

Disorders of the respiratory and circulatory system



**ASSIGN
BUSTER**

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1. Asthma

Asthma is an allergic response which affects the bronchial tubes and can result in coughing, wheezing or breathlessness. It leads to the inflammation of airways, causing them to tighten, resulting in difficulty of breathing.

Asthma is not classified as an infectious disease and it is rather an allergic condition which cause is not fully understood. It is usually triggered when the person with asthma comes in contact with: House dust mite, animal fur, some medicines (Nsaids), pollen, tobacco smoke, exercise, stress, cold air, chest infections.

When the immune system receives an inflammatory response, white blood cells release histamine and this result in the contraction of smooth circular muscle of bronchioles as well as restriction of airways. (Bronchoconstriction). More mucus is then secreted by the epithelial cells and as the result the airways are blocked even more. This condition reduces the rate of ventilation through tightened bronchioles therefore less gas exchange will take place in the alveoli and cellular respiration in the body. This condition causes breathing difficulty, coughing and wheezing as the lungs want to get rid of the built up mucus in them.

There is no cure for asthma. However, there are different ways to control the condition. These methods are applied in two ways. One is to Treat/Relieve symptoms and the other is to prevent any future symptoms/attacks. The procedure includes a combination of medicines, lifestyle advice and understanding the asthma triggers.

The Asthma medicines are normally given by inhaler which supplies the drug directly to airways through mouth. It is effective as it delivers the drug directly to the lungs.

There are number of conditions which increase the risk of developing Asthma such as:

- If your parents have asthma
- If you are overweight
- If you have certain allergic conditions
- If you smoke or exposed to second hand smoke
- If you are exposed to any type of pollution or chemicals used in the industry.

There are 5.4 million people in UK receiving treatment for asthma which means that 1 in 12 adults or 1 in 11 children are currently receiving treatment for their condition. In adults, asthma is more common in women than men.

Assessment Criteria 1.4

Discuss disorders of the respiratory system

2. Pulmonary Tuberculosis

Pulmonary Tuberculosis is a contagious bacterial infection that can spread in areas where large amount of blood and oxygen exist such as the lungs as well as other organs in the body.

This disease is caused by a type of bacterium named *Mycobacterium Tuberculosis*. It spreads when a person who has active TB in their lungs

breaths out the germs when sneezing, laughing, coughing, singing or talking and then the other person breathe in the germs.

The common symptoms of Active TB in the lungs are Cough which contains bloody mucus for two weeks or more, weakness and tiredness, sudden weight loss and loss of appetite, difficulty when breathing and chest pain or fever.

TB disease can affect many organs in our body such as kidneys, bones and brain but it usually affects human lungs. There are two main stages in the process of this infectious disease.

In the first stage which commonly lasts for the duration of several months, the bacteria cells attack the epithelial cells of the alveoli and bronchioles. Then they start to multiply in fibrous capsule which spreads around that area. Here the human immune system becomes stimulated and starts to resist the disease. Before this invasion is over, a few bacteria might escape into the bloodstream and develop in other body organs. If the body's immune system is successful, this disease never develops and is known as TB infection. However, if it remains untreated it develops into the second stage where it becomes an active disease.

In the second stage of this disease the germs start to multiply and destroy the epithelial cells of the lungs. In some cases, although it seems that the disease has been cured, but after a while it comes back and becomes active. This occurs mostly when the immune system of the body becomes weak. The second stage of this disease is presented through the consumption of the

tissue of lungs which leads to the destruction of the alveoli. Here the person starts to manifest the symptoms such as continues cough.

The risk factors that increase the possibility of a person getting infected by this disease are named below:

- Being in contact with/ living with an infected person.
- Living or working in crowded places where there is a possibility of coming in contact with people with untreated active TB. These places can be prisons, nursing homes or homeless shelters.
- Having a poor diet which affects the immune system of the human body.
- Pasteurisation of milk and cultivation of animals as this used to be a common cause of transmission of TB by Cows.

