Author’s response to reviews

Title: Oscillometric Blood Pressure By Age And Height For Non Overweight Children And Adolescents In Lubumbashi, Democratic Republic of Congo

Authors:
Emmanuel Muyumba (elmuyumba_01@yahoo.fr)
Dophra Nkulu (ngoynkuludophra@gmail.com)
Clarence Mukeng (deckeng@gmail.com)
Jacques Musung (jamusung@yahoo.fr)
Placide Kakoma (pkambola@yahoo.fr)
Christian Kakisingi (chriskakis@yahoo.fr)
Justin Kizonde (kizondej@hotmail.com)
Françoise Malonga (kaj_malonga@hotmail.com)
Oscar Luboya (oscarluboya@yahoo.fr)
Olivier Mukuku (oliviermukuku@yahoo.fr)
Weili Yan (yanwl@fudan.edu.cn)

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Author’s response to reviews:

Cover letter with a point-by-point response to the comments of the reviewers

We would like, first of all, to thank you for your interest in our manuscript through your contribution in its form and its content as well. Please find hereunder our answers to your concerns.

1. Jun Ma (Review 1)

1.1. Abstract

1.1.1. Sample size was not mentioned
Out of 8371 participants: 795 were less than 3 years old (55 children) or more than 17 years old (740 children and adolescents) and 53 had erroneous or absent data. Among the 7523 remaining participants, 640 were overweight (n=548) or obese (n=92). Thus, the data of 6883 subjects who had a normal weight of whom 3510 girls (51%) were used for the setting up of blood pressures percentiles.

1.1.2. Criteria for identifying overweight and obesity were not provided

The criteria used for the identification of overweight or obese subjects are those of the International Obesity Task Force (IOTF) as provide in our link (http://www.unilu.ac.cd/wp-content/uploads/2016/07/Seuils1.pdf) in the manuscript:

- Overweight: values of the BMI centiles in relation to sex which corresponded to the cutpoint of 25 kg/m2 at the age of 18 years;

- Obesity: values of the BMI centiles in relation to sex which corresponded to the cutpoint of 30 kg/m2 at the age of 18 years.

1.2. Introduction

1.2.1. Though authors mentioned the relationship between obesity and BP, why the participants with overweight / obesity were not involved in the analysis was not addressed.

The main objective of our study was to set up the thresholds of the blood pressures of children and adolescents with normal weight. Indeed, given the link that exists between overweight and blood pressure (Nguyen, T. and D. Lau, The Obesity Epidemic and Its Impact on Hypertension, in Can J Cardiol. 2012. p. 326-33), one must avoid to include overweight or obese subjects because this would have an influence on the percentiles worked out (Neuhauser, H., et al., Blood pressure percentiles by age and height from nonoverweight children and adolescents in Germany, in Pediatrics. 2011. p. e978–e988). As mentioned in the discussion section « using a sample of normal weight to develop percentile allows our BP thresholds proposed to be more sensitive to the identification of children and adolescents with high BP because we avoided certain risk factors associated with the BP as being overweight or obese”.
1.2.2. "Simonetti et al [13] reported a strong linear correlation between BP and BMI'. Simonetti’s paper is not for this purpose, please change the article.

We agreed with you to change this article with another one. Indeed, the purpose of Simonetti et al.’s study was not to determine the correlation between BP and BMI. Nevertheless, the results obtained (and discussed) by Simonetti et al. represented in Table 3 (Univariate and Multivariate Linear Regressions Analyses of Factors affecting Systolic and Diastolic BP), the authors have noted a strong correlation between the BMI and the BP for the PAS (p < 0.0001) as well as for the PAD (p < 0.0001). Therefore change the Simonetti’s paper with the article of Dong et al: The association of overweight and obesity with blood pressure among Chinese children and adolescents (Biomed Environ Sci, 2013; 26(6):437-444)

1.3. Methods

1.3.1. Sample size was not described in the methods section

In the methods section we said that “General information, methods and dataset information for this study can be accessed by website (http://www.unilu.ac.cd/wp-content/uploads/2016/07/Seuils1.pdf)”. Indeed, the sampling method used being very long to explain in this article, we have referred our readers to our web site (cfr above) in which are developed in details the different processes that have allowed the determination of the size of the sample.

The size of the sample was determined from all the children who go to school in the city of Lubumbashi during the school year 2011-2012 (data from te Provincial Technical Office of Education Statistics of Ktanga). For details, see web site (http://www.unilu.ac.cd/wp-content/uploads/2016/07/Seuils1.pdf)

In order to obtain results as representative as possible for each age group and by sex, the calculation of the size of the sample had taken into account the following factors:
- the level of confidence desired for the results of the survey: 95%

- the acceptable error margin of the results of the survey: 0.05%

- the initial level of the measured indicator (the school attendance rate): 50%

- the effect of the sampling plan: 1.5%

- the adjustment of the valuing by sex and by age group: 3%

- the adjustment of the estimations by the anticipated number of non answers: 20%

For a strate, the equation allowing the calculation of the sample was the following:

In which: - $z$ : is the level of confidence.  
- $p$ : is the initial level of the school attendance rate.  
- $e$ : is the error margin.

The size calculated in this way had been adjusted according to the effect of the sampling plan, the number of estimations by age group and by sex and this was reported to the expected number of non-answers.

The number thus obtained was multiplied by the number of the strate of the city of Lubumbashi.

