PEER REVIEW HISTORY

ARTICLE DETAILS

TITLE (PROVISIONAL)	Are preschool children active enough in Shanghai—An accelerometer-based cross-sectional study
AUTHORS	Quan, minghui; Zhang, Hanbin; Zhang, Jiayi; Zhou, Tang; Zhang, Jinming; Zhao, Guanggao; Fang, Hui; Sun, Shunli; Wang, Ru; Chen, Peijie

VERSION 1 – REVIEW

REVIEWER	Qian Lin Central South University, China
REVIEW RETURNED	10-Jun-2018

GENERAL COMMENTS	Comments and Suggestions for Authors: Introduction 1.A bit more explanation about importance of accelerometer-based PA data would be useful. What are the other measurements of PA? 2.Why Shanghai? Methods The methods require a much more detailed description. 1.Please explain in much more detail how the children were selected, and also the recruitment. Was there compensation for participation? 2.How was the sample size determined? Add a sample size calculation and clarify for what primary outcome the calculation was done. The overall number of kindergartens in Shanghai city was not revealed, so we do not know how much the eight chosen are in relation to all of them. 3. It should be added that how children's height and weight data are measured? or collected? Is there any underweight in this population? Results 1. In Table 1, the sum of BMI category in Boys is not 100%. 2.How about other characteristics of the children, e.g. if the child is the only child, who is the main caregiver. 3. What is the meaning of "relative time" in Table 2? What is the meaning of "Adherence" in Table 3? Discussion

	1.Move “strengths and limitation” to the end of discussion section will be better. Season is also an important factor related to PA, which maybe another limitation of this study. 2. You mentioned “Engaging in physical activity (PA) and minimizing sedentary time play important roles in promoting physical, psychological, and cognitive health” . But sedentary behavior is not either measured or discussed in this article. 3. Is there any policy or strategy to promote PA for preschool children in China? Why the polices or strategies are not effective? What kind of intervention you suggest for Chinese kindergartens? The discussion should explain the new understanding of the problem, the next step or future strategies, after taking your results into consideration. Conclusions The conclusions provide useful information about the context, but could be used to better interpret the results as well.

REVIEWER	Zan Gao University of Minnesota-Twin Cities
REVIEW RETURNED	09-Jul-2018

GENERAL COMMENTS	General comments: This paper examined preschool children’s objective physical activity levels with accelerometers in a sample of children in Shanghai, China and determined the proportion of children meeting the aforementioned age-specific PA recommendations. It is desctiptive in nature, and represents a logical extension of the investigation of young children’s PA in a developing country. Overall, this paper is well-written, and easy to follow. I would like to applaud the authors for their effort and dedication in this area of inquiry. Here I have some suggestions to help the authors improve the quality of the paper. My suggestions are listed as followings: Introduction 1. Page 4 line 22: be specific about the different standards from different countries. 2. Page 5: please add the significance of this study. Methods 1. Page 5, participants: add the inclusion criteria for the sample 2. Page 6-7: reorganize the two subsection: Measures—measure the outcome variables; procedures—data collection. Results 1. Page 9, results section: please be more specific regarding the percentages of meeting the recommendation(s). For example, which recommendation? MVPA or TPA?

	Discussion 1. Page 13: what are the practical implications of this study. References: I would suggest the authors proofread the reference list and correct any errors before submission.

VERSION 1 – AUTHOR RESPONSE

Reviewer(s)' Comments to Author:

Reviewer: 1
Reviewer Name: Qian Lin
Institution and Country: Central South University, China
Please state any competing interests or state 'None declared': None declared.

Please leave your comments for the authors below
Comments and Suggestions for Authors:

Point 1. A bit more explanation about importance of accelerometer-based PA data would be useful. What are the other measurements of PA?

Response 1: Thank for this comment. The importance of accelerometer-based PA data has been revised and described in the INTRODUCTION section (Page 4, Lines 65-73).

The mainly methods of measuring PA including subjective and objective methods. Subjective methods mainly refers to self-report questionnaires and proxy-report. Obviously, it is very difficult for preschool children to achieve self-report questionnaires, and recall bias is inevitable in proxy-report from parents or teachers. The objective methods, mainly including pedometer or accelerometer, which can overcome the limitations of self-report questionnaires and proxy-report are the wise choice for measuring the PA levels of young children. Compared with pedometer, the accelerometer can provide data not only about the total amount of daily activities, but also the pattern of daily activities (e.g., intensity), which is considered to be more important to achieve health benefits based on the current PA guideline (Tremblay et al., 2012). Therefore, accelerometer-based method was selected to measure PA in this study. This point has been briefly highlighted with the manuscript (Page 4, Lines 63-73).

