

PEER REVIEW HISTORY

BMJ Open publishes all reviews undertaken for accepted manuscripts. Reviewers are asked to complete a checklist review form (<http://bmjopen.bmj.com/site/about/resources/checklist.pdf>) and are provided with free text boxes to elaborate on their assessment. These free text comments are reproduced below.

ARTICLE DETAILS

TITLE (PROVISIONAL)	Causes of Death and Characteristics of Nonsurvivors Rescued during Recreational Mountain Activities in Japan between 2011 and 2015: A Retrospective Analysis
AUTHORS	Oshiro, Kazue; Murakami, Tomikazu

VERSION 1 – REVIEW

REVIEWER	Martinez-Caballero, Carmen M SACYL, Gerencia Emergencias Sanitarias de Castilla y León
REVIEW RETURNED	15-Aug-2021

GENERAL COMMENTS	<p>Dear Editors, thank you for giving me the opportunity to review this interesting article.</p> <p>" Causes of Death and Characteristics of Nonsurvivors Rescued during recreational Mountain Activities in Japan between 2011 and 2015: A Descriptive Analysis."</p> <p>It is a perspective not often used to analyze the deaths of those who are rescued and I consider necessary the contribution made by the article. I enjoyed reading it very much.</p> <p>INTRODUCTION This section provides sufficient background. It is true, as the authors emphasize, that the article presents quite a large sample. However, it seems reasonable to present the article as "one of the first" to analyze causes of death in those rescued subjects and not the first. Given that there are smaller studies that allude to the causes of death of those rescued not referenced in the text. Please review the references and consider adding some of them. line 14 please shorten the sentence for instance, "causes of death and causes of injuries" line 32 Rephrase without using "FR" regional differences in mortality outcomes</p> <p>METHODS Methodology seems concerning due to the lack of standards in the police reports and the memory bias.</p> <p>RESULTS, DISCUSSION AND CONCLUSIONS These parts provide enough information and are well-developed.</p>
-------------------------	--

	If authors could polish up some details and defend the adequacy of their methodology this manuscript should be considered for publication
--	---

REVIEWER	Ströhle, Mathias Medical University of Innsbruck, Anesthesiology and Intensive Care Medicine
REVIEW RETURNED	20-Aug-2021

GENERAL COMMENTS	<p>Dear Authors, Thank you for giving the opportunity to review this manuscript. The manuscript "Causes of Death and Characteristics of Nonsurvivors Rescued during Recreational Mountain Activities in Japan between 2011 and 2015: A Descriptive Analysis" written by Kazue et al. is focusing on deaths in mountain activities in the Japanese mountains. There are several interesting facts resulting from this work. Nevertheless, there are also some major concerns regarding the quality of the results and missing relation to successful rescues in mountain emergencies.</p> <p>General Comments:</p> <p>Major concerns:</p> <p>These data only cover results of onsite mortality. It is not known how the mortality or survival rate of the rescued victims was. Especially in CPR conditions after avalanche burial or cardiac arrest further mortalities are quite probable. From this point of view the manuscript should be rearranged to more highlight that 3,5% of all victims are still alive when rescue teams arrive.</p> <p>Unfortunately, these data are not compared to those successfully rescued. Therefore, they might reflect the results of prolonged rescue or poor quality of treatment. We don't know the outcome of successful rescues in relation to these results. Therefore these results have only minor impact on adaption of prehospital treatment except of pelvic binder.</p> <p>How was hypothermia as death cause diagnosed? As no autopsy was performed, how could be differentiated between a cardiac arrest or a stroke and hypothermia, when the event was reported by a bypasser? In this setting 46 of 77 cases were reported from persons not on site.</p> <p>Oder studies reported already numbers of fatalities, sometimes even in relation to survivors Windsor JS. Mountain mortality: a review of deaths that occur during recreational activities in the mountains. Postgrad Med J. 2009 Jun;85(1004):316-21. doi: 10.1136/pgmj.2009.078824 Waddell G. Mountain rescue transport. Injury. 1975 May;6(4):306-8. doi: 10.1016/0020-1383(75)90178-3</p> <p>Specific:</p> <p>Abstract: Page 3, line 41: change "descriptive analysis of mountain nonsurvivors" to "descriptive analysis of prehospital nonsurvivors in mountain emergencies".</p> <p>Strengths and limitations:</p>
-------------------------	---

