A Retrospective Correlational View of Hypertension Risk Factors in an Urban School Health Screening Program

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Acknowledgements

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Introduction/Background

- Hypertension remains under-identified in the pediatric population.

- Related to number one mortality indicator cardiovascular disease.

- There are serious consequences to hypertension.

- Personal cost: Loss of quality of life, school attendance, lost employment.

- Public cost: Increase in health care cost, decrease in work force, decreased GNP.
Problem

✧ Uncontrolled blood pressure (BP) leads to chronic illness extending into adulthood.

✧ High BP adversely affects every system in the body.

✧ Research indicates that hypertension exists in children as early as elementary school around age 9.
Purpose/Aims

- Study investigated the presence of pre-hypertension and hypertension among 5th-graders in the Cleveland Metropolitan School District (CMSD).

- Identified risk factors and their relationship to BP.

- Correlated associated characteristics of gender, BP, and BMI.
Theoretical Framework

♦ Nola Pender’s 2006 health promotion model:
  ♦ Provides a method for the assessment of client’s health-promoting behaviors.
  ♦ Emphasizes the concepts of social influences, skill building, and behavioral competencies related to particular health related behaviors.
  ♦ Informs delivery of successful care directed at improved health and functional abilities.
Research Questions

- **Research Question One:** How do blood pressures of fifth-graders in the CMSD correlate with weight and height and what is the distribution of blood pressures?

- **Research Question Two:** Are there gender differences in blood pressure (systolic and diastolic) among fifth-graders in the CMSD?

- **Research Question Three:** Is there a difference in the four body mass index categories on blood pressure categories in fifth-graders in the CMSD?
Approach/Methods

- Secondary analysis of Prentiss grant using multiple regression data analysis.
- Sample of 7,398 CMSD 5th-graders.
- Variables collected:
  - Age
  - Systolic BP
  - Height
  - Diastolic BP
  - Weight
  - BMI
- Data gathered from 2010–2016.
Risk Factors

- Family history
- BMI
- Socioeconomic status
- Gender
- Ethnicity/race
Risk Factor Parameters for CVD

♦ BP
♦ BMI
♦ Cholesterol
♦ Triglycerides
♦ Autonomic dysfunction
♦ Sleep disorders
Design, Setting, & Sample

♦ Senior nursing students/faculty trained students in protocols:
  ♦ Weight/height
  ♦ BP
  ♦ Data recording

♦ CWRU junior nursing students were team leaders:
  ♦ Completed pre-screening visits to schools for planning
  ♦ Provided information to teams
  ♦ Directed process
Data Collection

- Schedule screenings of 5th-graders.
- Preliminary loading of student data.
- Oversee training and equipment.
- Upload collected data into the school district database.
- Prepare and send out letters with screening data to all 7,000 parents.
- Complete 2nd and 3rd BP screenings.
Data Analysis

- Data set and regression analyses were used to identify correlates of hypertension within the childhood population in the CMSD.

- Validated and measured the statistical presence of hypertension and looked at contributing factors that influence the population of the CMSD.

- Demographic data were analyzed using univariate statistics. Research questions one and two were analyzed using descriptive statistics.
This study confirmed the presence of HTN among 5.5% (n = 408) of participants, which exceeds global and national rates for this age group (3% and 5%, respectively).

The majority of the 5th-graders in the CMSD had normal BP readings.

There were no gender differences found in the distribution BP levels.

The higher the BMI, the higher the systolic and diastolic BP scores.
Table 1. Correlation Matrix for Blood Pressure, Height, and Weight of 5th-Grade Students (N = 7398) in the CMSD from 2010–2016

