ment induced BP reduction, a lower in-treatment BP is associated with superior outcomes.

Key Words: Cardiovascular Outcome, In-treatment Blood Pressure, Worksite Hypertension Control Program

P-60
DIPPING AND VARIABILITY OF BLOOD PRESSURE AND HEART RATE AT NIGHT ARE HERITABLE TRAITS
Cristiano Fava, Philippe Buori, Peter Algenv, U.Lernarn Halthen, Giudo Arcaro, Leif Groop, Olle Melander. Endocrinology, UMAS University Hospital of Malmo, Sweden, Malmo, Sweden; Internal Medicine, Hospital GB Rossi of Verona, Verona, Verona, Italy.

Objective: Blunted nocturnal blood pressure dipping as well as high variability of blood pressure and low variability of heart rate are associated with increased cardiovascular morbidity and mortality. The aim of this study was to test if these traits are heritable.

Methods: We studied 260 healthy siblings without antihypertensive drugs from 118 Swedish families. Blood pressure and heart rate variability were defined as the standard deviation of blood pressure and heart rate values recorded during 24-hours, daytime (06am-10pm) and nighttime (10pm-06am). Nocturnal blood pressure dipping was defined as the ratio between nighttime and daytime blood pressure. Heritability was estimated with a maximum likelihood method implemented in “Sola” software package with and without adjustment for significant covariates.

Results: At night, significant heritability was found for systolic (33%, \( P<0.05 \)), diastolic (36%, \( P<0.05 \)) and mean (42%, \( P<0.01 \)) blood pressure variation. After covariate adjustment the corresponding heritability values were 23% (\( P=0.08 \)), 29% (\( P<0.05 \)) and 37% (\( P<0.05 \)). Daytime blood pressure variability was not heritable. The heritability of nocturnal dipping was 38% (\( P<0.05 \)) for systolic, 9% (\( P=0.29 \)) for diastolic and 36% (\( P<0.05 \)) for mean blood pressure but after adjustment only systolic nocturnal dipping was significant (29%, \( P<0.001 \)). Heart rate was highly heritable both during daytime (57%, \( P<0.001 \)) and nighttime (58%, \( P<0.001 \)) but the variability of heart rate, after adjustment, was only significant at night (37%, \( P<0.05 \)).

Conclusions: Our data suggest that blood pressure and heart rate variability are partially under genetic control and that genetic loci of importance for these traits could be mapped by linkage analysis.

Heritability of ABP phenotypes after full adjustment

<table>
<thead>
<tr>
<th>ABP phenotype (%)</th>
<th>SBP</th>
<th>DBP</th>
<th>MBP</th>
<th>HR</th>
</tr>
</thead>
<tbody>
<tr>
<td>24-hour SD</td>
<td>21</td>
<td>15</td>
<td>14</td>
<td>15</td>
</tr>
<tr>
<td>Daytime SD</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Nighttime SD</td>
<td>23</td>
<td>29**</td>
<td>37**</td>
<td>37**</td>
</tr>
<tr>
<td>24-hour VC</td>
<td>9</td>
<td>9</td>
<td>14</td>
<td>15</td>
</tr>
<tr>
<td>Daytime VC</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Nighttime VC</td>
<td>21</td>
<td>25</td>
<td>33**</td>
<td>37**</td>
</tr>
<tr>
<td>Nocturnal dipping in Blood Pressure</td>
<td>29**</td>
<td>9</td>
<td>24</td>
<td>1</td>
</tr>
</tbody>
</table>

\( * P < 0.05 \), \( ** P < 0.01 \), \( *** P < 0.001 \)

Key Words: Ambulatory Blood Pressure, Dippers, Variability

P-61
RESEARCH UTILIZATION: IMPLEMENTING THE AMERICAN HEART ASSOCIATION GUIDELINES FOR MEASURING BLOOD PRESSURE
Brandy K Frost, Ihab M Hajjar. Center for Senior Hypertension, Senior Primary Practice of Palmetto Richland Memorial Hospital, Columbia, SC.