Assessment Criteria 2.3

Discuss disorders of the circulatory system

Hypertension (High Blood Pressure)

The human heart is designed to pump the blood around the body through causing pressure. However, if the blood is pumped around the body with an increased amount of pressure than normal, the arteries and the heart itself can be seriously damaged or even it can lead to heart failure if they both stop because of the strain. High blood pressure can cause microscopic tears in the walls of the arteries which turn into scar tissue. The damaged artery can trap more plaque as the scar tissues formed in it accommodates plaques (Fat, cholesterol, etc). This causes the arteries to become narrower and as a result conditions such as Coronary Artery Disease appear.

Two main conditions control the blood pressure: One is the amount of force generated when the heart pumps the blood around the body and the other is how relax or narrow the arteries are:

HBP can damage the arteries: Our arteries in their healthy state are flexible strong and elastic. Its smooth internal lining is where the blood can flow freely and provide different nutrient and Oxygen gas to our tissues and organs. High blood pressure damages these cells. In the case of arteriosclerosis which causes damage to the artery by blocking it, organs such as kidneys, brain, arm and legs can be affected. These damages can lead to stroke, heart failure and kidney failure. In some cases the continues pressure of blood in already weakened artery can lead to enlargement of its walls and formation of aneurysm which can bring about life threatening complications such as internal bleeding. This complication usually takes place in our aorta.

- Can damage the heart: It can lead to diseases such as coronary artery disease. This happens when arteries are narrowed by coronary artery disease and do not let the blood to move freely through our arteries. It can cause chest pain, heart attack or irregular heartbeat if the blood doesn't flow freely to the heart. It can also lead to enlarged left heart as high blood pressure leads the heart to pump blood with excess pressure around the body and causes the left ventricle to thicken.
- Can damage the brain: The brain has to receive blood which contains nourishing substances in order to be able to carry out its function. However, in some cases if the blood clotting takes place as the result

of high blood pressure it can cause Transient ischemic attack (TIA), Stroke or Dementia.

Symptoms related to HBP are headache, sleepiness or confusion.

The risk factors of hypertension:

Family history, obesity, smoking, type 1 & 2 diabetes, kidney disease, alcohol abuse, having high amount of salt in the diet, lack of physical activities (exercise) and medicines such as steroids

About 10 million in the UK are diagnosed with hypertension. This means that one out of five has high blood pressure.

Assessment Criteria 2.3

Atherosclerosis

Atherosclerosis is the built up of plaques which is made up of fatty deposit around the wall of the arteries.

After a while these fatty deposits of cholesterol and smooth muscle cells form *Atheroma* which causes the arteries to lose their elasticity as well as becoming narrow. This reduces the amount of blood flow through the arteries and blood vessels hence reducing the oxygen supply.

It can take a long time until atherosclerosis is hardened and narrowed.

However, when the arteries are considerably damaged, different conditions may occur such as:

- **Thrombus:** The arteries can be blocked if blood clots on the plaque made of cholesterol around its walls and as the result the blood flow will be restrained and the tissues will not receive the required nutrient.

The atheroma on the walls of the arteries is covered by protective cells from the blood which flows in the artery. If this protective cell barrier is broken down, the blood will be exposed to high concentration of cholesterol on the wall of the artery and this generates the blood clotting system. This process can lead to the blockage of the artery and prevention of blood flow to the organ it supports therefore, depending on the organ; it can cause stroke, heart attack and angina.

- Heart failure: When the artery is narrowed, it causes damage to the muscle of the heart.
- High blood pressure and renal failure when the arteries which exist in the kidney are affected.

Many people are affected by atherosclerosis. It is possible that it starts from the age of 20. The reason behind its occurrence is still unknown but the reasons given below can be considered as risk factors:

- Family history of atherosclerosis
- Having high amount of LDL cholesterol in the blood or low amount of HDL in the blood.
- High blood pressure
- The rate increases if the person smokes.
- Diabetes: In people with type 1 diabetes atherosclerosis can take many years to appear but in people with type 2 diabetes it can appear within a few years.
- Kidney failure
- Excess weight
- A diet with high amount of fat in it

- Race: People from south Asia are more likely to develop Atherosclerosis.

According to the British Heart Foundation, at least 2.6 million people in the UK suffer from Atherosclerosis.

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