prevention .

It involve preventing the emergence and spread of CVD risk factors and life styles that has not yet appeared or become endemic.

## **B. High Risk Strategy**

- **1. Identifying risk:** high risk intervention can only be start once those at high risk identified by the means of simple test such as BP and serum cholesterol.
- Individuals at risk also include who smoke, strong family hx of CVD, diabetes and obesity and young women using oral contraceptive.
- **2. Specific advice:** once identified next step is to bring under preventive care such as elevated BP should be treated , stop smoking replace by nicotine chewing gum to stop from smoking and elevated serum cholesterol to be reduce.

## **C. SECONDARY PREVENTION**

**the aim is to prevent the recurrence and progression of CVD and mortality.**

Such as with the help of drug trials, coronary surgery ,use of pace makers.

- The principle governing sec prevention are cessation of smoking, control of hypertension ,diabetes, healthy nutrition and exercise.
- Medicine to reduce mortality such as beta blockers
- cessation of smoking is the most effective single means of intervention in the management of patient after heart attack.

# **PREVENTIVE STRATEGIES OF HYPERTENSION**

WHO has recommended the following approaches in the prevention of hypertension.

## **□ Primary prevention.**

- Population strategy.
- High risk strategy.

## **□ Secondary prevention.**

# Primary Prevention

- All measures to reduce the incidence of disease in a population by reducing the risk of onset.
- In connection with primary prevention the approaches are
  - Population strategy.
  - High risk strategy.



# Population Strategy

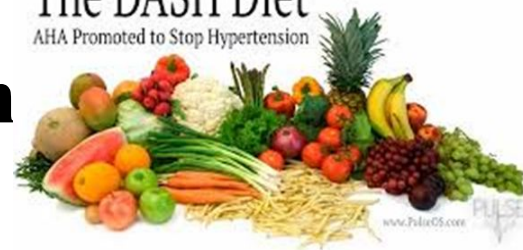
- Directed at the population as a whole, based on the fact that even a small reduction in the average blood pressure of a population would produce a large reduction in the incidence of cardiovascular complications such as stroke and cardiovascular diseases.
- Aim of the strategy is to shift community distribution of blood pressure towards lower levels or biological normality.



- This strategy is based on the following non pharmacological interventions.

## □ **Nutrition**

- Reduction in salt intake not more than 5 g per day.
- Moderate fat intake.
- Avoidance of alcohol intake.
- Restriction of energy intake appropriate to body needs.



# Dash Eating Plan

- Dash stands for "Dietary Approaches to Stop Hypertension" and it is an eating plan that encourages you to eat a wide variety of whole foods including:
  - Fat-free or low-fat milk and dairy foods
  - Fruits and vegetables
  - Whole grains
  - Lean meat, fish, poultry
  - Nuts, seeds, and legumes (dried beans and peas)

- **Weight Reduction** : Prevention and correction of wt is a way reducing the risk of hypertension and indirectly CVD.
- **Exercise Promotion**: lead to fall in body wt ,blood lipids and blood pressure.
- **Behavioural Changes** such as reduction of smoking and stress, personal life style .
- **Health Education**. advice on risk factors and related health behavior.
- **Self care**: to check BP regularly and keep record

# High Risk Strategy

- A part of the primary prevention high risk strategy aims to prevent the levels of blood pressure at which treatment will be considered.
- Detection of high risk subjects should be encouraged by the optimum use of clinical methods .
- As HTN cluster in families, the family history of HTN and TRACKING of blood pressure from childhood may be used to identify at risk.

## Secondary Prevention

- Secondary prevention is for detection and control of high blood pressure in affected individuals. The following measures comprises .
- **Early case detection:** early detection is a major problem as high BP rarely cause symptom until organic damage has already occurred and our aim is to control it before this happens. So for this screening the population be done.
- **Treatment:** To reduce BP to normal as it reduce the incidence of stroke and other complications. This is the main reason to identifying and treating asymptomatic hypertension.

## **Patient Compliance:**

- The treatment of high blood pressure must be life long and this presents problems of patient compliance mean patient behavior in terms of taking medicine ,diet ,life style.
- The compliance rate can be improve through education directed to patient, families and community.

# **Other Example Where Level of Prevention Applied**

- Stroke
- Heart failure
- Renal failure



# Rick Factor for CVD

Cardiovascular disease risk factors can be split into two categories: **modifiable and non-modifiable**.

Non-modifiable cardiovascular disease risk factors are those that cannot be changed

## **Non Modifiable**

- Age
- Sex
- ethnicity
- Family history(genetics cannot be changed)

**Modifiable cardiovascular disease risk factors are those that can be reduced or controlled with altered behavior.**

### **Modifiable**

- Cigarette smoking.
- High blood pressure
- Elevated serum cholesterol.
- Diabetes.
- Obesity.
- Sedentary habits.
- Stress

## Age

CVD increases with age.

- Older people are at greater risk of developing cardiovascular disease. Although the process of aging cannot be changed,

So leading a generally healthy lifestyle is recommended to help reduce the likelihood of developing heart and circulatory conditions.

