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TITLE: M3815B Home-based Blood Pressure Monitoring Using the Philips Blood Pressure Unit

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SERVICE BULLETIN INFORMATION:

Home-based Blood Pressure Monitoring Using the Philips Blood Pressure Unit

The Philips Patient Telemonitoring Set includes an automatic blood pressure monitoring unit designed for self-measurement. Using this simple, automated, accurate device, patients take recordings for themselves without assistance from a healthcare professional.
Comparing Two Methods: Automatic Blood Pressure Devices and Traditional Auscultatory Technique

The Philips blood pressure unit is an oscillometric device. It works on the principle that pulsating blood flow produces oscillation of blood vessels that are transmitted to the cuff encircling the arm. The peaks of cuff oscillations correlate with mean arterial pressure (MAP); all oscillometric devices use MAP measurement, a mathematical formula and error correction technique to derive systolic and diastolic blood pressure and pulse measurements.

Healthcare providers typically take blood pressure readings by traditional auscultatory technique. Using a stethoscope, the practitioner begins to count Korotkoff sounds when cuff pressure falls below systolic pressure and ends the count when cuff pressure falls below diastolic pressure. The timing and interpretation of Korotkoff sounds are subjective and technique-dependent.

A recent study evaluated the accuracy of the Philips blood pressure monitor and found that the device satisfied the recommended European Society of Hypertension accuracy levels. The results of the study demonstrated that the Philips blood pressure monitor provides accurate and reliable blood pressure measurements and is capable of generating precise blood pressure readings across a wide spectrum of subjects with different clinical characteristics. The study also measured arterial compliance and found that the performance of the device was uniform across the whole range of large-artery elasticity (C1) and small artery elasticity (C2) in test subjects. The absolute and the relative discrepancies between observer and device were totally unrelated to indices of arterial compliance. In addition, the precision of the blood pressure unit did not vary according to age, gender, anthropometric characteristics, and degree of adiposity or blood pressure level (Longo, Toffanin, Garbelotto, Zaetta, Businaro, & Palatini, 2003).

Repeatability, Battery Voltage and Ageing

The Philips Engineering team evaluated the repeatability of measurements on the blood pressure monitor. They concluded that the measurements on the blood pressure unit are repeatable.

With 95% confidence, the following statements can be made:

1. Systolic pressure level measurements are repeatable within a range of +/- 3 mmHg from the mean.
2. Diastolic pressure level measurements are repeatable within a range of +/- 1 mmHg from the mean.
3. Pulse Rate measurements are repeatable within a range of +/- 1 count from the mean.

The team also investigated the effects of battery voltage as well as device age, on the accuracy of blood pressure readings. They concluded that there is no observable difference in the performance of the units or their accuracy of measurements (Jabil, 2010).
Definition and Importance of Using Correct Technique

Technique plays a critical role in obtaining an accurate blood pressure. A recent study found that "office blood pressure readings result in incorrect diagnoses & treatment changes 81% of the time". The study investigated the impact of closely following the standard guidelines for blood pressure diagnosis and treatment (American Heart Association [AHA] and The Seventh Report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure.

The study was conducted at the Texas Tech University Health Sciences Center. Subjects had to have a systolic blood pressure reading over 120 mmHg and/or a diastolic reading over 80 mmHg and be over 18 years of age.

Blood pressures were retaken following published AHA and JNC-7 guidelines, including ensuring that the cuff fit properly, there was no restrictive clothing, the patient sat for 5 minutes in a chair with back support, the patient had their feet firmly planted on the floor and legs uncrossed, the middle of the cuff was located at mid-sternum for the patient, the patient had had no caffeine and had not smoked or exercised for 30 minutes, and 2 separate readings were taken and then averaged, with a third reading taken if the first 2 differed by over 5 mm Hg.

Of the 56 patients included in the initial subject group, over half [56.4%] changed JNC-7 classifications upon having their blood pressure taken according to the above referenced guidelines. These changes can make a significant difference in how doctors manage their patients (Burgess MD, 2010).

Clinical Considerations and Possible Contraindications

Please consult the patient’s physician about patient conditions that could affect the accuracy of the blood pressure monitoring unit, including: rapid changes in pressure or extremely low blood flow states (shock or low pulse pressure), physical movement such as shivering, respiratory variation, calcified arteries, or thoracic outlet syndrome. Frequent and premature atrial and ventricular complexes affect the accuracy of any oscillometric device.

The Philips Blood Pressure monitor provides a blood pressure and pulse rate measurement even when an irregular heartbeat occurs. An irregular heartbeat is defined as a heartbeat that varies by 25% from the average of all heartbeats during the blood pressure measurement. It is important that the patient is relaxed, remains still, and does not talk while taking a blood pressure measurement.

Using the Philips Blood Pressure Unit

In order to obtain the most accurate reading possible:

- Ensure that the patient is using the device properly and following the instructions in the PTS Instructions for Use and Quick Start Card.
- Since blood pressure measurement can be affected by environmental, emotional and physical stimuli, the patient should make every effort to standardize the conditions of measurement while keeping outside influences to a minimum.
- Blood pressure should be taken at the same time each day in a quiet place in the home. The patient should rest 10 minutes before taking a measurement and relax for 5 minutes between measurements. Blood pressure should not be measured immediately after exertion, drinking of coffee or during conversation.
The keys to accurate measurement of blood pressure are using a correctly sized cuff and using the cuff properly. Prior to installing the blood pressure unit in a patient’s home, examine the cuff to ensure there is no visible damage or signs of wear. Replace blood pressure cuffs on a regular basis, as prescribed by your organization’s policies and procedures. Worn cuffs may cause inaccurate readings.

**Conclusion**

The Philips blood pressure unit is an accurate, convenient and affordable automatic blood pressure measuring device. Clinicians may see variation when comparing automatic blood pressure readings to manual blood pressure readings. These variations may be due to the calibration of the manual measurement device or technique of the clinician taking the manual measurement. Further, variation across automatic blood pressure readings can result from physiological or environmental conditions. It is important to provide proper training to patients who are using the Philips blood pressure unit.

The Philips blood pressure monitoring unit meets the American National Standard for Electronic or Automated Sphygmomanometers/Association for the Advancement of Medical Instrumentation SP10-1992.

**Works Cited**


**Further Reading**

Patient Telemonitoring Set Instructions for Use (S-M3810-90096-1 Rev F), Philips Lifeline Systems Company, 2009

Blood Pressure Unit Quick Start Card (M3815-90002), Philips Lifeline Systems Company, 2002

Blood Pressure Accuracy (M3815A), Field Change Order (FCO86300012)

**RELATED DOCUMENTS:** N/A

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