Author’s response to reviews

Title: Reliability of routinely collected anthropometric measurements in primary care

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Author’s response to reviews:

BMC Medical Research Methodology
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RE: BMRM-D-18-00581 “Reliability of routinely collected anthropometric measurements in primary care”

Dear Dr. Dykema,

Thank you for the opportunity to revise and resubmit the manuscript titled “Reliability of routinely collected anthropometric measurements in primary care” to BMC Medical Research Methodology.

The reviewers’ and editors’ comments and suggestions were very helpful and we feel have improved the quality of our manuscript. We have responded to all the comments and suggestions and incorporated them into the revised manuscript where necessary. Please see below the point-by-point responses to the reviewers’ individual comments:
Editor Comments:

In order for readers to assess how well your results can be generalized to other populations, Reviewer 2 requests more information regarding how participants in your convenience sample were selected. Please provide more detail and indicate any limitations in your discussion. In addition, please provide readers with more information regarding how likely the sites you selected are representation of the population of Pediatric and Family Medicine Clinics more generally (and/or how these selected sites may be different).

We thank the editor and reviewer for this important comment. Our text currently describes this point as follows: “Children 0 to 18 years of age were recruited at scheduled well-child visits at two pediatric practices and one family medicine primary care practice participating in the TARGet Kids!11 research network in Toronto, Canada (www.targetkids.ca).”

We have clarified by adding “Parents or guardians of healthy children 0 to 18 years attending a scheduled well-child visit were invited to participate and informed consent was obtained. Children were recruited at two pediatric practices and one family medicine primary care practice participating in the TARGet Kids!11 research network in Toronto, Canada (www.targetkids.ca).” Page 4, line 12-15.

We have also included the limitations to generalizability based on the chosen sites in the discussion which now states “The practices that volunteered to participate were already participating in research through TARGet Kids!, therefore may have more standardized protocols related to measurement compared to other primary care practices in Ontario.” Page 14, line 15-17.

Please provide more information regarding how the research assistants were trained. How similar was their training to that of primary care team members?

The research assistants were trained based on the World Health Organization anthropometric manuals and the standardized operating procedures from the TARGet Kids! study. Our manuscript currently describes: “Research assistants were trained using the WHO Training Course Growth Assessment modules. Primary care team members did not receive any further training other than what they received during their professional degrees or at the practice where they worked.” We have included this more detailed information in the methods section.

The text now states “Research assistants were trained using the WHO Training Course Growth Assessment modules. These growth monitoring guidelines were adopted by multiple professional health agencies such as the Canadian Pediatric Society, and Community Health Nurses of Canada and are the guidelines primary care team members would have received in their professional training.” Page 5, line 17-20.

There is some concern that your conclusions are overstated in your abstract in which you state there was "high agreement between routine measurements and research measurements.” Previous research indicates that the measurement of length for infants is prone to measurement error and your results indicate there were significant differences in intra-observer reliability between
research assistants and primary care staff for length 0-2 at both sites in which it was assessed. Do these results temper your conclusions? What do they suggest for training and practice?

Our primary research question was whether an anthropometric measurement taken by a routine health care provider and a trained research assistant were reliable. These results were very promising with coefficients of reliability greater than 99% and no relative technical error of measurement (either inter- or intra-observer) were less than 2%. Our secondary research objective was to determine intra-observer differences between routine and research personnel. Here we determined some significant differences. However, the absolute values of these statistical differences were in the acceptable range according to published references. We therefore feel our data merits our stated conclusion however have added a sentence to our conclusion related to the results from the second objective.

The text now states “Although length measurement had the highest TEM, it was still acceptable according to standards based on both published reliability statistics18 and comparable to the expert anthropometrists from the WHO-MGRS18, meaning the magnitude of human measurement error was small.” Page 15 lines 12-13.

As well we have added to our abstract “Length measurements in children <2 years had the highest measurement error. There were some significant differences in length intra-observer reliability between observers.” In the conclusion “There was high agreement between routine measurements and research measurements although there were some differences in length measurement reliability between practice staff and research assistants.”

Reviewer reports:

Carolyn Bramante (Reviewer 1): Overall this paper is good and I think will be a helpful contribution to the literature for people who want to conduct research in a clinical setting.

