

THE ACCURACY OF BLOOD PRESSURE DEVICES IN PAEDIATRIC RENAL OUTPATIENTS

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DECLARATION

I, *Nokukhanya Swazi Mwandla*, declare that this research report is my own work. It is being submitted for the degree of Master of Medicine in the branch of Paediatrics in the University of the Witwatersrand, Johannesburg. It has not been submitted before for any degree or examination at this or any other University.

.....*N.S Mwandla*.....

.....1st day ofSeptember....., 2016

Dedicated to my sister
Nosiphiwe Thabisile Mwandla
1990- 2013

ABSTRACT

Purpose

The purpose of this study is to determine accuracy of aneroid and automated machines versus the mercury gold-standard in blood pressure (BP) determination. Childhood hypertension is an important condition that is most often secondary hypertension. The accurate measurement of BP is imperative.

Methods

94 paediatric renal outpatients had BP taken in a random order with Welch Allyn aneroid, Dinamap Pro 100 and Omron HEM 907 manometers. The BP was compared to a mercury manometer. 2 observers obtained the manual device readings simultaneously but blindly to each other. Inter-device differences were used to validate the devices by two international standards.

Results

The aneroid manometer overestimates SBP and DBP. The Dinamap Pro 100 overestimates SBP and underestimates DBP. The Omron HEM 907 was accurate for SBP, but overestimates DBP.

Conclusion

Abnormal oscillatory BP readings need confirmation using manual methods. Further studies are needed to determine accuracy of the aneroid manometer.

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I would also like to thank the management of Chris Hani Baragwanath Academic Hospital for granting permission to perform the study at paediatrics outpatient renal clinic and to use hospital equipment for the study.

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NOMENCLATURE

AAMI	Association for the Advancement of Medical Instrumentation
AKI	Acute kidney injury
BHS	British Hypertension Society
BP	Blood pressure
DBP	Diastolic blood pressure
ESH	European Society of Hypertension
FSGS	Focal segmental glomerulosclerosis
HIV	Human immunodeficiency virus
PUJ	Pelvi-ureteric junction
PUV	Posterior urethral valves
RTA	Renal tubular acidosis
SLE	Systemic lupus erythematosus
UTI	Urinary tract infection
VUR	Vesico-ureteric reflux
SBP	Systolic blood pressure
SD	Standard deviation

DEFINITIONS

Manual device	Aneroid and/ or mercury sphygmomanometer
Oscillometric device	Dinamap and/ or Omron BP machine

PREFACE

Which blood pressure monitor is the perfect replacement for the gold-standard mercury device? Mercury sphygmomanometers are heavy to carry and pose a potential hazard in paediatric wards and outpatient clinics. The hospital is teeming with automated machines, such that these are used without positive scientific validation.

The purpose of this study is to be part of the solution. I chose to perform this prospective study due to paucity of device validation in Africa.

This report is targeted toward the South African doctor and medical student. There are many unanswered and unasked questions. One needs to question efficacy and validity. Make a difference.

I would like to thank the young study participants, for their willingness. Those that agreed to participate handled the process with such grace. I thank the second observer, Ms Kolatsoeu, for giving of her time and expertise and, most importantly, my supervisor for expert guidance.