CHRD 2024: Abstract Submission Form

Presenter Name
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Presenter Status
Non-Trainee

Role in the project
Perform Experiments
Write Abstract

Research Category
Community Health / Policy

Title
Bioelectrical Impedance Analysis underestimates Dual-Energy X-Ray Absorptiometry in evaluating whole-body total fat and percent fat in a Canadian population-based cohort of school-aged children

Background
Childhood obesity, which increases the risk of chronic diseases such as asthma, has almost tripled in Canada over the past 30 years. Accurate body composition assessment is essential to guide interventions. We compared the accuracy of the portable and cost-efficient Bioelectrical Impedance Analysis (BIA) against the gold standard Dual-Energy X-ray Absorptiometry (DXA) for evaluating whole-body total and percent fat in the CHILD Cohort.

Objective
Based on previously published data, we hypothesized that BIA would underestimate whole-body total fat and whole-body percent fat compared to the DXA gold standard.

Methods
The CHILD Cohort Study enrolled children before birth and followed them prospectively with clinical visits at ages 1, 3, 5, 8, and 12 years. Children attending the 8-year clinical visit at the Winnipeg site had whole-body total fat and whole-body percent fat measured by BIA using the Tanita BF-2000 IRONKIDS Wireless Body Monitor, and by DXA using the Hologic QDR Series Discovery A DXA Scanner. Comparisons were made by Wilcoxon rank sum test.

Results
Among the 511 children with BIA and DXA measurements at the 8-year clinical visit, 265 (51.9%) were female and 246 (48.1%) were male. BIA and DXA measurements were correlated for whole-body total fat ($p=0.80$, $p<0.001$) and whole-body percent fat ($p=0.74$, $p<0.001$). Whole-body total fat (median, IQR) was lower when measured by BIA (5.40 kg, 3.95-7.40) than by DXA (7.65 kg, 5.94-10.5, $p<0.001$). Whole-body percent fat was also lower when measured by BIA (18.4%, 15.5-23.0) than DXA (26.0%, 22.6-30.6, $p<0.001$).

Conclusion
Among 8-year-old CHILD participants, BIA measured by Tanita scale underestimated whole-body total fat and whole-body percent fat compared to DXA. Further analysis may determine situations in which each measure should be used to determine pediatric body composition for early detection risk factors for chronic conditions such as asthma.

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No

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