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1. Scope

This Standard Operating Procedure (SOP) applies to the staff and students using the Medisana® Upper Arm Blood Pressure (BP) Monitor in the Pharmacy Practice Resource Unit (PPRU) at the Pharmacy Department, University of Malta.

2. Objective

To describe the procedure for set-up, configuration, operation, recording and recalling of results, quality control, maintenance and troubleshooting of the Medisana® Upper Arm BP Monitor.

3. Definitions

3.1. Medisana® Upper Arm BP Monitor MTV: Device used to measure BP in the upper arm. The measurement is carried by a microprocessor, which, via a pressure sensor, measures the vibrations resulting from the inflation and deflation of the cuff over the artery.

3.2. Memory Function: Stores up to 60 measurements in memory automatically (BP with pulse, time and date).

3.3. Cuff: The part of the device that is attached to the patient’s arm. It detects oscillations due to arterial expansion and contraction. The build up of pressure stops after establishing systole, diastole and pulse and air is then let out of the cuff. The amplitude of each pressure wave is measured in millimetres of mercury and converted digitally to be displayed on the device’s screen.

3.4. Diastolic BP: Minimum pressure in the arteries when the heart is at rest.

3.5. Systolic BP: Maximum pressure being exerted when the heart is contracting.

3.6. Pulse Rate: Number of pulsations noted in a peripheral artery per unit of time.

3.7. WHO BP Classification

<table>
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<tr>
<th>Low BP</th>
<th>Normal BP (Green)</th>
<th>Types of High BP</th>
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<tr>
<td></td>
<td></td>
<td>Mild (Yellow)</td>
</tr>
<tr>
<td>Systolic</td>
<td>&lt;100</td>
<td>140-159</td>
</tr>
<tr>
<td>Diastolic</td>
<td>&lt;60</td>
<td>90-99</td>
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4. Responsibility

4.1. The members of the Department of Pharmacy (staff and students) are responsible for following this SOP.

4.2. The designated Laboratory Officer or Laboratory Assistant is responsible for ensuring that this SOP is followed.

5. Procedure

5.1. Diagram of Medisana® Upper Arm Blood Pressure (BP) Monitor
5.2. Set-Up

5.2.1. Open battery compartment.
5.2.2. Insert four AA batteries and replace the lid pressing it until it snaps into place.

5.3. Setting Date and Time

5.3.1. Press Start button and MEM button simultaneously. The month appears flashing on the display.
5.3.2. Press MEM button repeatedly until the required value is displayed to change the month. The value auto-repeats if the MEM button is held down.
5.3.3. Press Start button again to display the values for month, day, hour and minute (flashing).
5.3.4. Press MEM button to change the values. After the fifth press of Start button, the numbers in the display stop flashing. The time setting is now complete.
5.3.5. Re-set date and time when batteries are replaced.

5.4. Fitting the Cuff

5.4.1. Push the end piece of the air tube into the hole on the device.
5.4.2. Slide the open end of the cuff through the metal bracket so that the velcro fastener is on the outside.
5.4.3. Open the cuff so as to create a cylindrical shape.
5.4.4. Slide cuff over left upper arm.
5.4.5. Position the air hose in the middle of the arm, in line with the middle finger.
5.4.6. Place relaxed arm on a flat surface with the palm facing upwards.
5.4.7. Check that the lower edge of the cuff is 1-2cm above the crease of the elbow.
5.4.8. Pull the cuff tight and close the velcro fastener.

5.5. Taking BP Readings

5.5.1. Press Start button to switch the display On.
5.5.2. Wait for voice instructions and press Start button to continue procedure.
5.5.3. Wait for measurement to finish. When the measurement is complete, the cuff will deflate. Systolic and diastolic BP and pulse value (with a ♥ symbol) will appear on the display. The BP indicator flashes next to the relevant coloured bar depending on the WHO BP classification (Section 3.7). If the unit detects an irregular heartbeat, the arrhythmia display (with a (♥) symbol) will also flash.
5.5.4. Record the measurement.
5.5.5. Press Start button to switch device Off. The device also has an automatic Switch Off function.
5.6. Memory

5.6.1. Press MEM button to list the measured values stored. The device displays the memory set (U1 or U2) and the number of memory slots occupied.

