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Assessment of agreement between invasive and non-invasive blood pressure measurements in critically ill patients

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ASSESSMENT OF AGREEMENT BETWEEN INVASIVE AND NON-INVASIVE BLOOD PRESSURE MEASUREMENTS IN CRITICALLY ILL PATIENTS

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A Research Report submitted to the Faculty of Health Sciences, University of the Witwatersrand, in partial fulfillment of the requirements for the degree of

Master of Science in Nursing

Johannesburg, 2010

DECLARATION

I, Jadot Ninziza declare that this research is my own work. It is being submitted for the degree of Master of Science (Nursing) in the University of the Witwatersrand, Johannesburg. It has not been submitted before for any degree in any other University.

Signature: _____

Jadot Ninziza

_____ Day of _____ 2010

Protocol number: M040516

DEDICATION

This work is dedicated to my family, friends and colleagues, for their motivation, inspiration, love and support throughout my studies at the University of the Witwatersrand, Johannesburg.

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To almighty Jehovah God for his protection and blessing throughout my study.

My utmost gratitude goes to my lecturer, supervisor, Mentor and role model,
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To the doctors, nurses, patients and families who participated in this study, thank you so much for making this study possible.

ABSTRACT

The purpose of the study was to describe and compare the limits of agreement between invasive blood pressure (IBP) and non-invasive blood pressure (NIBP) readings obtained on patients in the adult critical care units (CCU) of a tertiary health care institution, to describe the factors that affect accuracy of both techniques, to describe the difference in terms of accuracy and sensitivity and the reasons given by the clinical practitioners for their choice of blood pressure measurement technique.

A non-experimental descriptive comparative, prospective design was utilized in this two part study. The sample comprised of CCU patients (n = 80) in five adult critical care units over a 3-month period. Non-probability purposive sampling was utilized to obtain the desired sample in part one of the study. Data collection was via IBP and NIBP measurements obtained by the researcher and a record review of the patient's critical care charts. Part two of the study comprised of clinical practitioners (n=50) and convenience sampling method was utilized. Descriptive and inferential statistics were used to analyse data.

At the 95% confidence interval, the limits of agreements were found to be in range of ± 35 mmhg of IBP and NIBP systolic, ± 19.5 mmHg of IBP and NIBP diastolic and ±19.3 mmhg IBP and NIBP of mean arterial pressure. In practical terms this means that IBP and NIBP can not be used interchangeably in CCUs as the two methods did not consistently provide similar measurements because there was a high level of disagreement that included clinically important discrepancy of more than 10 mmhg which is the cut off acceptable reference in terms of discrepancy between the two BP techniques and add to the growing literature suggesting that IBP remains the gold standard technique for measuring the blood pressure in critical care setting. Factors such as Inotropic/ vasopressor support, sedation / analgesia, mechanical ventilation and severity of illness (APACHE II score) did not show significant influence on the discrepancy of the two BP techniques.

In the second part of the study, more than 80 % of the sample of clinical practitioners acknowledged that the IBP technique remains the gold standard.

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LIST OF ABBREVIATIONS

The following abbreviations are used consistently throughout the study:

CCU	Critical care unit
IBP	Invasive blood pressure
NIBP	Non-invasive blood pressure
BP	Blood pressure
CVA	Cerebro-vascular accident
SANC	South Africa Nursing Council
MAP	Mean arterial pressure
ABG	Arterial blood gas
SVR	Systemic vascular resistance
CVP	Central venous pressure
Hb	Hemoglobin
ARDS	Acute Respiratory Distress Syndrome
MRC	Medical Research Council
SBP	Systolic blood pressure
DBP	Diastolic blood pressure
MBP	Mean blood pressure
PC	Pressure control
SIMV	Synchronized intermittent mandatory ventilation
PS	Pressure support
PEEP	Positive end-expiratory pressure
TNT	Nitroglycerin
PRN	As necessary
IV	Intravenously
mmHg	Milliliters of mercury
RSA	Republic Of South Africa