EL 12

ORAL SECTION

TOPIC: CHILDREN AND ADOLESCENTS

ACCURACY OF VALIDATED BP MONITORS FOR OUT OF OFFICE MEASUREMENT IN CHILDREN AND ADOLESCENTS: A SYSTEMATIC REVIEW

Kleo Evripidou¹, Athanasia Chainoglou¹, Christina Antza³, Giannis Goulas¹, Carla Simão², Gilad Hamdani⁴, Javier Calpe⁵, Stella Stabouli¹, HyperChildNET Working Group 1 (WG1)⁶. ¹1st Department of Pediatrics, Hippokration General Hospital, Aristotle University of Thessaloniki, Thessaloniki, GREECE, ²Department of Pediatrics, Hospital Universitario de Santa Maria, FMUL, Lisbon, PORTUGAL, ³3rd Department of Medicine, Papageorgiou Hospital, Aristotle University of Thessaloniki, GREECE, ⁴Nephrology and Hypertension Institute, Schneider Children's Medical Center, Petah Tikva, ISRAEL, ⁵Analog Devices, SLU, Paterna, Valencia, SPAIN, ⁶COST Action HyperChildNET (CA19115)

Objective: BP measurement devices must demonstrate clinical accuracy proved by proper validation testing in the intended population, following the standards published by the internationally accepted protocols. This review aims to evaluate out-of-office blood pressure (BP) validated devices using current validation protocols in children.

Design and method: The eligibility criteria included observational studies published after 2000, with successful validation for automatic, oscillometric BP measurement devices in the pediatric population, for out-of-office settings, either home BP or ambulatory BP monitoring (HBPM or ABPM) devices. The review was conducted per the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines. The accuracy of devices was assessed based on the mean BP difference between reference and test device measurement and its standard deviation (SD), following the AAMI/ESH/ISO 2018 statement. The quality of the eligible studies was evaluated using the checklist for validation studies using the AAMI/ESH/ISO Universal Standard (ISO 81060-2:2018) from the European Society of Hypertension (ESH) Working Group on BP Monitoring.

Results: Based on the eligibility criteria, this review included 17 studies, 8 devices for HBPM and 9 for ABPM. The reported characteristics were the number (N) of participants including pediatric ones, the characteristics of the devices and the cuffs used, the validation protocol used in each study, and the manufacturer. The primary limitation of the included studies was the lack of separate reporting for the pediatric population concerning the parameters used in the validation process. When assessing validation criteria 1, HBPM devices generally showed slightly lower accuracy than ABPM devices, with statistical significance only for mean SBP difference (p=0,023, CI: 0,21 to 2,50). All validation studies followed at least one internationally recognized protocol. Almost half of the devices (47%) have been validated based on multiple protocols.

Conclusions: Several BP measurement devices have been validated for use in the pediatric population. However, the reporting rate of results in studies in the pediatric population for out-of-office BP measurement devices is low and several pitfalls were noted in the validation procedure.

Acknowledgments: COST Action HyperChildNET (CA19115) (COST (European Cooperation in Science and Technology), Horizon 2020 Framework Program of the European Union).

BLOOD PRESSURE TRAJECTORY FROM BIRTH TO PRESCHOOL-AND SCHOOL-AGE: EVIDENCE FROM ENVIRONAGE BIRTH COHORT

Yuling Yu¹, Eleni Renaers², Hanne Sleurs², Michelle Plusquin², Rossella Alfano², Dries Martens², Dong -Yan Zhang¹, De -Wei An¹, Anke Raaijmakers¹, Karel Allegaert¹, Peter Verhamme¹, Jan Staessen^{1,3}, Tim Nawrot^{1,2} ¹KU Leuven, Leuven, BELGIUM, ²Hasselt University, Diepenbeek, BELGIUM, ³Non-Profit Research Association Alliance for the Promotion of Preventive Medicine, Mechelen, BEL-GIUM

Objective: Blood pressure (BP) is an essential modifiable risk factor and associated with cardiovascular disease in adulthood. The modifiable effect of BP might initiates from birth and operates across the whole life span. We aimed to explore

[A] Birth FU1 [B] FU1 FU2 8±7.81 61.7±3.6 8±3.38 ^[C] 120 [D] 120 Non-Tracker 25 Tracker 221 on-Tracker 110 10 문 90 80 MAP APP. 70 40 60

the BP trajectory in childhood and evaluate whether the cardiovascular risk later

in life is related to early life BP.

20 -

Design and method: The Environmental Influence on Aging in Early Life (EN-VIRONAGE) is a birth cohort, with BP and other phenotypes measured at birth, preschool- (4-6years) and school-age (9-11years). The participants with 2 or more BP measurements at different visits were analyzed, including 283 children in the preschool dataset, 272 in the school-age dataset, and 500 in the combined dataset. Tracker, horse-racer and non-tracker were defined by the change in mean arterial pressure (MAP) percentiles between 2 visits within 0-1 quartile, moving up for 2 or 3 quartiles, and moving down for 2 or 3 quartiles. Elevated BP and hypertension, standardized for age, sex, and height, were defined following the 2017 American Academy of Pediatrics guidelines. Multivariable adjusted linear, mixed and Cox proportional hazard regression models were applied to associate incident hypertension and BP in earlier childhood.

FU1

50

EU14

Results: This study included 500 healthy children (53.2% girls). Mean systolic/ diastolic BP tracked from 67.3/40.5 at birth to 100.2/57.5 at preschool-age and to 107.7/65.1mm Hg at school-age, and correspondingly mean MAP increased from 51.2 to 74.6 and to 82.1mm Hg. In the combined dataset and accounting for confounders, with per 1-standard deviation increase in initial BP, BP in the last follow-up increased by 2.67/1.31mm Hg (1.66 to 3.68/0.21 to 2.40mm Hg) in systolic/diastolic BP, and 1.91mm Hg (0.78 to 3.04mm Hg) in MAP, respectively. The hazard ratios of elevated BP and hypertension were 2.84 (1.50 to 5.38) and 3.75 (1.79 to 7.86), confirming the findings in preschool- and school-age datasets.

Conclusions: In this prospective study, BP tracked over time. Risk of elevated BP and hypertension was associated with the BP levels in earlier childhood, suggesting that BP links to cardiovascular risk later in life.

CHILDHOOD HYPERTENSION, TRANSITION TO NORMOTENSION IN ADULTHOOD, AND SUBCLINICAL CARDIOVASCULAR OUTCOMES IN ADULTS: A 36-YEAR PROSPECTIVE COHORT STUDY

Yang Wang¹, Ming -Ke Chang¹, Hao Jia¹, Ming -Fei Du¹, Yue Sun¹, Dan Wang¹, Gui -Lin Hu¹, Zi -Yue Man¹, Chao Chu¹, Xiao -Wei Zheng², Jian -Jun Mu¹. ¹First Affiliated Hospital of Xian Jiaotong University, Xi an, CHINA, ²Wuxi School of Medicine Jiangnan University, Wuxi, CHINA

Objective: Elevated blood pressure (BP) is associated with increased cardiovascular and chronic kidney disease risks. However, It is uncertain whether these risks are attenuated in individuals who had elevated BP during childhood but normalized BP levels in adulthood. We aimed to determine whether transitioning from elevated BP during childhood to normal BP levels in adulthood would be associated with a lower risk of subclinical cardiovascular outcomes.

Copyright © 2025 Wolters Kluwer Health, Inc. All rights reserved

Copyright © 2025 Wolters Kluwer Health, Inc. All rights reserved.