Author's response to reviews

Title: The socio-environmental determinants of railway suicide: a systematic review

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Author's response to reviews: see over
Review of manuscript titled

‘The socio-environmental determinants of railway suicide: a systematic review’

Dear Reviewers,

Thank you very much for your valuable comments. They were helpful in improving the quality of our manuscript. Please find our responses to your comments below.

Reviewer 1 (Karolina Krysinska):

1. Background: Could the authors provide a comment regarding differences and similarities between suicidal behaviour on the railway networks and metro/underground systems.

   Studies looking at both types of environments have been included in the review, although the factors influencing these two types of “rail suicides” (and appropriate prevention measures) might differ.

   **Response:** Thank you for this comment. We have specified the type of railway systems in the table 1 (under the ‘setting’ column). They are categorised into two systems: 1) railway systems 2) metro, subway or underground. Two out of eleven studies have not clearly specified the type of systems (page 7). However, we have explicitly indicated the type of railway systems in the results and discussion sections where possible. For example:

   - **Page 8:** “the presence of surveillance units in stations was found to have no positive effect on railway suicide, with a higher frequency of railway suicides being observed in the **subway** stations….”

   - **Page 12:** “The evidence is inconsistent on the relationship between suicides in railway **systems** and variables of track length, train mileage, distances travelled by train passengers and population density”.
• Page 12, first paragraph: we added “In particular, the factors related to train frequency and number of train passengers were associated with suicides on the railway network [27, 34] while the factors of availability of fast train, number of passengers and presence of drug users were associated with suicides in subway systems [30].”

2. Background: The second paragraph on page 3 (“Past research suggested…”) is not clear. Could the authors specify the eight “preventative strategies” according to Radbo et al. (2008)?

Response: We have changed the sentence to “Suggested prevention strategies for railway suicide have emphasised the need to decrease the perceived attractiveness (e.g. increase public knowledge on survival rate) and availability of trains as a suicide means (e.g. reduce train frequency) [9]. These strategies have also suggested reducing accessibility to train lines (e.g. install physical barriers) and the potential of collision (e.g. decrease train speed), mitigating the consequences of collision (e.g. modify the front design of the train), and increasing medical survival and recovery (e.g. offer rehabilitation for survivors) [9].”

3. Could they provide references for the statement regarding the existing “empirical evidence” supporting the effectiveness of these strategies?

Response: 10-16 are the references for the statement. We also changed the statement to “these findings align with several reviews on limiting access to ‘lethal’ methods via physical restriction and a reduced number of suicides, with minimal substitution effect to other suicide method [10-16].”

4. Could the authors specify which of the strategies described or reported in references [10-16] relate directly to prevention of railway suicide?

Response: Thanks for this comment. We have specified the strategy and reference in the following sentence “As it stands, reducing accessibility to train lines through installation
of physical barriers is the only suicide prevention strategy that has been followed by a decrease in train suicide [10].”

5. In the third paragraph (page 4), could the authors provide a definition of “means restriction” in the context of rail suicide prevention?

**Response:** We have provided the definition of method restriction “(i.e. restricting access to railway)” on page 3.

6. Inclusion and Exclusion Criteria: Could the authors specify what is meant by “so forth” in this systematic review (p. 5)?

**Response:** Thank you for this comment. We have removed “so forth” and changed the sentence to “we specifically examined geographical, physical, economic and social characteristics for railway suicide such as: railway- and train-related factors (e.g. track length, train frequency, number of train passenger, physical barrier, surveillance measure, and blue light), population characteristics, and presence of social media reporting on railway suicide”.

7. Study Characteristics: Could the authors provide information how many studies included in the review were conducted in the context of a) railway networks and b) underground systems (p. 7)?

**Response:** This information has been added in the table 1 (under the column of setting) and also in the text (in the section of study characteristics page 6-7: “Four studies examined metro, subway or underground suicide and seven studies considered suicides occurring in railway systems (including two studies that did not provide information on whether the suicide data of railway systems included or excluded metro suicides [34, 35]).”

8. Results: How the different definitions and/or indicators of the socio-environmental determinants of railway suicide used in studies conducted in different countries could
affect the results and conclusions of the study (see p.12)? How the authors of the manuscript have “controlled” for the different operationalization of the analysed variables?