	<p>Page 4, line 8: change "...of nonsurvivors" to "of prehospital nonsurvivors".</p> <p>Page 4, line 20: why was only the Japanese population enrolled in this study?</p> <p>Methods:</p> <p>Page 6, line 23: How could be discriminated between the different mechanism of death when there was no autopsy? E.g. was there a cardiac event leading to immobility and resulting in hypothermic state and death, or was it a "simple" hypothermia?</p> <p>Results:</p> <p>Page 7, line 16: Are you sure that these numbers are the correct ones in calculating a Fatality rate? Regarding the flowchart the number of rescue missions was 6159. I assume that the number of callouts should be replaced with this value and the results should be recalculated. Why is the fatality here mentioned as 551 and not 548 as mentioned elsewhere?</p> <p>Page 10, line 36: rewarming in 6 cases but only 4 of them were alive when rescue arrived at scene. How where the already confirmed dead rewarmed? Please explain or adopt.</p> <p>Discussion:</p> <p>Page 11, line 46: In line 25 you mentioned that there were no AAI. Therefore, rephrase this sentence or delete AAI in this sentence.</p> <p>Page 12, line 55: Do you have data supporting that callout in hypothermia was done by relatives or friends as the person was missing?</p> <p>Page 12, line 57: once more – please highlight that in high altitude AAI could lead to hypothermia but not in your cohort.</p> <p>Page 13, line 9: Please discuss as mentioned above how you discriminate between hypothermia as primary cause or as a result of illness (cardiac problem, stroke, ...)</p> <p>Page 13, line 50: You should say instead "In the group of non-survivors only one person with cardiac arrest was alive when rescue arrived."</p> <p>Page 13, line 57: Once more it would be more interesting if there was a difference in survival regarding the callouts between the successfully rescued and the deceased victims.</p> <p>Page 14, line 25: There are also data in favor for prehospital intubation (Pakkanen T. Physician-staffed helicopter emergency medical service has a beneficial impact on the incidence of prehospital hypoxia and secured airways on patients with severe traumatic brain injury. Scand J Trauma Resusc Emerg Med. 2017 Sep 15;25(1):94. doi: 10.1186/s13049-017-0438-1)</p> <p>Fig 1. nonsurvivors rescued in mountain – sounds awkward. Fig 2B – the symbol for smaller and larger for below 60min and over 361min in the timeline should be corrected.</p> <p>REFS:</p> <p>2. is this REF in English also available?</p> <p>replace 7 with: Schön CA. Determination of Death in Mountain Rescue: Recommendations of the International Commission for Mountain Emergency Medicine (ICAR MedCom). Wilderness Environ Med. 2020 Dec;31(4):506-520. doi: 10.1016/j.wem.2020.06.013</p>
--	---

VERSION 1 – AUTHOR RESPONSE

Reviewer 1

It is a perspective not often used to analyze the deaths of those who are rescued and I consider necessary the contribution made by the article. I enjoyed reading it very much.

Response: We are elated to know that! Thank you for your careful review of our manuscript and the insightful feedback.

1. INTRODUCTION

This section provides sufficient background.

It is true, as the authors emphasize, that the article presents quite a large sample. However, it seems reasonable to present the article as "one of the first" to analyze causes of death in those rescued subjects and not the first. Given that there are smaller studies that allude to the causes of death of those rescued not referenced in the text. Please review the references and consider adding some of them.

Response: Thank you for pointing this out. We agree with you and have revised "first" to "one of the first" in the Abstract (page 2, line 17) and Strengths and Limitations (page 3, line 3) sections. We have added relevant references (page 4, line 12).

2. line 14 please shorten the sentence for instance, "causes of death and causes of injuries"

Response: We have shortened the phrase to "Causes of death and alive rate at rescue team arrival" (Page 6, line 5).

