



COMPARING METHODS OF BLOOD PRESSURE MEASUREMENT

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Methods

PROCEDURE

This study was conducted on April 8, 2015 from 11:30-3:00 at IUPUC.

1. Prescreening included measuring arm circumference. The arm circumference needed to be between 26 and 40 cm to be included in the study, and participants were required to be over 18. Also included in prescreening was data gathering of whether the participant was male or female. Each participant was given a study information sheet.
2. We had 4 seats available to get the blood pressure checked. The participant sat in a chair and had their automated upper arm BP measured. It was written down and the participant was given their result.
3. We waited one minute between measurements to allow blood circulation to return to normal.
4. An automatic wrist cuff was next, followed by another minute of wait-time.
5. A manual upper arm device with which we used our stethoscopes to check the blood pressure was last.
6. Participants moved to the last station to get pizza and a hand sanitizer. Participants could have pizza simply for volunteering to be in the study, but if they completed the station of getting their pressures checked, then they could also take a hand sanitizer.
7. Results were documented confidentially to use in statistical tests.

OBJECTIVE

To detect whether or not there are differences between blood pressure (BP) measurement methods. Medical facilities use all three methods so it is important to make sure the measurements are consistent.

Supplies:

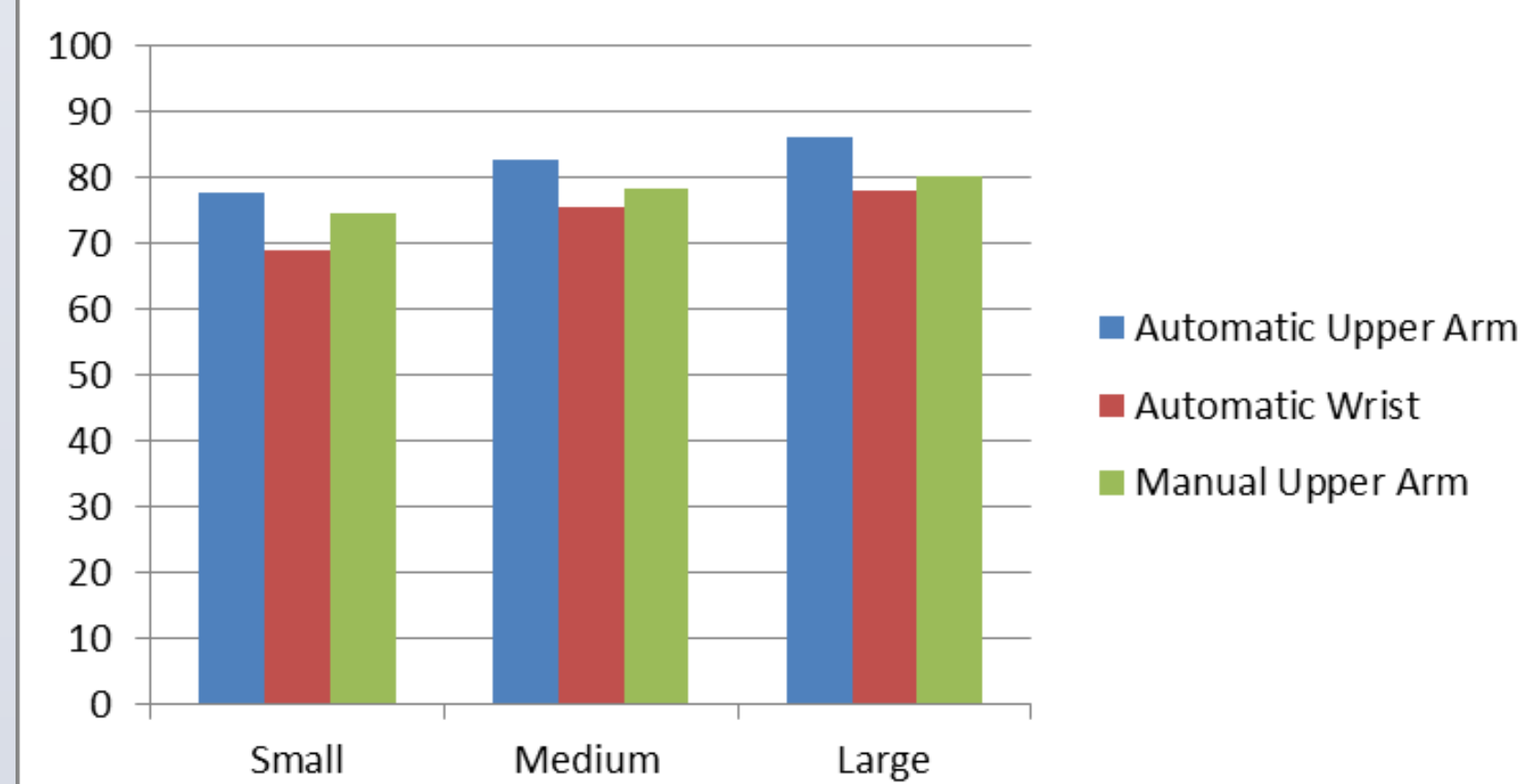
- Stethoscopes
- Automated Arm & Wrist Cuffs
- Manual Cuff
- Measuring Tape
- Sanitizing Wipes
- Incentives

