



Blood Pressure:

Blood pressure (BP): refers to the force of the moving blood against arterial walls. Its measured in millimeters of mercury (mm Hg). Atypical BP for a healthy adults is 120/80 mmHg.

Arterial blood pressure: a measure of pressure exerted by the blood as it flows through the arteries, there are two BP measures:

- a. **Systolic pressure:** the phase in which the ventricles contract to eject blood, which present the height of the blood wave.
- b. **Diastolic pressure:** the phase in which ventricles are at rest (ventricles are relaxed). Diastolic pressure, then, is the lower pressure, present at all times within the arteries.

Pulse pressure: the difference between diastolic and systolic pressure. normally is about 40 mmHg.

Hemodynamic regulators for blood pressure control:

1. **Peripheral vascular resistance:** is the capillaries diameter or the capacity of the arterioles, peripheral resistance can increase BP especially diastolic.
2. **Pumping action of the heart:** lower cardiac output decrease BP and higher cardiac output increase BP.
3. **Blood volume:** BP decrease when fluids in arteries decreased e.g., in hemorrhage or dehydration, conversely when volume increase BP increased e.g., rapid intravenous infusion.
4. **Blood viscosity:** when proportion of RBCs to blood plasma is high, BP increase when the blood is highly viscous.

Factors affecting blood pressure:

1. **Age:** Pressure rises with age, reaching the peak on puberty and then tend to decline somewhat. In older adults BP is increased as a result of decreased elasticity of the arteries.
2. **Exercise & physical activity:** increases cardiac output and thus increasing B/P. For reliable assessment of BP, wait 20-30 minutes following exercise.
3. **Stress:** increasing BP reading (stress stimulate sympathetic nervous system, thus increase cardiac output and vasoconstriction of the arterioles).
4. **Medical conditions, and medication:** Any condition affecting the cardiac output, blood volume, blood viscosity, and/or compliance of the arteries has a direct effect on the BP.
5. **Race.**
6. **Sex:** after puberty females have lower BP than males at the same age, this difference is due to hormonal variations. After menopause women higher BP than before.
7. **Obesity:** predisposed to hypertension.

Measuring and recording vital signs

Instructor: Hassan Abdullah Athbi



Fundamentals of Nursing I

8. Diurnal variation: BP usually lowest at the early morning then raise throughout the day and peaks in the late afternoon or early evening.

9. Temperature: Because of increased metabolic rate, fever can increased BP, external heat causes vasodilatation and decrease BP, external cold causes vasoconstriction and increase BP.

10. Body position: BP higher when person standing rather than sitting or lying.

Methods for assessing BP:

1. Direct (invasive) measurement involves the insertion of a catheter into the brachial, radial, or femoral artery. Arterial pressure is displayed on a monitor. With correct placement, this pressure reading is highly accurate.
2. Indirect (noninvasive) methods : auscultatory and palpatory methods.

Blood pressure assessment sites through indirect methods:

1. Most common site on the client’s upper arm (brachial artery).
2. Radial – taken on the lower arm; possible site for infants or clients who have very large upper arms.
3. Client’s thigh (popliteal artery) is indicated in these situations:
 - a. BP cannot be measured on either arm (e.g., burns or trauma).
 - b. BP in one thigh is to be compared with BP in the other thigh.

BP is not measured on a particular clients limb in the following:

- a. Injury or disease in the limbs.
- b. Cast or bulky bandage is on any part of limbs.
- c. Surgical removal of breast or axillary, inguinal lymph nodes.
- d. Intravenous or blood transfusion on that limb.
- e. Arteriovenous fistula in that limb.

Classification of blood Pressure:

Category	Systolic BP (mmHg)	Diastolic BP (mmHg)
Normal	< 120	< 80
Prehypertension	120-139	80-89
Hypertension stage 1	140-159	90-99
Hypertension stage 2	> 160	> 100

Alteration in Blood Pressure:

- a. **Hypertension:** BP above normal, when either systolic BP higher than 140 mmHg or diastolic BP is 90 mmHg or higher. A single elevated BP reading indicates the need for reassessment. Usually hypertension cannot be diagnosed unless an elevated BP is found twice at different time.
- b. **Hypotension:** BP below normal, that is systolic reading consistently between 85 and 110 mmHg in an adult whose normal pressure is higher than this. **Orthostatic hypotension:** BP that falls when the clients sits or stands.

Measuring and recording vital signs

Instructor: Hassan Abdullah Athbi