Response: We acknowledge that this is a good point. We have added a paragraph in the section of limitation “Another limitation of the review is that it included small number of studies, which were based in different countries with diverse structure of railway networks and applied various definitions in measuring same variables. All of these lead to making definitive conclusions difficult.” We carefully considered the definition used for each variable in different studies. When necessary, we reported the difference of definitions may play a role in the findings (page 12, second paragraph).

9. Media Impact: please, check the sentence starting with “Consistent with this…” (p. 10).

Response: We have changed the sentence to “Consistent with this, another study showed that subway suicide increased when greater number of stations operated in the period of extensive media reporting of subway suicide”.

10. Figure 1: I am surprised by the number of studies identified during the first phase of the database search (n=5195). This seems very high!

Response: This number is the sum of articles found using four databases: Medline (Ovid), PsycINFO (ProQuest), Web of Science (Web of Knowledge) and Scopus (SciVerse) from their inception to June 2013. After deleting the duplicates, the total number became 2845.

11. Table 1: Both the content and the language used in this table should be thoroughly revised. The studies are not presented in a consistent and well organized way. For example, the “factors of interest” in Study 1 are described in much detail; while similar variables in Study 6 (e.g., population density) are only listed. Results (“significant relationships”) should be presented in a more concise (less descriptive) way. English should be revised, for example phrases such as “fatal train suicidal act” (p. 1), “there was no significant
sign of suicide displacement to other platforms” (pp. 9-10). What is the difference between an “entire railway system” and a “national railway track system”?

**Response:** Significant changes have been made to the table 1 according to the comments e.g. “fatal train suicidal act” has been changed to “railway suicide”, “there was no significant sign of suicide displacement to other platforms” to “No sign of suicide substitution to unsealed platforms”, “entire railway system” and a “national railway track system” to either railway system, metro, subway or underground system. We are not able to provide detailed definition of variables for study 6 because they were not provided in the study.

12. Summary and Interpretation of Evidence: Could the authors provide relevant references in the first paragraph of this section (p. 12)? The sentence staring with “This appears to support Durkheim’s hypothesis…” (p. 13) is not clear. The phrase “On the contrary” (p. 13) does not seem appropriate as an opening of the next paragraph.

**Response:** Thank you for this comment. We have removed the sentence starting with “This appears to support Durkheim’s hypothesis..”. Further, “On the contrary” (page 13) has been removed.

13. Future Research: This is the weakest part of the manuscript and is not suitable for publication in a scientific journal. First of all, English be reviewed and revised to ensure the clarity of the text (pp. 14-15). Additionally, it is not clear why the authors have chosen to focus on the Durkheim’s theory (please, check referencing style on p. 14). The application of Joiner’s model is also not very convincing. The concept of “acquired capacity for suicide” can undoubtedly be applied to suicide on the railway networks. However, given the high lethality of this method, this process could be more complicated and maybe linked to the use of other (less lethal) methods as a “suicide practice”.
Response: We have removed the theories and written a new paragraph for the section of future research. Please refer to the manuscript (page 13-14).

14. Future research: Discussion regarding the need for studies looking at individual risk factors for railway suicide seems a bit paradoxical in the context of the aims and rationale for the current review (p.4).

Response: Thank you for this comment. To clarify, we did not suggest future research looking at individual risk factors; instead we suggested using multilevel model to examine the socio-environmental risk factors. This would have the advantages of controlling for individual level sources of bias while at the same time measuring the impact of wider environmental factors. We have clarified this on page 14.

15. Limitations of this Review: Could the authors explain why the one study on temporal variations was not included although it was identified following the study search procedures?

Response: We clarified this comment with the sentence “this was not so much a limitation because the primary purpose of the review was to provide a greater understanding of socio-environmental factors associated with railway suicide to assist in characterising high risk areas. Therefore, the evidence on temporal factors would not be relevant to this review.”

16. The sentence “Since railway suicide occurred most often in..” (p. 16) is not acceptable.

There is no evidence (due to lack of published English-language studies on rail suicide outside the Anglo-Saxon and Western-European countries, Japan, Hong Kong and Canada) showing that railway suicide is most frequent in “non-English speaking countries such as Netherlands, Germany and Sweden” (p. 16). (In addition, categorising these three Western European countries as “non-English speaking countries” is inappropriate; an example of quite extreme “Anglocentrism”).
Response: Thank you for this comment. We have changed the sentence to “We also excluded non-English articles. Because of this, it is possible that the review under-reports relevant studies conducted in non-English speaking areas of the world.”