Results

Mean BP in Women by Arm Circumference

N= 56	26-27 CM	28-30 CM	31-40 CM
SBP MANUAL	111	119	120
SBP AUTO ARM	115	124	125
SBP WRIST	115	129	127
P-VALUE	Insig.>0.05	Insig.>0.05	Insig.>0.05
DBP MANUAL	75	78	80
DBP AUTO ARM	78	83	86
SBP WRIST	69	75	78
P-VALUE	0.03*	Insig.>0.05	<0.001*

Mean Diastolic BP in Women by Arm Size



SUMMARY:

- In a sample of 18 men, there was no significant differences in methods of BP measurement, in systolic or diastolic readings.
- In a sample of 56 women, there was a significant difference in DBP measurement in females with 'small' and 'large' arms—women with 'small' arm circumferences showed differences in automatic wrist measurement and women with 'large' arm circumference showed differences in manual arm measurement.

Conclusions

Is there a significant difference in systolic blood pressure (SBP) between the three groups?

Yes - there is a significant difference found in SBP at a $p < 0.03$ level.

Is there a significant difference found in diastolic blood pressure (DBP) between the three groups?

Yes - there is a significance difference found in DBP at a $p < 0.001$ level.

What is the difference in SBP and DBP by gender?

There is no significant difference in SBP in measurement devices in females ($p = 0.05$).

There is no significant difference in SBP in measurement devices in males ($p = 0.36$).

*****There is a significant difference in DBP in measurement devices in females at $p < 0.001$.**

There is no significant difference in DBP in measurement devices in males ($p = 0.496$).

What is the difference in females by arm circumference?

*****Females with small arms (26-27 cm in diameters) have differences in DBP measurement at $p < 0.03$.**

Females with average size arms (28-30 cm in diameter) show no difference across BP measurement devices in DBP measurement ($p = 0.06$).

*****Females with large arms (31-40 cm in diameter) have significant differences in DBP measurement across BP measurement devices ($p < 0.001$).**

Which measurement devices show a significant difference in DBP in females with small (26-27 inch) arms?

*****When comparing measurement devices in females with small arms (26-27 inches in diameter), diastolic BP is significantly different when using an automatic arm cuff as compared to an automatic wrist cuff ($p < 0.001$) and when using a manual arm cuff as compared to an automatic wrist cuff ($p < 0.03$); however, there is no difference found between an automatic arm cuff and a manual arm cuff when using a two-tailed t-test ($p = 0.06$).**

Which measurement devices show a significant difference in DBP in females with large (31-40 inch) arms?

*****When comparing measurement devices in females with large arms (31-40 inches in diameter), diastolic BP is significantly different when using an automatic arm cuff as compared to an automatic wrist cuff ($p < 0.001$) and when using an automatic arm cuff as compared to a manual cuff ($p < 0.001$); however, there is no difference found between an automatic wrist cuff and a manual arm cuff when using a two-tailed test ($p = 0.27$).**

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