CODEN [USA]: IAJPBB ISSN : 2349-7750

INDO AMERICAN JOURNAL OF
PHARMACEUTICAL SCIENCES
SJIF Impact Factor: 7.187
http://doi.org/10.5281/zenodo.4418663

Avalable online at: http://www.iajps.com *Research Article*

ACCURACY OF AUTOMATED BLOOD PRESSURE ASSESSMENT DEVICE CONFIRMED BY MERCURY SPHYGMOMANOMETER

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Article Received: November 2020 **Accepted:** December 2020 **Published:** January 2021

Abstract:

Objective- *The objective of this study is to measure the accuracy of BP assessing device confirmed by mercury sphygmomanometer.*

Material and Methods- *This was a cross sectional types study conducted in Holy Family Hospital Rawalpindi in which total 212 subjects were selected for observation. All the selected children were kept at 45 degree on examination bed and then after that 5 minutes rest period was given to them. After this both diastolic and systolic BP was measured using automated BP assessing device named as Omron HEM-907XL. Three reading were taken from all the selected patients and then average of these readings was taken for further analysis. After checking BP through automated assessing device, a further rest period of five minutes were given to them and then BP was again measured of all the patients using standard mercury sphygmomanometer.*

Results- *Out of 212 selected patients 44% were female and 56% were male and the mean age of all the selected patients was 10 ± 7.53 years. Mean BMI was 25 ± 4.463 Kg/m2. In 72% off the patients automated device measured accurate BP while in 28% it was not accurately measured.*

Conclusion- *It was concluded that the automated BP assessing device is 72% accurate confirmed by mercury sphygmomanometer.*

Key Words: *mercury sphygmomanometer, automated blood pressure, accuracy*

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Please cite this article in press Mah Rukh et al, ***Accuracy Of Automated Blood Pressure Assessment Device Confirmed By Mercury Sphygmomanometer.,*** *Indo Am. J. P. Sci, 2021; 08(1).*

INTRODUCTION:

In all over the world hypertension or raised BP is one of the most common cause of mortality. Around 12.8% of the death all around the world are due to hypertension in which 45% deaths occur due to disease of coronary artery while 51% occur due to stroke. Increasing age is also a major contributing factor of hypertension as around 90% people may have BP problem after the age of 55 years old. However, it is also very alarming that prevalence of hypertension in young generation is increasing and reason behind this is increased atherosclerosis. Moreover, proper treatment is very necessary for treating hypertension in youth so that the increased risk of cardiovascular diseases can be reduced. Some studies witnessed that ambulatory BP monitoring is very helpful rather than assessing cardiovascular diseases in young generation. Therefore, its use is increasing in young generation but there are some problems associated with it as these devices mostly depends upon oscillometric methods which cannot measure diastolic BP accurately as compared to systolic BP. However, new devices like automated BP assessing device are replacing the standard mercury sphygmomanometer in various clinical set-ups. According to a study the accuracy of oscillometric BP device is 70% while in another it was 80%. The objective of this study is to measure the accuracy of BP assessing device confirmed by mercury sphygmomanometer.

MATERIAL AND METHODS:

This was a cross sectional types study in which total 212 subjects were selected for observation. Children of both genders belong to age group of 3 to 18 years were included in this study. All those were excluded who had any history of congenital heart problems, cardiovascular diseases. A written consent paper was signed by all the parents. After that detailed clinical examination and history was done to all children. All the selected children were kept at 45 degree on examination bed and then after that 5 minutes rest period was given to them. After this both diastolic and systolic BP was measured using automated BP assessing device named as Omron HEM-907XL. Three reading were taken from all the selected patients and then average of these readings was taken for further analysis. After checking BP through automated assessing device, a further rest period of five minutes were given to them and then BP was again measured of all the patients using standard mercury sphygmomanometer. Accuracy was determined by comparing the results of both devices for each patient. SPSS version 20 was used for statistical analysis. MeanSD was calculated for BMI, weight, height, Diastolic BP, systolic BP, and age while for sensitivity, false negativity, and gender frequency and percentages was calculated.

RESULTS:

Out of 212 selected patients 44% were female and 56% were male and the mean age of all the selected patients was 10 ± 7.53 years. 123 i.e. 58% belonged to the age group of 11 to 18 years while 89 i.e. 42% belonged to the age group of 3 to10 years of age. Mean BMI was 25 ± 4.463 Kg/m2. In 72% off the patients automated device measured accurate BP while in 28% it was not accurately measured.

