Why Blood Pressure fluctuates

Your blood pressure readings will not always be the same numbers. It can go a little higher or lower depending on your state of mind when taking your measurements. Your blood pressure is likely to remain within normal range during these subtle fluctuations if you do not have hypertension. Usually, the difference is between 10 mmHg and 20 mmHg.

Some causes of blood pressure fluctuations are;

A) Transient (normal) blood pressure fluctuations

Some emotional states and physical illnesses can cause slight blood pressure fluctuations. Such changes are transient because they last only a few minutes to hours and then the blood pressure returns to normal. The reversal is partly due to the reduction of stress hormones that increase blood pressure, among other body processes.

The following can cause a transient increase in blood pressure:

- Anxiety
- Fear
- Pain
- Exercise
- Fever
- Anger or agitation
- Lack of adequate sleep
- Drugs like steroids
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On the other hand, these can cause transient decrease in blood pressure.

- Diarrhoea
- Vomiting
- Excessive urination and reduced fluid intake

Hypertension versus high blood pressure; is there any difference?

A single reading of elevated blood pressure is not enough to diagnose hypertension. Your healthcare provider can only diagnose hypertension if your blood pressure has been persistently higher than normal on at least two different days and
in the absence of physical illness or emotional states outlined above. However, if your BP is at or higher than 180/110 mmHg, your doctor would diagnose hypertension with a single reading. And you can start treatment immediately.

Abnormal Blood pressure fluctuations

Blood pressure fluctuates throughout the day depending on your activity and state of mind. When asleep at night, your BP drops by more than 10 per cent of the highest daytime reading. And once you are awake, your BP increases. It increases with physical activity and drops again when you are at rest. These changes in day and night are called diurnal variations. BP fluctuations can be abnormal when the differences between the lows and highs are as wide as 20-30 mmHg within a few minutes. When blood pressure changes rapidly from extremely high to very low, it can cause complications affecting various internal organs. Complications such as stroke, heart attack and other heart diseases could occur.

How hypertension starts

People who check their blood pressure often would know their BP range and also know when it starts going above the normal range. A combination of factors can cause blood pressure to increase consistently.

Hypertension happens due to a combination of many factors, as outlined below.

The blood volume

The amount of blood passing through your body determines your blood pressure.
Your blood pressure increases as the volume of blood in your body increases. The amount of blood (in millilitres) your heart pumps out every minute is called your cardiac output (CO). Your cardiac output, when multiplied by the resistance of your blood vessels to blood flow within them, is your blood pressure.

Certain substances can cause your blood volume to increase. For instance, high sodium intake, either from table salt added to food, sodium from preservatives, baking powder/soda or taste enhancers will cause your blood volume to increase.

This increase happens because sodium attracts water. As you increase sodium intake in your diet, your kidney reduces urine production. This means that your body retains more water, increasing your blood volume. As your kidneys get rid of the excess sodium through urine, your BP starts to reduce.

However, if you continue to take excess sodium, then your kidneys are eventually unable to get rid of extra sodium, and your blood pressure remains high. In addition, your body also has other processes by which it tries to reduce your blood volume when your BP goes up. When these processes fail to return the BP to normal, you develop persistent high blood pressure.

The flexibility of blood vessels

Your blood vessels are pipes that channel blood to different body parts. It is actually a plumbing system with varying sizes of pipes supplying blood to different parts of your body. When your blood vessels expands or narrows, the pressure within them increases and vice versa. This pressure is called peripheral resistance and determines your blood pressure. Suppose your blood volume increases; the typical reaction is for your blood vessels to relax, thereby reducing your blood. The inner part of your blood vessel - endothelium- produces a chemical called nitric oxide. Nitric oxide is a vasodilator. This means that it makes your blood vessels relax and open up, allowing blood to flow through them easily. Sensors are present in your blood vessels that make them know when to produce nitric oxide and when to stop.

Your blood vessels become stiff or less flexible as you get older. Sometimes, a build up of cholesterol plaques may also block them. As a result of this blockage, the processes that should make the blood vessels relax begin to have little or no effect on them. This means the body loses part of its ability to maintain your BP within the normal range. This stiffness or blockage causes an increase in high blood pressure

The kidneys

Your kidneys produce the chemical renin, which sets off the release of various hormones that act on the body to cause temporary narrowing of the blood vessels (vasoconstriction). Furthermore, the release of these hormones affects how the kidneys remove various salts and water from the body. It causes retention of water and sodium, which causes an increase in blood volume as well as blood pressure. Blood loss, reduced blood supply to the kidneys, loss of fluid from diarrhoea, and vomiting are common conditions that trigger the release of renin from the kidneys. This process is supposed to cease once the BP is normal, But if something goes wrong, it leads to a malfunction that makes the process the blood pressure not to return to normal. This causes hypertension.

Emotional stress

Emotional stress is a reaction to a perceived threat or pressure. Pressure could be from your workplace, family or society. This can manifest as constantly feeling anxious or scared, difficulty concentrating, poor sleep or sleep deprivation. High emotional stress causes an increase in the release of the stress hormone called cortisol.
When cortisol levels remain high over a long period, blood pressure increases. The effect of elevated cortisol on the kidneys is to increase sodium and water retention. Some people cope with stress by resorting to drinking alcohol, smoking and use of illicit drugs. These substances further increases blood pressure.

The strength of the heart muscles

As a result of increased blood volume, your heart has more work to do—subsequently, your cardiac output increases. Your heart perceives the increased pressure or resistance as a signal that it needs to reduce your blood volume. Increased blood volume and peripheral resistance cause your heart to produce chemicals called natriuretic peptides, making the

kidney remove salt (sodium) and water. Furthermore, natriuretic peptides stop the kidneys from retaining water. Recall that sodium increases water retention so that the kidneys produce less urine. Now the heart releases these chemicals that remove sodium. These chemicals make your kidneys reduce the production of the substances that cause water and salt retention. Consequently, your kidney excretes more sodium and water, lowering your blood pressure. Any disruption or malfunction of these processes would lead to hypertension.