17. Conclusions: Again, English be reviewed and revised to ensure the clarity of the text (pp. 16-17). It is not clear what is meant by “the impacts of inhabited socio-environments rather that surroundings of incident location” (p. 16) and interventions “generalizable to their local conditions” (p. 17).

Response: We have removed “the impacts of socio-environments in victim’s residential neighbourhood rather than the incident location” and changed “generalizable..” to “tailor to their local structure of railway networks.”

18. The conclusion regarding the need for “well-designed studies” (p. 17) is correct; however, it seems to ignore the good quality and important (also for prevention) results of the studies conducted to-date.

Response: We have removed the need for “well-designed studies” in the text.

19. Please, correct “to clarifying” (should be “to clarify”) on page 6.

Response: This has been corrected.

Reviewer 2 (Garrett Glasgow):

20. While a review of this literature is useful, some critical analysis would also be helpful.

For instance, some researchers have concluded that means restriction is most effective on methods of suicide that are readily available, such as household items (Hawton et al. 2001). What bearing does this have on the likely effect of means restriction on railways? Should researchers focus their attention on urban areas where rail lines are readily accessible to a large population, for instance?
Response: Is the reviewer asking whether we believe that greater access to railways related to a great number of railway suicides? If so, we feel that we are unable to answer this question based on the evidence in the current review as there is no conclusive findings on increased access to railways related to increased number of railway suicide and only one study found that platform screen doors protected against underground railway suicides. There are a few case series studies on urban/rural differences (e.g. Rådbo et al, 2005). However, they were only descriptive and cannot provide clear evidence about whether greater access to railways is related to a greater number of railway suicides.

21. Identifying and controlling for possible confounders is especially difficult in studies of suicides in public places. I feel that the apparent effectiveness of blue lights in reducing suicides at Japanese rail stations is more likely due to some unmeasured confounders rather than the blue lights themselves, especially since no causal mechanism for how blue lights might work has been identified. It is likely impossible to rule out all confounders in studies of a small number of rail stations that have tried preventive measures. A better approach might be to follow up on those studies that have researched the relationship between access to rail lines and overall suicide rates. Evidence that increased access to rail lines leads to more suicides would be evidence that means restriction on rail lines might save lives (see Glasgow 2001 for a similar approach). Advancing this argument would be helpful.

Response: We agree with you about the blue light study. We have modified the language of the relevant sentence (page 13) “the introduction of blue lights is a new suicide preventive intervention that has only been examined in one location. The longer-term effect of this measure, the underlying causal mechanism of why this is effective and substitution effect to other stations and other suicide methods over time should be
evaluated.” As indicated on the response to item 20, we feel that we are unable to answer whether access to railways leads to more suicide based on the evidence in the current review.

22. Overall, I think this manuscript could be a more useful guidepost for future research by casting a more critical eye on existing research and suggesting some clear paths forward. 

Response: We have written a new paragraph in the future research section (page 13-14).

23. The fact that relatively few people who attempt suicides on rail lines go on to attempt suicide again is ambiguous. Many of these individuals could be "parasuicides," who attempt suicide in a public place to attract help rather than out of a true desire to die. This also applies to other studies that have made similar observations (Seiden 1978). A note of skepticism here would be appropriate.

Response: There were two studies interviewed railway suicide survivors about why they chose the method (Guggenheim & Weisman, 1972; O'Donnell, 1996). The majority of these individuals indicated that they expected this method is a certain way of death and quick. As these studies were based on a small number of individuals, we would hesitate to draw any conclusions and this has not included in the review.

24. A sentence on page 9 states "the longer the passenger kilometer" -- is this meant to say "the more passenger kilometers"?

Response: It has been changed to ‘more passenger kilometre was correlated with lower railway suicide rate’

Reviewer 3 (Ulrich Hegerl):

25. The list of possible socio-environmental factors influencing railway suicides should be stated more precisely by using a table: Which socio-economic factors did the authors consider to be possibly relevant? Do socio-environmental factors also include political
decisions with indirect consequences for railway suicides like an army reform in Switzerland which led to a significant decrease of firearm suicide rates, but also to a partial method substitution indicated by a subsequent significant increase of railway suicide rates in this country (see Reisch et al. Am JPsychiatry 2013)?

