

PEER REVIEW HISTORY

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ARTICLE DETAILS

TITLE (PROVISIONAL)	Adverse effects of train noise and vibration on human heart rate during sleep –an experimental study
AUTHORS	Croy, Ilona; Smith, Michael; Persson Waye, Kerstin

VERSION 1 - REVIEW

REVIEWER	<p>Gunn Marit Aasvang Scientist (PhD) Norwegian Institute of Public Health Norway</p> <p>I declare no competing interest in the study presented in this manuscript</p>
REVIEW RETURNED	18-Feb-2013

THE STUDY	<p>The process of recruitment of the participant needs to be described: criteria for inclusion, exclusion, type of population the sample was drawn from etc.</p> <p>The authors state that they have conducted a randomized lab study. The process of randomization thus needs to be described more clearly. It seems like all participants have been exposed to the same train stimuli, but in random order. No controls or control periods are introduced in the method chapter. The "fake events/trains" seem to be control events, but what these events are and how they are used as control events needs to be described more clearly.</p> <p>Furthermore, the process of analysing the data is not clearly described. Is analysis of the HR data conducted independently (blindly) from the exposure to not affect/bias the results? This needs to be clarified.</p> <p>In the Article summary the authors state that CVD risk is increased in people living close to railway, and that this is due to effects on sleep and HR. There is not sufficient scientific knowledge to conclude on a causal association. That`s why you are doing more research on this. So, the first paragraph in the summary should be modified (as you have done in the introduction).</p> <p>The limitations of the study need to be discussed.</p> <p>The manuscript needs some language improvement</p>
RESULTS & CONCLUSIONS	<p>The discussion should include a paragraph on the strength and limitations of the study. Especially the limitations need to be discussed with focus on the limited sample, generalizability, etc. Furthermore, the clinical relevance of the magnitude of the HR change could be discussed.</p> <p>It is not clear if the HR changes were accompanied by EEG arousals, sleep stage changes or awakenings. Some more results</p>

	from the PSG could preferably be reported.
REPORTING & ETHICS	Regarding appropriate reporting statement or checklist: only if regarded necessary
GENERAL COMMENTS	The introduction could benefit from being tightened up a bit, be more focused and have a more summaric style. Some language editing is needed throughout the manuscript. The relevance of measuring HR could also have been introduced. Consider the use of "adverse" effect. The physiological response you measure is a normal acute biological response and the clinical relevance in the long run is uncertain. It might be better to just use "effect" or "response".

REVIEWER	Britt Øverland MSc, PhD Lovisenberg Diakonale Hospital Oslo, Norway
REVIEW RETURNED	18-Feb-2013

THE STUDY	Are the participants evaluated for sleep disorders and heart diseases? There are some grammatical errors that need to be corrected.
RESULTS & CONCLUSIONS	Table 2 is difficult to understand, it could be divided into two or three tables. Why have you used a cut off of 3 bpm? It seems like a small increase in HR, do you have any references for this? You have not included in your analysis events which lead to awakenings. Have you scored arousals? And are the events leading to arousals included? It could be interesting to see the results including events followed by awakenings and/or arousals, and maybe an overview of the HR events which are associated with arousals.
GENERAL COMMENTS	The aim of the submitted manuscript is to study if nocturnal noise and vibration exposure from trains provoke HR accelerations. They used polysomnography for sleep staging, synchronized with ECG recordings. The study is carefully conducted, and they found significant effect of noise and vibration on HR during sleep.

VERSION 1 – AUTHOR RESPONSE

Abstract and Title

We agree with Dr Aasvang that the term “adverse” may over interpret the findings and revised the paper accordingly.

For the abstract, Dr Aasvang stated that there is not sufficient scientific knowledge to conclude on a causal association between CVD risk and transportation noise. However, the paper of Eriksson (2012) together with the work of Babisch (2006) gives indication that there is coherence. We decided to attenuate our statement in the abstract.

The randomization was done for the experimental nights. However, we agree with Dr. Aasvang that the word randomization in the abstract is misleading and removed it.

Introduction

We focused the introduction more, and introduced the HR measurement.

Methods

The participants have been evaluated for sleep disorders and heart diseases in an anamnestic interview preceding the study. The process of recruitment of the participants is described more in detail.

As Dr. Aasvang mentioned, fake trains were calculated as control events. These are time intervals in the nights, where no train event took place. We described this more clearly.

Dr. Aasvang worried about potential biases in the results: The analysis of the HR data was not conducted independently (blindly) from the exposure, but in an automated way, so that our own expectation could not influence the results.

Results

We have not analyzed event related HR changes in relation to arousals. However, we follow Dr Aasvangs and Dr Øverland advice to report the number of event related awakenings. Thereby it becomes obvious that train exposure not only increased HR, but also led to enhanced awakenings.

Discussion

Dr. Øverland wondered about the cut off of 3bpm and Dr. Aasvang wanted to know more about the clinical relevance of the findings. The average increase of 3bpm actually is rather big; keeping in mind, that this is data averaged over 20 to 36 events and different sleep stages. Unfortunately, we could not find any reference giving guidance about the clinical relevance of the amplitude of event related HR. We suspect the HR increase reflects an increase in sympathetic tonus. We added our considerations in the discussion section.

A limitations section has been added.

Tables

We improved the design of table 2 in order to make it easier to understand. However, in order to have all relevant information at a glance we prefer not to split it in several tables.

VERSION 2 – REVIEW

REVIEWER	Gunn Marit Aasvang Scientist (PhD) Norwegian Institute of Public Health Norway I declare no competing interest.
REVIEW RETURNED	05-Apr-2013

- The reviewer completed the checklist but made no further comments.