Reviewer’s report

Title: Resting heart rate: Its correlations and potential for screening metabolic dysfunctions in youth

Version: 2 Date: 20 November 2012

Reviewer: Katrina D DuBose

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Title: Resting heart rate: it’s correlations and potential for screening metabolic dysfunctions in youth

The relationship resting heart rate has with different diseases is starting to be investigated. Preliminary research suggests that having a higher resting heart rate is related to some chronic diseases and could possibly be used as a predictor of future diseases like type 2 diabetes. This study investigates the relationship between resting heart rate and metabolic dysfunction in an adolescent population. A large sample of adolescents from an area of Brazil was measured for their resting heart rate, and metabolic parameters (lipids, glucose, etc). The results indicated that resting heart rate was positively related with triglycerides and glucose. Logistic regression indicated that those in the highest resting heart rate group (> 86) were more likely to have low HDLC or high glucose values compared to those with the lowest group. AUC analysis indicates that resting heart rate could be a predictor or high glucose and triglyceride levels.

This study is examining an area that has had limited study. The results support what the previous evidence has suggested. High resting heart rate is related to adverse health outcomes; however, this study extends findings to an age group that has not been examined and to different health outcomes (lipids). While this study contributes to the current literature base, there are some factors that need consideration before publication.

Major Compulsory Revisions

1. short title: change the word tachycardia. There is no evidence from this paper that tachycardia is related to metabolic function.

2. This issue is through out the paper. The highest grouping for the OR is >86 and tachycardia is defined as a heart rate >100 bpm. Further, the results do state what exact heart rate is idea to use as a screening value. Everywhere the authors talk about tachycardia it needs to be changed.

Abstract

3. Page 2 abstract - results. Is heart rate used categorically or continuously? Is resting heart rate positively or negatively related with sleep and VO2? What level of resting heart rate is associated with HDL and glucose (OR data)?
4. Page 2 abstract – conclusion: cannot say tachycardia, no evidence given to support this. What type of dysfunctions are being referenced?

Methods
5. Page 5 inclusion criteria: self-report of health. Did they just have to self-report health to be in the study or were certain diseases excluded?

6. Page 6 resting heart rate: Provide a rational for why ref 9 is being used for the quartiles values.

7. Why was fitness not considered a confounder for the logistic analysis?

8. It would be interesting and important to run the analysis stratifying by those having high aerobic fitness and those with low aerobic fitness, since fitness is going to have an important impact on resting heart rate and also the metabolic factors. OR at the very least control for fitness in the analysis.

Discussion
9. 2nd paragraph: in the statistical analysis section there was no mention of adjusting for obesity, but it is mentioned here. Which is correct?


Tables/Figures
11. It would be very helpful to have a table describing the sample. Mean age, lipid values, glucose, %BF, etc.

12. Table 2: why was the linear regression not run for LCL and HLD?

13. Figure1: the presentation of the AUC data is odd. Why not present the actual curves and give the sensitivity and specificity so the reader can determine what resting heart rate is idea to use as a cut-off value for screening purposes.

Minor Essential Revisions

Background
14. Page 3 2nd paragraph: with the Freitas et al [11] study what direction is the relationship between RHR and lipid values?

15. The last sentence is awkward and unclear, this needs to be re-written.

Methods
16. Page 7 statistical procedures & page 9 2nd paragraph in discussion: change wording of maturational status to pubertal stage.

Discussion
17. Page 9 1st paragraph: the 1st sentence is awkward, re-word.
18. Format for the references changed in the 2nd paragraph.
19. Last paragraph: reference 7 was this study in adults or children?

Discretionary Revisions
Methods
20. Move potential confounders section to before statistical procedures

Results
21. Page 8 2nd paragraph r and p values not needed as all this information is in the table.

Tables/Figures
22. Table 1 and 2 could be combined into 1 table

**Level of interest:** An article of importance in its field

**Quality of written English:** Needs some language corrections before being published

**Statistical review:** No, the manuscript does not need to be seen by a statistician.

**Declaration of competing interests:**

I declare that I have no competing interest