The Accuracy of National Body Fat Cutoff Levels in the Prediction of Elevated Blood Pressure among Brazilian Male Adolescents

Summary

Objective: To assess viability of the development of percentage body fat cutoffs based on blood pressure values in Brazilian adolescents.

Methods: A cross-sectional study was conducted with a sample of 358 male subjects from 8 to 18 years old. Blood pressure was measured by the oscillometric method, and body composition was measured by dual-energy X-ray absorptiometry (DXA).

Results: For the identification of elevated blood pressure, these nationally developed body fat cutoffs presented relative accuracy. The cutoffs were significantly associated with elevated blood pressure [odds ratio = 5.91 (95% confidence interval: 3.54–9.86)].

Conclusions: Development of national body fat cutoffs is viable, because presence of high accuracy is an indication of elevated blood pressure.

Key words: obesity, adolescent, receiver operating characteristic curve, dual-energy X-ray absorptiometry, body fat percentage

Introduction

It is known that obese adolescents have increased risks of developing chronic disorders such as hypertension [1]. Despite increasing concern regarding obesity, internationally accepted standards for its identification have not been developed, and thus, the development of such standards to identify at-risk youth is necessary. Thus, the purpose of this prototype study was to assess viability of the development of percentage body fat (%BF) cutoffs based on blood pressure values in Brazilian adolescents.

Methods

The sample composed of 358 male subjects from 8 to 18 years old. The sample population was found at schools (n = 3) and recreational clubs (n = 3), where, all male students/members in each setting were invited to participate. Inclusion criteria were (i) declared to be healthy (no previously detected illnesses), (ii) not currently using any medicine and (iii) that they were not undergoing any current clinical treatment. The study was approved by the Ethics Committee on Human Experimentation of the Institution involved.

Systolic blood pressure (SBP) and diastolic blood pressure (DBP) values were measured with an electronic device (Omron, model HEM 742, Tokyo, Japan, MX3 Plus) [2], utilizing two types of cutoffs according to the arm circumference. Elevated blood pressure (EBP) was defined using the National High Blood Pressure Education Program cutoffs [3]. Whole body and regional body composition were measured with a Lunar DPX-NT scanner (GE Medical, Software Lunar DPX Encore 2007 version 11.40.004, Madison, WI, USA) and the %BF was estimated.

Binary logistic regression [odds ratio (OR) and 95% confidence interval (95% CI)] analyzed associations among categorical variables, and the receiver operating characteristics (ROCs) curve was utilized to generate optimal %BF cutoffs based on blood pressure values.

Results

The prevalence of EBP was 26% (n = 93), and age was related to blood pressure (SBP: r = 0.38; p = 0.001/DBP: r = 0.22; p = 0.001). In each age group, the ROC curve was utilized to designate optimal %BF for detecting EBP; these %BF values adjusted by age are presented in Table 1. Analyzing overall sample, there was a significant association between these proposed %BF cutoffs and EBP [OR = 5.91 (95% CI: 3.54–9.86)].

Discussion

The EBP rate found in this study (~26%) was higher than the 10% observed among the general Brazilian pediatric population [4]. High SBP is frequently related to higher adiposity [1, 4]; thus, this elevated rate may have resulted from an elevated obesity rate in the analyzed sample, and would thereby justify the use of EBP values to indicate %BF cutoffs. Obesity identified by dual-energy X-ray absorptiometry was markedly associated with EBP, agreeing with previous studies [1, 5, 6]. The contextual model to explain this association is well known, in which early

| Table 1 |
|__________|

<table>
<thead>
<tr>
<th>Age groups (years)</th>
<th>Optimal cutoffs</th>
<th>ROC curve parameters (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>%BF cutoffs</td>
<td>Sensibility</td>
</tr>
<tr>
<td>8 (n = 23)</td>
<td>19.4</td>
<td>71.4</td>
</tr>
<tr>
<td>9 (n = 33)</td>
<td>21.5</td>
<td>66.7</td>
</tr>
<tr>
<td>10 (n = 36)</td>
<td>21</td>
<td>66.7</td>
</tr>
<tr>
<td>11 (n = 37)</td>
<td>22.9</td>
<td>75.0</td>
</tr>
<tr>
<td>12 (n = 34)</td>
<td>20.9</td>
<td>71.4</td>
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<tr>
<td>13 (n = 35)</td>
<td>24.5</td>
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<td>54.5</td>
</tr>
<tr>
<td>15 (n = 37)</td>
<td>24.1</td>
<td>75.0</td>
</tr>
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<td>16 (n = 32)</td>
<td>24.6</td>
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</tr>
<tr>
<td>17 (n = 28)</td>
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</tr>
<tr>
<td>18 (n = 34)</td>
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<td>66.7</td>
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</table>
deposition of fatty streaks and plaque in adolescent arteries increases the resting blood pressure values, and the final outcome is chronic EBP in individuals who are obese.

In summary, the presented prototype study indicates that specific national reference tables should be created and utilized in clinical settings, since they present characteristics for accurate diagnosis.

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References


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Development and Dysmorphism in Joubert Syndrome—Short Case Series from India

Summary

Five children with Joubert syndrome (JS), who fulfilled the criteria and had molar tooth sign (MTS) on magnetic resonance imaging were included in the study. Prominent forehead, open mouth and low set ears were consistent facial features. Severe developmental delay was seen in three children (66%). A differential developmental delay was noticed in all children and was independent of the radiological features. The children who had complications in the neonatal period were found to have more developmental delay on follow-up. The optimal control of sleep disturbances and hyperkinetic activity in one child resulted in a better cognitive performance. A regular neuro-developmental follow-up and interventions can optimize the potential of children with JS. In addition to the regular screening for retinal, renal and hepatic functions in JS, there is a need to monitor cognitive functions, sleep and behavior.

Key words: behavior, development, Joubert syndrome

The children with a diagnosis of Joubert syndrome (JS) were included in the study, based on the core diagnostic criteria [1, 2].

1. Developmental delay.
2. Hypotonia in infancy.
3. Cranial magnetic resonance imaging (MRI) findings demonstrating the molar tooth sign (MTS) on axial imaging (Fig. 1).
4. One or both of the following (not absolutely required).
   - Irregular breathing pattern in infancy.
   - Abnormal eye movements.

The history, examination and development of the children are documented in the Table 1. The median age of presentation of children was 1.25 years of age. At birth, three babies had birth asphyxia and required nursery care. They had intermittent hyperpnea and respiratory alkalosis. Child number 4 had Gastro–Esophageal Reflux Disease and failure to thrive between 1 and 3 years of age. For other