Point 2. Why Shanghai?

Response 2: This is a great question. The reasons why we choose Shanghai are based on the following two reasons. Firstly, convenience. Our university located in Shanghai, therefore we can conveniently recruit participants from Shanghai. Secondly, software and hardware conditions are available. With regard to this investigation of preschool children's PA levels, both the experienced PA research group (e.g., our research group) and a sufficient number of accelerometers (usually 30 accelerometers can measure the PA levels in a class of children at the same time, our group has 100 accelerometers) are indispensable. The two required conditions are all met in Shanghai, so this why this study was conducted in Shanghai. In future studies, we will try to collect more representative data on the PA levels in preschool children from other cities in China.

The methods require a much more detailed description.
Point 3. Please explain in much more detail how the children were selected, and also the recruitment. Was there compensation for participation?

Response 3: Thank for your comment. The details how to recruit and select participants in this study were added accordingly (Page 5-6, Lines 95-102). In addition, only comprehensive data analysis report was given to the participants, there is no other compensation.

Point 4. How was the sample size determined? Add a sample size calculation and clarify for what primary outcome the calculation was done. The overall number of kindergartens in Shanghai city was not revealed, so we do not know how much the eight chosen are in relation to all of them.

Response 4: Thank for this comment. This study is a descriptive study, therefore the sample size estimation mainly depends on three parameters, which are confidence level, level of precision (sampling error), and coefficient of variation. The primary variables of this study were moderate to vigorous physical activity (MVPA) and total physical activity (TPA), sample size was estimated based on the following equation. This point has been briefly highlighted in the manuscript (Page 8, Lines 142-144).

$n= ⟦((z_{a/2}\ CV)/ε)⟧^2=⟦(z_{a/2}/ε×s/\bar{y})⟧^2=⟦1.96⟧^2/⟦0.05⟧^2 ×⟦22.2⟧^2/⟦77.9⟧^2 ≈125$ (Based on MVPA)
$n= ⟦((z_{a/2}\ CV)/ε)⟧^2=⟦(z_{a/2}/ε×s/\bar{y})⟧^2=⟦1.96⟧^2/⟦0.05⟧^2 ×⟦46.7⟧^2/⟦348.0⟧^2 ≈28$ (Based on TPA)
Note: Setting $α=0.05$, confidence level = $1 - α= 95\%$, $z_{a/2}=1.96$; $ε$ is the level of precision (sampling error), we set it as 5% in this study; CV, coefficient of variation, shows the extent of variability in relation to the mean of the population: it is defined as the ratio of the population standard deviation to the population mean, which were assumed by the sample standard deviation (s) and sample mean ($\bar{y}$) of the previous study (Moller et al., 2017).

Obviously, valid samples in this study (303 participants) satisfied the need of the results of sample estimation (303 > 125 > 28). Based on the statistics from Shanghai Municipal Education Commission, there was a total of 1,849 kindergartens in Shanghai in 2012. Eight kindergartens equal to 0.04% of the total number of kindergartens.

Point 5. It should be added that how children's height and weight data are measured? or collected?

Response 5: Thank you for this comment. This description was added in the paragraph as suggested (Page 7, Lines 117-120).

Point 6. Is there any underweight in this population?

Response 6: Thanks. There was no underweight participant in this population.

Point 7. In Table 1, the sum of BMI category in Boys is not 100%.

Response 7: Thank for this comment. Revised as suggested (Page22).

Point 8.How about other characteristics of the children, e.g. if the child is the only child, who is the main caregiver.

Response 8: Thank for this comment. We suspected that the review believes caregiver will affect the preschool children's PA levels, if so, the authors totally agree that main caregiver's attitude to PA and their daily PA levels will impact on the preschool children's PA levels. However, this point was not the concentration of this study. Our research group focused on this topic and found that the PA levels of parents can strongly influence the PA levels of their preschool children in a recent publication (Xu et al., 2018).

Point 9. What is the meaning of "relative time" in Table 2? What is the meaning of "Adherence" in Table 3?

Response 9: Thank for this comment. "Relative time"in Table 2 means percentage of time spent in different intensities of PA, which is another way to quantify PA levels and minimize the influence of the duration of accelerometer wear time. This description "relative time" has been revised, please see the edits on Page 23. "Adherence" in Table 3 means "meet the need", table 3 shows the data in which the percentage of participants meet the need of established PA recommendations.

Point 10. Move "strengths and limitation" to the end of discussion section will be better. Season is also an important factor related to PA, which maybe another limitation of this study.