<table>
<thead>
<tr>
<th>Demographic Variables</th>
<th>Range</th>
<th>Min</th>
<th>Max</th>
<th>M</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (months)</td>
<td>138</td>
<td>61</td>
<td>199</td>
<td>132.65</td>
<td>7.27</td>
</tr>
<tr>
<td>Height (cm)*</td>
<td>79.65</td>
<td>100.30</td>
<td>179.95</td>
<td>147.92</td>
<td>8.51</td>
</tr>
<tr>
<td>Weight (kg)*</td>
<td>133.77</td>
<td>17.43</td>
<td>151.20</td>
<td>47.38</td>
<td>15.00</td>
</tr>
<tr>
<td>BMI**</td>
<td>37.70</td>
<td>13.90</td>
<td>51.60</td>
<td>21.37</td>
<td>5.39</td>
</tr>
<tr>
<td>BMI (percentile)**</td>
<td>95.90</td>
<td>4.00</td>
<td>99.90</td>
<td>70.50</td>
<td>28.00</td>
</tr>
<tr>
<td>Systolic BP**</td>
<td>72</td>
<td>68</td>
<td>140</td>
<td>100.26</td>
<td>9.411</td>
</tr>
<tr>
<td>Diastolic BP**</td>
<td>86</td>
<td>25</td>
<td>111</td>
<td>63.60</td>
<td>8.171</td>
</tr>
</tbody>
</table>

Note. * Average of two readings. ** Average of three readings.
Figure 1. Systolic and diastolic BP z-scores of 5th-grade students \((N = 7398)\) in the CMSD from 2010–2016.
Figure 2. BMI and systolic and diastolic BP of 5th-grade students (N = 7398) in the CMSD from 2010–2016.
Table 2. Systolic and Diastolic BP Readings Correlated with BMI Category and Percentage of 5th-grade students (N = 7398) with hypertension (HTN) in the CMSD from 2010–2016.

<table>
<thead>
<tr>
<th>Systolic BP</th>
<th>BMI Category</th>
<th>% with HTN</th>
</tr>
</thead>
<tbody>
<tr>
<td>Underweight</td>
<td>2.2</td>
<td></td>
</tr>
<tr>
<td>Normal</td>
<td>6.7</td>
<td></td>
</tr>
<tr>
<td>Overweight</td>
<td>12.9</td>
<td></td>
</tr>
<tr>
<td>Obese</td>
<td>23.7</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Diastolic BP</th>
<th>BMI Category</th>
<th>% with HTN</th>
</tr>
</thead>
<tbody>
<tr>
<td>Underweight</td>
<td>5.9</td>
<td></td>
</tr>
<tr>
<td>Normal</td>
<td>9.1</td>
<td></td>
</tr>
<tr>
<td>Overweight</td>
<td>15.3</td>
<td></td>
</tr>
<tr>
<td>Obese</td>
<td>19.4</td>
<td></td>
</tr>
</tbody>
</table>
Significance/Relevance

♦ Increased presence of pre-hypertension and hypertension in childhood.

♦ Hypertension in young children has serious long-term health consequences.

♦ Cardiovascular disease has serious personal and public health implications.

♦ Although screening of BP is recommended to start at 3 years, 24% of children had no BP taken during clinic visits.
Complications

- Organ damage
- Left ventricular hypertrophy
- Kidney disease
- Diabetes
- Cognitive changes
Study Limitations

♦ The only data analyzed were data that had been previously collected by the parent study.

♦ Inability to collect additional data in the next school year for follow-up of CMSD 6th-graders.

♦ It was not possible to track transient students moving from school-to-school.

♦ The generalizability of this research to the national population was limited due to the particular demographics of the CMSD student population.
Conclusion

♦ The majority of the 5th-graders in the CMSD had normal BP readings.

♦ There were no gender differences found in the distribution BP levels.

♦ The higher the BMI, the higher the systolic and diastolic BP scores.

♦ Hypertension may indicate a medical problem warranting further evaluation.

♦ The Nursing in Cleveland Schools Project recommends BP screenings for 6th- and 7th-graders.
Conclusion

♦ This study confirmed the presence of hypertension among 5.5% \((n = 408)\) of participants, which exceeds global and national rates for this age group (3% and 5%, respectively).

♦ Armed with this data, stakeholders must design effective strategies for addressing, tracking, and providing follow-up on students who have been identified as at-risk by this study, thus minimize the impact of this costly and often-disabling disease.
References


References


References