1.3.2. Authors are suggested to clarify the criteria for inclusion and exclusion. Additionally, the reason of deleting the participant, and the number of deleted participants for each reason, should be provided.
a) Authors are suggested to clarify the criteria for inclusion and exclusion

The criteria for inclusion and non-inclusion

As described in our methodology (http://www.unilu.ac.cd/wp-content/uploads/2016/07/Seuils1.pdf):

No child had been reported to have a chronic disease likely to influence weight or blood pressure and also no child was taking a medicine having an influence on the blood pressure.

b) Additionally, the reason of deleting the participants, and the number of deleted participants for each reason, should be provided.

We provide the number of deleted participants for each reason in the results section. But we agreed with you to insert this part in inclusion and exclusion criteria (methods section)

1.4. Discussion

1.4.1. Why did the authors use P90 and P95 as the cut-off values for prehypertension and hypertension, respectively? Some countries, such as UK, use P98 as the cut-off values for hypertension. Authors are advised to address the reason.

Like many other authors, we have taken as reference the fourth report of the National High Blood Pressure Education Program Working Group on High Blood Pressure in Children and Adolescents [NHBPEP, The fourth report on the diagnosis, evaluation, and treatment of high blood pressure in children and adolescents, in Pediatrics. 2004. p. 555-76] and the recommendations of the European Society of Hypertension [Lurbe E, et al, Management of high blood pressure in children and adolescents: recommendations of the European Society of Hypertension, in J Hypertens. 2009. p. 1719–42]. Normal BP is defined as SBP and DBP that is less than the 90th percentile for sex, age, and height. Hypertension is defined as average SBP or DBP that is greater than or equal to the 95th percentile for sex, age, and height on at least three separate occasions. Average SBP or DBP levels that are greater than or equal to the 90th percentile, but less than the 95th percentile, had been designated as “high normal” and were considered to be an indication of heightened risk for developing hypertension. The term prehypertension has been changed to ‘high-normal’ according to the ESH/ESC guidelines 2007. It has described stages of hypertension (classification), defining normotension as less than the 90th percentile, prehypertension as between the 90th and 95th percentile, stage 1 hypertension as
between the 95th and 99th percentile plus 5 mmHg and stage 2 hypertension as greater than the 99th percentile plus 5 mmHg, similar to the seventh report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure (JNC7).

1.4.2. It is still controversial whether oscillometric devices could use as an alternative to auscultation for BP measurement. In addition, oscillometric devices developed by different companies are likely to be incomparable. That means that the cut-off values developed by the Authors' study (Datascope Accutorr Plus) may not be suitable for the BP measured by other company's oscillometric device.

Authors are advised to address how other researchers could use this study in discussion section.


Given the differences observed with the methods of measurement of blood pressure and according to oscillometric apparatuses (of which each uses a different algorithm for the definition of the BP), the devices to use for children must comply with scientific recommendations (Lurbe E, et al, Management of high blood pressure in children and adolescents: recommendations of the European Society of Hypertension, in J Hypertens. 2009. p. 1719–42): If an oscillometric method is applied, the monitor should have passed the validation procedure recommended by the British Hypertension Society, the American Association for the Advancement of Medical Instrumentation or the European Society of Hypertension International Protocol. The continuously updated data available on monitor validation for children is found at www.dableducational.org

We think that the other researchers will resort to our study in their discussions if the device of the BP measurement is a validated one.

1.4.3. As mentioned by the authors, "BP references are based on ... study populations as ethnicity or nationality". Different populations have their BP characteristics, and the BP references based on one population may not be suitable for other populations.

Why did the authors compare their results with others, such as KIGGS, OLAF and CHNS? These references not only use different BP measurements, but are also based on different
populations. The Authors cannot identify the difference between their reference and others are the result of different devices, ethnicities, or other reasons.

As mentioned in the introduction of our manuscript: BP references or standards are not available for Congolese children in the Democratic Republic of Congo. In addition, there is not any African study in connection with the references or standards of the BP in children and adolescents. Therefore, to support this assertion, it is important to compare our results with Other’s. The studies with which we have compared our results have used either the same target of children and adolescents (aged from 3 to 17 years), the same technique or the same type of oscillometric device to measure the BP or the same methodological approach to set the percentiles of blood pressures.

2. Mehmet A. Agirbasli (Reviewer 2)

2.1. Specific comments:

a) As authors indicated the potential limitation of such studies study is the selection bias. The decision to exclude the overweight and obese children should be explained further. After excluding overweight or obese subjects, gender-specific SBP and DBP percentiles were constructed. However, including all subjects could be more representative of the entire local pediatric population.

The main objective of our study was to set up BP thresholds for the normal weight children and adolescents. Indeed, other studies are being carried out in relation with overweight and obesity in children and adolescents in Lubumbashi.

b) They could also compare their data to different populations such as Bogalusa Heart Study. Reference is as below: Such comparisons provide temporal changes in blood pressure among children.


Our comment is that the study of Voors et al.(accessed through the abstract only) is interesting. The population of this study was made of children aged 2 years and half and 5 years and half.
Moreover, the authors have used three different instruments to measure the BP and their results have made it possible to give temporal changes of the children’s BP. Thus, we think that Voors et al.’s work will serve us in our subsequent studies for analysing the tendencies which will be observed during the two periods of the BP.