Response: We clarified which socio-environmental factors to be examined in the review on page 5. Political factor are part of the social characteristics, and has been considered in the review.

26. Table 1: Regarding the study no. 3 (Niederkrotenthaler et al., 2012), the summary of significant relationships between study factors and outcomes is very long. Thus, it is recommended to shorten it by eliminating the sections “after adjustment for the frequency of total suicides and total number of operative stations” (the findings after full adjustment are more important).

Response: We have shortened the findings in table 1. The findings before full adjustment remain in the table as we think they are important too.

27. Discussion: Future research, end of the forth paragraph: The authors recommend “stronger approaches” for studies evaluating particular interventions regarding railway suicidal acts: For the reader, it would be helpful if the authors could specify these approaches.

Response: Thank you for this comment. We have removed the sentence as we think the suggested approaches by the authors are not specifically relevant to the intervention for railway suicides. We have modified the language of this paragraph.

28. References Nos. 26 and 29: Volume and pages are missing.

Response: Thank you. The volume and pages have been added to the references.
29. Method: I am unsure why the article by Matsubayashi et al (2013) has been included. The inclusion criteria states that: We included studies with an outcome variable of fatal (suicide) and non-fatal (suicide attempt) railway suicide, and exposure variables of socio-environmental factors. In terms of socio-environmental factors, we speculated geographical, economic and social characteristics for railway suicide such as: track length, train frequency, socio-economic of population, presence of media reporting on railway suicide and so forth. Installation of blue lights does fall under an environmental intervention, however this type of factor needs to be made clearer in the inclusion criteria. It is also a direct intervention to reduce suicide, whereas the other articles look at causal factor related to suicide, therefore I am not sure how the authors are able to directly compare them. Please comment.

Response: Thank you for the comment. We have changed the sentence to “we specifically examined geographical, physical, economic and social characteristics for railway suicide such as: railway- and train-related factors (e.g. track length, train frequency, number of train passenger, physical barrier, surveillance measure, and blue light), population characteristics, and presence of social media reporting on railway suicide.” Blue light is considered as one of the physical factors. This review does not directly compare the findings. It includes the intervention studies (e.g. platform screen doors, blue lights) because they still provide some insights about the relationship between factors of interest and outcome. We have separated intervention and non-intervention studies on the table 1.

30. Discussion: The authors note that they did not search conference abstracts. Given the difficulty in conducting studies in this area, I would recommend that this is done, as it is commonly part of a systematic review process. Only conference abstracts relevant to the suicide area need to be searched.
**Response:** This review extracted detailed data of included articles e.g. definitions of variables and significant findings for comparison. Conference abstract are not sufficient for this purpose, so have been excluded.

31. Discussion: I would also recommend that the authors re-think their inclusion criteria in terms of studies that examined temporal variations; given that they appear to have obtained at least one, and this is highlighted in the discussion, it seems a shame to leave this out of the general review. It could be argued that the authors have amended their inclusion criteria as they progressed through the review, given that only 2 articles were found relating to media reporting, and these have been included.

**Response:** Thank you for this comment. To clarify, we think this was not so much a limitation of the review because the primary purpose of the review was to provide a greater understanding of socio-environmental factors associated with railway suicide to assist in characterising high risk areas. Therefore, the evidence on temporal factors would not be relevant to this review. These statements have been added to the manuscript (page 14-15).

**Additional editorial requirements:**

32. Copyediting: After reading through your manuscript, we feel that the quality of written English needs to be improved before the manuscript can be considered further.

**Response:** This manuscript has been edited by fluent English-speaking co-authors.

33. Abstract: Please include the contextual information of your study in the Background section of the Abstract.

**Response:** The contextual information has been added in the Background section of the Abstract.
34. PRISMA: Please adhere to PRISMA guidelines when reporting Systematic Reviews (http://www.prisma-statement.org/).

**Response:** We have made sure that the manuscript adheres to the PRISMA guidelines for reporting Systematic Reviews.

Warm Regards,

All authors