## **Ethnicity:**

- Statistics suggest that people of South Asian, African or Caribbean origin have a greater risk of developing cardiovascular disease.
- Blacks are at higher risk than whites
- Type 2 diabetes – a risk factor in itself for cardiovascular disease – also seems to be more prevalent among these groups. The reasons for this are difficult to define.

So leading a healthy lifestyle is generally recommended as a way for people from all backgrounds to help prevent heart and circulatory disease from developing.

## **Family history:**

- There is a genetic element to cardiovascular disease, meaning a family history of the condition is considered to be a risk factor. Generally, this applies if a person's first-degree relative developed CVD at a relatively young age. This is the case if the person's father or brother developed cardiovascular disease before the age of 55, or their mother or sister developed it before the age of 60.
- A family history of high blood pressure (hypertension), high cholesterol and type 2 diabetes can also increase one's chances of developing these conditions, which can in turn increase the risk of cardiovascular disease.

## **Family history**

- First-degree relatives of patients with premature myocardial infarction have double the risk themselves.
- Premature CVD is that before age 55 years in men and 60 years in women.
- More than one third of admissions for premature myocardial infarction could be prevented by screening and treating first-degree relatives

## Gender

- Traditionally, CVD has been considered a disease of men.
- However, CVD is the leading cause of death both in men and women. It is responsible for a third of all deaths in women worldwide and half of all deaths in women over the age of 50 years in developing countries
- Women tend to develop cardiovascular disease at an older age than men. This later age of onset in women is thought to be linked to the hormonal changes that follow menopause



- **Smoking**

Smoking tobacco significantly increases the chance of developing cardiovascular disease. Smoking damages and narrows the arteries, making angina pectoris and heart attack more likely.

Mortality from CVD is 60% higher in smokers.

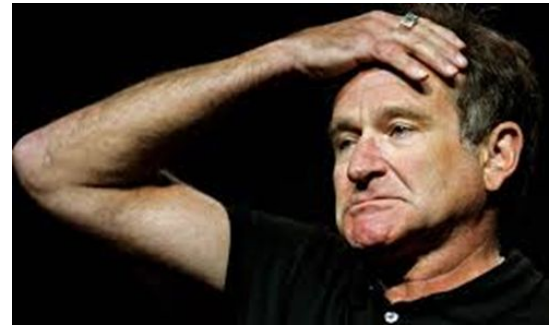
Regular exposure to passive smoking increases CVD risk by up to 25-30%.

World Health Organization (WHO) research estimates that over 20% of CVD is due to smoking



## Psychosocial wellbeing

- Work stress,
- lack of social support,
- depression,
- anxiety can all increase CVD risk.



## **Infrequent exercise**

- Physical activity reduces the risk of CVD.
- The 2002 World Health Report estimated that over 20% of CVD in developed countries was due to physical inactivity.
- Recommended physical activity levels are 30 minutes of moderate physical activity on five or more days per week or experts recommend that adults do at least 150 minutes of moderate to high-intensity exercise per week.



## Blood pressure

- High blood pressure, known as hypertension, is another contributing factor to cardiovascular disease, including heart failure, stroke and heart attack
- For adults aged 40 to 69 years, each 20 mm Hg rise in usual systolic blood pressure or 10 mm Hg rise in diastolic blood pressure doubles the risk of death from CVD.
- The study showed that 22% of heart attacks were due to a history of high blood pressure and those with hypertension had almost twice the risk of a heart attack.



## Poor Nutrition

- A WHO report in 2003 stated that a diet high in fat (particularly saturated fat), sodium and sugar and low in complex carbohydrates, fruit and vegetables increases the risk of CVD.
- Trans fatty acids reduce high-density lipoprotein (HDL) and increase low-density lipoprotein (LDL) cholesterol and can increase CVD risk.
- A meta-analysis showed that a 2% increase in the energy intake from trans fatty acids increased CVD incidence by 23%.



## **Cholesterol:**

CVD risk is related to cholesterol levels.

High levels of low-density lipoprotein (LDL) cholesterol – also known as “bad cholesterol” – are linked to a range of cardiovascular diseases.

People with low levels of HDL cholesterol have an increased risk of CVD .

If too much LDL cholesterol is present, it can cause fatty substances to build up in the artery walls and lead to complications

- **High-density lipoprotein (HDL)** cholesterol is known as “good cholesterol”. This cholesterol transports cholesterol and fats from around the body to the liver, where they can be removed. To have a high level of HDL, as this can help lower one’s risk of developing heart disease or having a stroke.
- Eating healthy, staying active, avoiding tobacco and limiting alcohol intake can all help to increase HDL cholesterol levels



## **Overweight and obesity:**

Obesity is a risk factor for CVD. It is also a risk factor for hypertension, hyperlipidemia, diabetes and impaired glucose tolerance.

Eating an unhealthy diet and being physically inactive are both contributing factors to being overweight, which is generally defined as having a body mass index (BMI) outside the normal range.

Central or abdominal obesity is most significant. Those with central obesity have over twice the risk of heart attack.

## Diabetes

- The risk of CVD is 2-3 times higher in diabetics than non diabetics.
- CVD is responsible for 30 to 50 % of death in diabetics over the age of 40 years in developed countries.





# Reference

- Ref K .Park

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