3. line 32 Rephrase without using "FR" regional differences in mortality outcomes

Response: Thank you for your suggestion. We have revised accordingly (page 6, line 13).

4 . METHODS

Methodology seems concerning due to the lack of standards in the police reports and the memory bias.

Response: Thank you for highlighting this issue. We have clarified this point on page 4, line 25, and on page 14, line 7-9. We reinstated that the lack of standards does not suggest memory bias but rather indicates missing data (the course of patient treatment is often not recorded over time).

5 . RESULTS, DISCUSSION AND CONCLUSIONS

These parts provide enough information and are well-developed.

Response: Thank you

Reviewer 2

1. These data only cover results of onsite mortality. It is not known how the mortality or survival rate of the rescued victims was. Especially in CPR conditions after avalanche burial or cardiac arrest further mortalities are quite probable. From this point of view the manuscript should be rearranged to more highlight that 3,5% of all victims are still alive when rescue teams arrive.

Response: Thank you for your insightful review of our manuscript.

We appreciate your feedback. We have described the overall fatality rate of all rescued victims on page 6, line 6. However, as you pointed out in comment 5, the number was incorrect; therefore, we have changed it.

Regarding the 3.5% of all victims that were alive at rescue, the police documented the final outcomes of the nonsurvivors based on their death certificate after they were transferred to a hospital or police station.

2. Unfortunately, these data are not compared to those successfully rescued. Therefore, they might reflect the results of prolonged rescue or poor quality of treatment. We don't know the outcome of successful rescues in relation to these results. Therefore these results have only minor impact on adaption of prehospital treatment except of pelvic binder.

Response: Thank you highlighting this. It would have been interesting to explore this aspect.

However, this was not possible in our study owing to the fact that data on those who were successfully rescued were limited, and analysis involving them was not possible. Although we agree that this is an important consideration, we think this study makes a valuable contribution to the field.

This is because we focus more on the time course and its use from the onset to the arrival of the rescue team. We will surely consider your suggestion in a future study.

3. How was hypothermia as death cause diagnosed? As no autopsy was performed, how could be differentiated between a cardiac arrest or a stroke and hypothermia, when the event was reported by a bypasser? In this setting 46 of 77 cases were reported from persons not on site.

Response: All deaths were confirmed by physicians or coroners after the victims were taken to hospitals or police stations, as clarified on page 5, lines 10. However, we agree that the lack of autopsy data is a potential limitation of our study. We have added this as a limitation on page 10, line 1–2.

4. Oder studies reported already numbers of fatalities, sometimes even in relation to survivors Windsor JS. Mountain mortality: a review of deaths that occur during recreational activities in the mountains. *Postgrad Med J.* 2009 Jun;85(1004):316-21. doi: 10.1136/pgmj.2009.078824
Waddell G. Mountain rescue transport. *Injury.* 1975 May;6(4):306-8. doi: 10.1016/0020-1383(75)90178-3

Response: Thank you for bringing this to our notice. Accordingly, we revised some phrases in the manuscript, such as “first” to “one of the first” in the Abstract (page 2, line 17) and Strengths and Limitations (page 3, line 3) sections. We have added the relevant references (page 4, line 12).

5. Abstract:

Page 3, line 41: change “descriptive analysis of mountain nonsurvivors” to “descriptive analysis of prehospital nonsurvivors in mountain emergencies”.

Response: Thank you for your suggestion. We have revised accordingly (page 2, line 17–18).

Strengths and Limitations:

Page 4, line 8: change “...of nonsurvivors” to “of prehospital nonsurvivors”.

Response: We have revised accordingly (page 3, line 3).

Page 4, line 20: why was only the Japanese population enrolled in this study?

Response: The target population was people rescued in Japan, as explained in the Methods. The phrasing was incorrect in the previous version of our manuscript; we have now revised it (page 3, line 7).

