SKILL 5 MEASURING OF BLOOD PRESSURE

Structure

5.0 Objectives
5.1 Introduction
5.2 Meaning of Blood Pressure (BP)
5.3 Normal and Abnormal Blood Pressure
5.4 Factors Affecting Blood Pressure
5.5 Method of Measuring Blood Pressure
5.6 B.P. Apparatus
    5.6.1 Stethoscope
    5.6.2 Procedure for Measuring Blood Pressure
    5.6.3 Checking BP Without Stethoscope
5.7 When to Refer a Patient
5.8 Let Us Sum Up
5.9 Key Words
5.10 Activities

5.0 OBJECTIVES

After reading the unit you will be able to:

- learn about blood pressure;
- differentiate between normal and abnormal blood pressure;
- develop skills in handling blood pressure apparatus/instrument;
- develop skills in measuring blood pressure; and
- explain when to refer the patient to the hospital.

5.1 INTRODUCTION

A patient may have variation in BP. You as a care giver may have to keep a record of the patient's BP. Accurate measurement of BP can prevent many diabetes related problems.

Measuring Blood Pressure (BP) needs skill and concentration. In this unit you will learn the meaning of Blood Pressure, what is high and low blood pressure, how to measure it and when to refer the patient to a hospital or medical facility.
5.2 MEANING OF BLOOD PRESSURE (BP)

Blood Pressure (BP) can be explained as the force of blood being pumped by the heart. When the heart pushes the blood with force (contraction of heart) and it reaches the artery/blood vessels it is called Systolic Blood pressure (upper BP). When the heart relaxes the arteries/blood vessel will also have less pressure of blood it is called Diastolic Blood Pressure (lower BP).

5.3 NORMAL AND ABNORMAL BLOOD PRESSURE

i) Normal Blood Pressure is between 90-120 mm of Hg upper/systolic and 60-80 mm of Hg lower/diastolic.

ii) Abnormal blood pressure can be high or low.

**High blood pressure**: (Hypertension): When the upper blood pressure is more than 120 mm of Hg and lower is less than 80 mm of Hg. It may occur during tension, high fever, bleeding and shock.

**Low blood pressure**: (Hypotension): When the upper blood pressure is less than 90 mm of Hg and lower blood pressure is less than 60 mm of Hg. It may occur in diarrhoea, bleeding and shock.

5.5 FACTORS AFFECTING BLOOD PRESSURE

- **Age**: Blood Pressure increases as a person grows older. It is lowest in infancy and childhood and highest in adulthood. But, due to increased peripheral resistance the Blood Pressure increases in elderly. Average B.P. (Blood Pressure) according to age is shown below (Table 5.1)

<table>
<thead>
<tr>
<th>Age</th>
<th>Blood Pressure</th>
</tr>
</thead>
<tbody>
<tr>
<td>New Born</td>
<td>40 mm of Hg Systolic</td>
</tr>
<tr>
<td>1 Month</td>
<td>85/54 mm of Hg</td>
</tr>
<tr>
<td>1 Year</td>
<td>95/65 mm of Hg</td>
</tr>
<tr>
<td>6 Years</td>
<td>105/65 mm of Hg</td>
</tr>
<tr>
<td>10-14 Years</td>
<td>110/65 mm of Hg</td>
</tr>
<tr>
<td>14 yrs and above</td>
<td>120/80 mm of Hg</td>
</tr>
</tbody>
</table>

- **Time of the day**: Blood pressure is low in the morning and rises as much as 5-10mm of Hg by late afternoon and again decreases during sleep.
- Sex: Women have lower blood pressure than men of the same age but after menopause their pressure reading increases over men.

- Relationship to food intake: Blood pressure increases after intake.

- Exercise: Muscular exercise raises systolic blood pressure.

- Body built: Blood pressure is higher in obese in comparison to thin built.

- Emotions: Anger, fear, excitement, pain etc., increase the blood pressure.

- Posture: Blood pressure tends to be low in lying position in comparison to a sitting or standing position.

- Disease condition: Disease affecting circulatory system, kidney, brain etc. cause alteration of blood pressure.

- Drugs: Certain drugs increase/decrease pressure

### 5.6 METHOD OF MEASURING BLOOD PRESSURE

Blood pressure is measured with the help of B.P. apparatus. Let us learn about this apparatus.

#### 5.6.1 B.P Apparatus

The B.P apparatus consists of Sphygmomanometer – consists of 1 cuff with tubing, 2 rubber pump, 3 measuring device manometer – cuff contains an air tight, flat, rubber bladder, covered with cloth, it has hooks to fasten the long tube attached to the rubber bladder, one is connected to manometer and the other is attached to bulb. It is used to inflate the bladder.
BP apparatus are also available with just a reading meter, cuff and rubber pump as shown in Fig. 5.2.

![BP apparatus with reading meter](image)

Fig. 5.2: BP apparatus with reading meter

5.6.2 Stethoscope

The bell of the stethoscope amplifies/increases the low sound produced by heart which is past from tubes to the ears through the ear plugs.

![Stethoscope diagram](image)

Fig. 5.4: Stethoscope

**Activity 1**

i) Draw a diagram of BP apparatus and explain its parts.

ii) Draw a diagram of Stethoscope and label it.
5.6.3 Procedure for Measuring Blood Pressure

- Explain the procedure to the patient.
- Make her/him sit by a table to rest her/his arm. When the patient is lying down, tell the patient to put the arm on the bed.
- Place the centre of the cuff of the BP apparatus firmly around the patient’s arm 2 or 4 fingers above the elbow. Refer to Fig. 5.5 for details.

![Fig. 5.5: Tying of cuff around arm of the patient](image)

- Find the brachial pulse with fingers. The brachial pulse can be found in the middle of the elbow more towards little finger and place the stethoscope over it.
- Fill the cuff with air till the pulse disappears (above 200 mm of Hg).
- Open the screw slowly and listen for the first sound while watching the mercury column reading note the reading at that point. As air escapes the sound becomes louder and clearer.
- Continue to let air out slowly as you listen, and take the diastolic/lower reading at the point, when the sound suddenly becomes dull and cannot be heard.
- Allow all the air to escape and the mercury to fall to zero.
- Repeat the procedure if there is any doubt about the reading.
- The reading of the Systolic/upper pressure e.g. 120 mm of Hg is always written above and the Diastolic/lower pressure, e.g. 80 mm of Hg is always written below.
- Remove the cuff from the patient’s arm. Massage the patient’s arm, roll the cuff and replace it in the box.
- Record the blood pressure.
5.7 WHEN TO REFER THE PATIENT

- When blood pressure is very high
- When blood pressure is low
- When the pulse is very fast and blood pressure is low
- When patient complains of pain in the chest and blood pressure is low/high.

5.8 LET SUM UP

In this unit you have learnt how to check BP. To develop this skill you need to practice. Wrong reading can lead to many complications. Hence always take reading carefully and remember to make patient comfortable.

5.9 KEY WORDS

| Measuring | Checking the level of BP. |
| mm of Hg | Mercury in the glass tube of the BP apparatus with markings. |
| Shock | When a person has low BP, he may fall down, feel giddy or skin may feel cold. He might even start sweating. |
| Diaphragm | A round piece of stethoscope with plastic cover and ring. |

5.10 ACTIVITIES

- **Activity 1** Draw diagram of BP apparatus and Stethoscope and label as per guidelines.
- **Activities 2** Tie the cuff on your arm, fill the air up to 200mm of Hg and feel the pressure. Release the pressure slowly and explain what you felt.
- **Activity 3** Select five patients in hospital, take blood pressure, get it checked from supervisor and record accurately.