Summary - there is good inter- and intra- observer reliability of height, weight, and length measurements between trained research staff and clinical team members in pediatric clinic settings. Good attempts were made to blind the process.

Minor suggestions:

Line 12, add clarification "relative to measurements taken by trained personnel."

Introduction - Page 4, line 4-5

The text now reads “The accuracy of routinely collected anthropometric data is currently unknown relative to measurements taken by trained personnel”

Line 17/18: move "in primary care practice" to behind "precise measure."
The text now states “Weight, height and length measurements are used as growth indicators to calculate body mass index-for-age which has been recommended as the most inexpensive, efficient and precise measure in primary care practice to determine if a child has overweight or obesity.”

Lines 18/19: Change language around overweight or obesity to the now standard patient-first language: "if a child has overweight or obesity." Rather than if a child "is overweight or obese." We don't want to define people by their weight, just like we try not to define patients by their disease ("patients with diabetes" rather than "diabetic patients.") Make the change to patient-centered language throughout the manuscript.

We thank the reviewer for picking this up. We have changed the text where needed. In the instance you have pointed out the text now states “Weight, height and length measurements are used as growth indicators to calculate body mass index-for-age which has been recommended as the most inexpensive, efficient and precise measure in primary care practice to determine if a child has overweight or obesity.”

Line 21: add patient concern, "patient and parental concern."

The text now states “However, imprecise measurements may lead to misclassification of weight status, unnecessary interventions, referrals and patient and parental concern”

Catherine M. Crespi (Reviewer 2):

1. The paper is clearly written and the data are analyzed appropriately. My main concern is that there are important limitations that are not acknowledged and that may result in the reliability of the measurements being optimistic.

We thank the reviewer for this overall positive review. As also requested by the editor, we have included a limitation on the generalizability of findings based on selection of practices already involved in clinical research.

The text now states “The practices that volunteered to participate were already participating in research through TARGet Kids!, therefore may have more standardized protocols related to measurement compared to other primary care practices in Ontario.” Page 14, lines 15-17.

2. PCP staff knew they were being observed and may have altered their behavior. Thus their measurements may not reflect their typical accuracy.

We have included this in the limitations. The text now states “Both primary care team members and research assistants were aware of the purpose of this study therefore may have changed their measurement behaviour.” Page 14, lines 18-20.
3. The sample is described as a convenience sample. How were participants selected? There is concern that there could have been sampling bias, eg, the researchers conscientiously or unconscientiously selected children who would be easier to measure (e.g., calmer).

Participants were approached to participate in the TARGet Kids! study initially which has inclusion and exclusion criteria that were unrelated to this measurement study (Carsley et al., 2015). All healthy children fitting inclusion criteria were asked to participate in the waiting rooms of their family or pediatric practices when attending scheduled well-child care during the weekdays. Once the initial consent form for TARGet Kids! was signed, the parents/caregivers were provided an additional consent form to participate in this sub-study. Because inclusion in the study was related to TARGet Kids! purposes rather than the measurement study, we are confident there was minimal sampling bias.

4. Only 5.7% were overweight (BMIz>2). Thus these results may not be fully generalizable to overweight/obese children. This is a very important limitation.

In this study we oversampled young children less than 2 years of age in order to get a more precise measurement reliability of length. As such, the prevalence of overweight/obesity in the sample was expected to be lower. Our estimate of 5.7% in 125 children is comparable to the previously reported prevalence of 6.2% in children 17 to 24 months old in a combined TARGet Kids! and Better Outcomes Registry & Network (BORN) study population (Reference: Satkunam M, Anderson LN, Carsley S, Maguire JL, Parkin PC, Sprague AE, Ball GDC, Birken CS on behalf of the TARGet Kids! Collaboration and Team ABC. Severe obesity in children 17 to 24 months of age: a cross-sectional study of TARGet Kids! and Better Outcomes Registry & Network (BORN) Ontario. Can J Public Health. (2018) doi.org/10.17269/s41997-018-0065-2).

5. Page 9: states that relative TEM for weight declined as child age increased, but the opposite is true.

We have corrected this. The text now reads “Relative TEM for weight slightly increased as child age increased from 0.64% in children <2 years to 0.70% in children >5 years.”

Sincerely,

Catherine S. Birken (Corresponding Author)

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