Research Utilization: Implementing the American Heart Association (AHA) Guidelines for Measuring Blood Pressure. The purpose of this pilot study was to determine if southeastern parish nurses would improve their knowledge of how to accurately measure blood pressure and improve their technique following a structured Blood Pressure Education and Evaluation Program (BEEP). The pilot study was a single-arm design and the outcome measures were assessed before (pre) and after (post) BEEP. The outcomes included: BEEP knowledge questionnaire, device assessment tool, technique tool, Terminal Digit Bias, and Attitude of Change. The unit of analysis was blood pressure readings (n=150 to 300 blood pressure readings). Southeastern parish nurses, who agreed to participate in BEEP, were asked to record all blood pressure measurements performed over the period of a month pre and post BEEP. The paired t-test difference between pre and post was used to assess the various outcome measures including terminal digit bias, knowledge, range of error and attitude of change. All equipment passed the device questionnaire. The knowledge improved post intervention (40% pre to 80% post). Technique improved (0% to 100%), range of error (SBP mean 2.33, SD \( \pm 9.35 \) pre, mean \( \pm 0.83 \), SD \( \pm 3.46 \) post, DBP mean-1.73, SD \( \pm 4.2 \) pre, mean \( \pm 1.5 \), SD \( \pm 3.53 \)), terminal digit bias (mean 23, SD \( \pm 11 \) pre, mean 14, SD \( \pm 10 \)) all increased. Attitude of change exhibited little change (cognitive 3.37 to 2.27, affective 2.93 to 3.13, behavioral 3.40 to 3.57). In conclusion to this pilot study it is important that further studies be conducted. It is necessary that a larger group be tested as well as adding a control group to further evaluate the effectiveness of the intervention.

Key Words: American Heart Guidelines for BP Measurement, Blood Pressure Monitoring, Measure Blood Pressure

P-62
ASSESSMENT OF THE WHITE COAT EFFECT
William Gerin, Ghenga Ogedeghe, Daichi Shimbo, Thomas G Pickering. General Medicine, Columbia University, NY- Presbyterian Hospital, New York, NY.

Background: A major limitation of blood pressure measurements made in the physician’s office is the transient elevation commonly seen in hypertensive patients, which does not appear to be linked to target organ damage or prognosis. This has been labeled the “white coat effect” (WCE), computed as the difference between blood pressure measurements taken by the physician and resting, or “basal” measures. It is unclear, however, which resting measure is most appropriate. The awake ambulatory blood pressure is the most widely used. However, while arguably the most useful measure for prediction of clinical outcomes, it is less appropriate for use as a resting measure, because it is influenced by many factors, including physical activity level. Resting levels taken in the clinic may also be elevated, and will therefore underestimate the WCE.

Methods: We addressed this question by taking resting measures in a non-medical setting on the day before patient were seen at a Hypertension Clinic (Day 1), and comparing these with resting measures taken on the following day, in the clinic before the patient saw the physician.

Findings: As predicted, the Day 1 resting levels were lower than those taken in the clinic prior to seeing the physician (p<.05 and .001, for systolic and diastolic pressure, respectively) in both normotensive and hypertensive subjects. Using the Day 1 resting levels, the estimated WCE, for hypertensives, was 5.3/6.9 mm Hg (systolic/diastolic), compared to estimates, using the clinic resting levels, of 0.3/0.5 mm Hg. The pattern of changes was different in normotensives and hypertensives, with the physician pressures being slightly lower than Day 1 pressures in the former, and substantially higher in the latter. Heart rate changes were similar and modest in both groups.

Interpretation: The WCE phenomenon may not just be limited to that narrow interval in which the patient actually sees the physician, but may generalize to the clinic setting, rendering a clinic “resting” level invalid. While it is strongly positive in most hypertensives, it is frequently negative in normotensives. Our results suggest that improved methods of