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BLOOD PRESSURE MEASUREMENTS IN CHILDREN: THE INFLUENCE OF THE ALERT REACTION AND REGRESSION TO THE MEAN

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Background: Usual blood pressure (BP) is commonly determined through repeated measurements. ABPM-24h (Ambulatory Blood Pressure Monitoring) or HBPM (Home Blood Pressure Measurement) are other alternatives to overcome the alert reaction in adults. However, in children there is scarce information about the occurrence of alert reaction in the measurement of blood pressure.

Objectives: This study aims to evaluate the behavior of repeated blood pressure measurements in children.

Methods: Children, seven to nine years old, born from teenage mothers and young adults, had four repeated BP measurements in the same day. Blood pressure was assessed using a standardized technique, validated oscillometric monitor (OMRON, model CP-705) and the appropriate cuff sizes for arm circumference, with five minutes intervals. The mean (± SD) systolic (SBP) and diastolic blood pressure (DBP) at each reading of the four measurements was assessed using General Linear Model and analysis of variance for repeated measurements was used to compare the first with the averages of subsequent readings. Afterward patients were classified into two groups, according to the measurement values of the first SBP and DBP, larger or smaller than the average pressures. Variance analysis of global systolic and diastolic BP and in each subgroup was performed by ANOVA for repeated measures using the Bonferroni test.

Results: Children (n=448) aged 8.0 ± 0.5 years, 52.5% males were investigated. The mean of SBP decreased from the first to the 4th reading: 109.9 ± 15.2 *vs.* 107.5 ± 14.0 mmHg; F = 3.8, P <0.001. The reduction of DBP did not reach statistical significance (F = 1.7; P =0.16). The first systolic BP measurement (109.9 ± 15.2) was significantly higher than the average of the following measurements (107.6 ± 11.7; P = 0.001).

Conclusions: Systolic blood pressure decreases with repeated measurements in children, particularly due the high value of the first measurement. Regression to the mean and the alert reaction are likely explanations for these findings. Despite to having low implication for diagnostic purpose, this phenomenon should be taken into account in studies of tracking of blood pressure. Further reduction of blood pressure in the measurement of blood pressure in other days requires additional investigation.