Response 10: Thank you for this comment. Revised as suggested (Page 13, Lines 260-274).

Point 11. You mentioned "Engaging in physical activity (PA) and minimizing sedentary time play important roles in promoting physical, psychological, and cognitive health" . But sedentary behavior is not either measured or discussed in this article.

Response 11: Thank you for this comment. This sentence is the first sentence in INTRODUCTION section, in which we would like to indicate two important determinants for health-related outcome. However, this study only focused on the levels of PA, not sedentary behavior, in preschool children. Based on this comment, I have deleted the description of "minimizing sedentary time" to make this sentence more in line with the content of this study (Page 4, Lines 52).

Point 12. Is there any policy or strategy to promote PA for preschool children in China? Why the polices or strategies are not effective? What kind of intervention you suggest for Chinese kindergartens? The discussion should explain the new understanding of the problem, the next step or future strategies, after taking your results into consideration.

Response 12: This comment is greatly appreciated. Please see the revisions made aligned with this comment (Page 12-13, Lines 243-258).

Point 13: The conclusions provide useful information about the context, but could be used to better interpret the results as well.

Response 13: Thank for this comment. Revised as suggested (Page 14, Lines 279-284).

Reviewer: 2
Reviewer Name: Zan Gao
Institution and Country: Umn
Please state any competing interests or state 'None declared': None declared

Please leave your comments for the authors below
General comments:

This paper examined preschool children's objective physical activity levels with accelerometers in a sample of children in Shanghai, China and determined the proportion of children meeting the aforementioned age-specific PA recommendations. It is desctiptive in nature, and represents a logical extension of the investigation of young children's PA in a developing country. Overall, this paper is well-written, and easy to follow. I would like to applaud the authors for their effort and dedication in this area of inquiry. Here I have some suggestions to help the authors improve the quality of the paper. My suggestions are listed as followings:

Introduction

Point 1. Page 4 line 22: be specific about the different standards from different countries.

Response 1: Thank you for this comment. Revised as suggested (Page 4, Lines 56-60).

Point 2. Page 5: please add the significance of this study.

Response 2: Thank for this comment. The significance of this study was added as suggested (Page 5, Lines 85-87).

Methods
Point 3: Page 5, participants: add the inclusion criteria for the sample

Response 3: Thank for this comment. The inclusion criteria were added as suggested (Page 6, Lines 100-102).

Point 4: Page 6-7: reorganize the two subsection: Measures—measure the outcome variables; procedures—data collection.

Response 4: Thank you for this comment. Revised as suggested (Page 6-8, Lines 105-139).

Results
Point 5: Page 9, results section: please be more specific regarding the percentages of meeting the recommendation(s). For example, which recommendation? MVPA or TPA?

Response 5: Thank you for this comment. Revised as suggested (Page 9, Lines 178-182).

Discussion
Point 6 : Page 13: what are the practical implications of this study.

Response 6: Thank for this comment. Practical implications of this study was add as suggested. Please see the revision with the manuscript (Page 14, Lines 279-284).

References:
Point 7: I would suggest the authors proofread the reference list and correct any errors before submission.

Response 7: Thank you for this comment. Revised as suggested.

VERSION 2 – REVIEW

REVIEWER	Qian Lin Central South University, China
REVIEW RETURNED	16-Sep-2018

GENERAL COMMENTS	Why Shanghai? Is preschool children in this city a typical population in China? It will be better that authors give some background information of Shanghai preschool children, average PA time or steps.

VERSION 2 – AUTHOR RESPONSE

Point 1: Why Shanghai? Is preschool children in this city a typical population in China? It will be better that authors give some background information of Shanghai preschool children, average PA time or steps.

Response 1: Thank you for your good question. Why we choose Shanghai are based on the following reasons. (1) Children and youth from Shanghai were more likely to adopt physical inactivity lifestyles. Questionnaire-based national survey in China indicated that only 29.9% of the children and youth met the guideline of PA (Fan et al., 2017). This phenomenon of lack of PA in children and youth may be more pronounced in the developed region. Take Shanghai, a highly-developed city in China, for example, it was only 18.4% of children and youth met the PA guideline in a representative sample (Chen et al., 2018). (2) The PA data from Shanghai preschool children are lacking. Considered accelerometer-based PA data for Chinese preschool children are lacking so far, and the facts that many health-related benefits are achieved by regular PA. Therefore, there is urgent need to objectively assess the PA levels in Chinese preschool children, especially in the developed regions like Shanghai. Please see the edits on Page 5, Lines 61-70.