Table 1. Patient's demographic

N	212
Age	10 ± 7.53
3-10 Years	89 (42%)
11-18 years	123 (58%)
Male	119 (56%)
Female	93 (44%)
Systolic BP	110 ± 12.56
Diastolic BP	80 ± 8.81
Height	1.3 ± 1.10
Weight	30 ± 6.27
BMI	25 ± 4.46
$\leq$25 Kg/m^2	187 (88%)
>25 Kg/m^2	25 (12%)

Table 2. Accuracy of automated BP assessing Device by comparing with mercury sphygmomanometer

Hypertension on		Mercury Sphygmomanometer		Total
		Positive	Negative	
Automated device	Positive	152	1	153
	Negative	56	3	59
Total		208	4	212

Sensitivity = 73.1%

DISCUSSION:

In all over the world hypertension or raised BP is one of the most common cause of mortality. Around 12.8% of the death all around the world are due to hypertension in which 45% deaths occur due to disease of coronary artery while 51% occur due to stroke. Increasing age is also a major contributing factor of hypertension as around 90% people may have BP problem after the age of 55 years old. However, it is also very alarming that prevalence of hypertension in young generation is increasing and reason behind this is increased atherosclerosis. However, new devices like automated BP assessing device are replacing the standard mercury sphygmomanometer in various clinical set-ups. According to a study the accuracy of oscillometric BP device is 70% while in another it was 80%. The objective of this study is to measure the accuracy of BP assessing device confirmed by mercury sphygmomanometer. Comparable finding were seen in past investigations. A concentrate by Natalie et al., found the legitimacy of gadget in 61% investigations which utilized as standard convention. As it were 34% examinations where the gadget was adequately affirmed were executed without infringement in protocols. In another examination had led an investigation on 200 people. The mean distinction in SBP was 8.54 ± 9.38 mmHg while the mean distinction in DBP was 4.21 ± 7.88 mmHg. 89 people have definitely known hypertension; and the distinction of mean SBP was 9.43 ± 9.89 mmHg also, contrast in mean DBP was 4.26 ± 7.35.

CONCLUSION:

It was concluded that the automated BP assessing device is 72% accurate confirmed by mercury sphygmomanometer.

REFERENCE:

1. Organization WH. Global health risks: mortality and burden of disease attributable to selected major risks: World Health Organization; 2009.
2. MEMBERS WG, Go AS, Mozaffarian D, Roger VL, Benjamin EJ, Berry JD, et al. Heart disease and stroke statistics—2014 update: a report from the American Heart Association. Circulation 2014;129(3):e28.
3. Flynn JT, Urbina EM. Pediatric ambulatory bloodpressure monitoring: indications and interpretations. J Clin Hyper 2012;14(6):372-82.
4. Gidding SS, Rana JS, Prendergast C, McGill H, Carr JJ, Liu K, et al. Pathobiological determinants of atherosclerosis in youth (PDAY) risk score in young adults predicts coronary artery and abdominal aorta calcium in middle age: the CARDIA study. Circulation 2016;133(2):139-46.
5. Lai C-C, Sun D, Cen R, Wang J, Li S, Fernandez- Alonso C, et al. Impact of long-term burden of excessive adiposity and elevated blood pressure from childhood on adulthood left ventricular remodeling patterns: the Bogalusa Heart Study. J Am Coll Cardiol 2014;64(15):1580-7.
6. Epoig FOR, Children RRI. Expert panel on integrated guidelines for cardiovascular health and risk reduction in children and adolescents: summary report. Pediatr 2011;128(Suppl 5):S213.
7. Koivistoinen T, Hutri-Kähönen N, Juonala M, Aatola H, Kööbi T, Lehtimäki T, et al. Metabolic syndrome in childhood and increased arterial stiffness in adulthood—The Cardiovascular Risk in Young Finns Study. Annals Med 2011;43(4): 312-9.
8. King-Schultz L, Weaver AL, Cramer CH. Correlation of Blood Pressure Readings From 6-Hour Intervals With the Daytime Period of 24-Hour Ambulatory Blood Pressure Monitoring in Pediatric Patients. J Clin Hypertens 2012; 14(6):396-400.
9. Skirton H, Chamberlain W, Lawson C, Ryan H, Young E. A systematic review of variability and reliability of manual and automated blood pressure readings. J Clin Nursing 2011;20(5-6):602-14.

10. Flynn JT. Ambulatory blood pressure monitoring in children: imperfect yet essential. Pediatr Nephrol 2011;26(12):2089.
11. Smulyan H, Safar ME. Blood pressure measurement: retrospective and prospective views. Am J Hypertension 2011;24(6):628-34.
12. Urbina EM, Khoury PR, McCoy CE, Daniels SR, Dolan LM, Kimball TR. Comparison of mercury blood pressure readings to oscillometric and central blood pressure in predicting target organ damage in youth. Blood pressure monitoring 2015;20(3):150.
13. Ostchega Y, Prineas RJ, Nwankwo T, Zipf G. Assessing blood pressure accuracy of an aneroid sphygmomanometer in a national survey environment. Am J Hypertens 2011;24(3):322-7.
14. Ostchega Y. Blood pressure randomized methodology study comparing automatic oscillometric and mercury sphygmomanometer devices: National Health and Nutrition Examination Survey, 2009-2010: US Department of Health and Human Services, Centers for Disease Control and …; 2012.
15. Bello NA, Woolley JJ, Cleary KL, Falzon L, Alpert BS, Oparil S, et al. Accuracy of blood pressure measurement devices in pregnancy.