5.6.2. Press Start button to switch to the other memory. The average measured values of the last 3 measurements saved appear on the display if no button is pressed for a duration of 5 seconds. An A (Average) appears instead of the memory location number.

5.6.3. Press MEM button to display the values of the most recently saved measurement, including the flashing BP indicator. When an arrhythmia is detected during the process, the arrhythmia symbol (♥) will also flash.

5.6.4. Press MEM button repeatedly to display the respective values measured previously. In memory recall mode the device switches off automatically after approximately 120 seconds if the last entry has been reached and the MEM button has been pressed once more.

5.6.5. Press and hold MEM button for approximately 8 seconds while in memory recall mode to delete memory. All measured data stored will be deleted automatically after 3 beeps. Only noughts will be shown on the display instead of values.

5.6.6. Press Start button to exit memory recall mode. The device will also be switched off.

5.7. Troubleshooting

| Erratic measurements being displayed | • Cuff incorrectly fitted or not tight enough; fit cuff correctly and tighten  
| • The body position has changed or the cuff has moved during measurement; keep still and do not move one’s arm or the cuff  
| • Irregular heartbeat; repeat measurement if heartbeat is only slightly irregular – device is not suitable for people with an extremely irregular heartbeat |
| “EE” appears on the display | • The device has not been inflated enough; repeat measurement  
| • Problem occurred during inflation or during measurement; repeat measurement |
5.8. Care and Maintenance

5.8.1. Remove batteries before cleaning the device.
5.8.2. Clean the device using a soft cloth; lightly moisten with a mild soapy solution.
      Do not use abrasive cleaning agents or alcohol.
5.8.3. Do not allow any water to enter the device
5.9. Flow Charts

5.9.1. Setting Date and Time

Start

Press Start button and MEM button simultaneously; the month appears flashing on the display

Press MEM button repeatedly until required value is displayed to change the month; the value auto-repeats if the MEM button is held down

Press Start button again to display values for month, day, hour and minutes (flashing)

Press MEM button to change the values; after the 5th press of the Start button, the numbers in the display stop flashing and time setting is now complete

Reset date and time when batteries are replaced

End
5.9.2. Fitting the Cuff

Start

Push the end piece of the air tube into the hole on the device

Slide open end of cuff through the metal bracket so that the velcro fastener is on the outside

Open the cuff so as to create a cylindrical shape

Slide cuff over left upper arm

Position the air hose in the middle of the arm, in line with middle finger

Place arm on a flat surface with the palm facing upwards

Check that the lower edge of the cuff is 1-2cm above the crease of the elbow

Pull the cuff tight and close the velcro fastener

End
5.9.3. Taking a Blood Pressure Measurement

Start

Press Start button to turn the device On

Wait for voice instructions and press Start button to continue procedure; systolic and diastolic BP and pulse value (with a ♥ symbol) appear on the display

Record measurement; cuff deflates completely when measurement is finished

Press Start button to switch device Off

End
5.9.4. Memory

Start

Press `MEM` button to list stored measured values; device displays memory set (U1 or U2) and number of memory slots occupied

Press `Start` button to switch to the other memory; average measured values of the last 3 measurements saved appear on the display if no button is pressed for a duration of 5 seconds and an A (Average) appears instead of the memory location number

Press `MEM` button to display the values of the most recently saved measurement, including the flashing BP indicator; when an arrhythmia is detected, arrhythmia symbol (♥) also flashes

Press `MEM` button repeatedly to display the respective values measured previously; in memory recall mode the device switches off automatically after approximately 120 seconds if the last entry has been reached and the `MEM` button has been pressed once

Press and hold `MEM` button for approximately 8 seconds while in memory recall mode to delete memory; all measured data stored will be deleted automatically after 3 beeps

Press `Start` button to exit memory recall mode and to switch device Off

End
6. Precautions

6.1. Avoid creating a space between the arm and cuff since it may falsify the measured result

6.2. Position the cuff on the right arm only if it cannot be used on the left arm

6.3. Always carry out the measurement on the same arm

6.4. Keep still during measurement

7. References


8. Appendices

N/A

9. Revision History

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<th>Amendments/ Reasons for change</th>
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<td>01</td>
<td>Initial Release</td>
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