Results:

Page 7, line 16: Are you sure that these numbers are the correct ones in calculating a Fatality rate? Regarding the flowchart the number of rescue missions was 6159. I assume that the number of callouts should be replaced with this value and the results should be recalculated. Why is the fatality here mentioned as 551 and not 548 as mentioned elsewhere?

Response: We appreciate and are grateful to you for your attention to detail. We have revised the total fatality rate on page 6, line 6. Regarding the number of deaths analyzed, we analyzed 548 deaths as the detailed data regarding three deaths in dispute were unavailable for analysis, as described in Figure 1.

Page 10, line 36: rewarming in 6 cases but only 4 of them were alive when rescue arrived at scene. How where the already confirmed dead rewarmed? Please explain or adopt.

Response: Bystanders started rewarming three victims who were already confirmed dead. We have added this information to page 9, line 15–16.

Discussion:

Page 11, line 46: In line 25 you mentioned that there were no AAI. Therefore, rephrase this sentence or delete AAI in this sentence.

Response: Thank you for pointing this out. We have deleted the text on page 10, line 21.

Page 12, line 55: Do you have data supporting that callout in hypothermia was done by relatives or friends as the person was missing?

Response: We obtained data from police organizations that documented who made the callout (page 5, line 2).

Page 12, line 57: once more – please highlight that in high altitude AAI could lead to hypothermia but not in your cohort.

Response: We have deleted this information from page 12, line 2.

Page 13, line 9: Please discuss as mentioned above how you discriminate between hypothermia as primary cause or as a result of illness (cardiac problem, stroke, ...)

Response: All deaths were confirmed by physicians or coroners after the deceased were taken to hospitals or police stations (page 5, lines 10), even if the callouts were made by people absent in the scene. However, we agree that this is a potential limitation of our study. Therefore, we have added this as a limitation on page 10, line 1–2..

Page 13, line 50: You should say instead “In the group of non-survivors only one person with cardiac arrest was alive when rescue arrived.”

Response: We have revised the text as per your suggestion (page 12, line 24).

Page 13, line 57: Once more it would be more interesting if there was a difference in survival regarding the callouts between the successfully rescued and the deceased victims.

Response: Thank you for your suggestion. Although we agree with your assessment, in our study, this would not be possible because data on those who were successfully rescued were limited. Therefore, analyses involving such data were not possible. We will consider it in our future studies.

Page 14, line 25: There are also data in favor for prehospital intubation

(Pakkanen T. Physician-staffed helicopter emergency medical service has a beneficial impact on the incidence of prehospital hypoxia and secured airways on patients with severe traumatic brain injury. Scand J Trauma Resusc Emerg Med. 2017 Sep 15;25(1):94. doi: 10.1186/s13049-017-0438-1)

Response: Thank you for providing the information. We have incorporated it in the revised manuscript.

Fig 1. nonsurvivors rescued in mountain – sounds awkward.

Response: Thank you for pointing this out. We have revised it accordingly.

Fig 2B – the symbol for smaller and larger for below 60min and over 361min in the timeline should be corrected

Response: We revised this symbol in Figure 2(B).

REFS:

2. is this REF in English also available?

Response: This literature is available only in Japanese.

replace 7 with: Schön CA. Determination of Death in Mountain Rescue: Recommendations of the International Commission for Mountain Emergency Medicine (ICAR MedCom). Wilderness Environ Med. 2020 Dec;31(4):506-520. doi: 10.1016/j.wem.2020.06.013

Response: We have replaced the relevant reference as per your suggestion.

VERSION 2 – REVIEW

REVIEWER	Martinez-Caballero, Carmen M SACYL, Gerencia Emergencias Sanitarias de Castilla y León
REVIEW RETURNED	21-Nov-2021

GENERAL COMMENTS	The suggested amendments have been implemented and, as a whole, the article meets the criteria for publication in the journal.
-------------------------	--

REVIEWER	Ströhle, Mathias Medical University of Innsbruck, Anesthesiology and Intensive Care Medicine
REVIEW RETURNED	03-Dec-2021

GENERAL COMMENTS	Thank you for addressing my concerns and answering my questions!
-------------------------	--