Author’s response to reviews

Title: Prevalence and correlates of suicidal ideation in Korean firefighters: A nationwide study

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Version: 1 Date: 07 Oct 2019

Author’s response to reviews:

Dear Editor,

I would like to thank you for the valuable comments and recommendations that significantly helped improving our manuscript. We have carefully revised the manuscript in accordance with the comments and the following changes were made in our manuscript to reflect their input. We tracked the changes in revised manuscript and highlighted them in sky blue color. We look forward to receiving positive feedback regarding the revised manuscript.

Yours sincerely,

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Response to the comments from the editors and reviews:

Reviewer 1

1. Introduction
The authors rightly assert that further understanding of suicidal ideation is important for improving suicide prevention efforts. However, the problem with this study is how suicidal ideation is measured. I have made some more detailed remarks on this below but the main problem is that assessing suicidal ideation with one question and in addition dichotomizing this item is not a very good way of measuring suicidal ideation. I am concerned that this outcome measure does not assess a phenomenon well worthy of investigation. The manuscript needs to make a much stronger argument for the idea that people who report suicidal ideation at least rarely in the last year is worthy of further investigation and possibly intervention. Also some more information about why this dubious outcome measure where used in a study where other phenomena such as depression and PTSD are way more solidly assessed.

=> Thank you for your thoughtful comment and advice. We totally understand what you are concerned about. In this letter, we tried to answer your question regarding the reasons why a single-question was used to assess suicidal ideation and why we chose to dichotomize this variable. In addition, we tried to show you whether and how the correlates of the presence of past-year suicidal ideation (SBQ-R item 2 ≥ 2) were also associated with the frequency of suicidal ideation in the past year. We also commented the limitation of assessing suicidal ideation with one question and suggested the necessity of further study investigating various aspects of suicidal ideation in revised manuscript.

1) In line 24, "an increased", not "the increased"

=> Thank you for the correction.

2) In line 27, within one year: is that recent?

=> We corrected the phrase ‘recent suicidal ideation’ to ‘past-year suicidal ideation’.

3) In line 35, language

=> Thank you for pointing this out. We have checked it for language.

4) In line 48-49, what is the current suicide rate in Korea?

=> The suicide rate in South Korea was 26.9 per 100k persons in 2018 (World Population Review, 2019). According to the World Health Organization, the suicide rate in South Korea was the 4th highest in the world (World Health Organization, 2018). We added the sentence as follows. “According to the World Health Organization, the suicidal rate in South Korea was 26.9 per 100,000 persons, ranking 4th highest in the world [2, 3].” Please see lines 50-51 in revised manuscript.

5) In line 56, please provide reference

=> We changed the wording from ‘suicidal ideation’ to ‘suicidal behaviors’ in the first sentence of the second paragraph (please see line 58) and added 2 references [9], [10].
6) In line 58, inset in text where these numbers come from

As suggested by Reviewer 1, the sentence was modified as follows. “It was recently reported that the number of firefighters who died from suicide was greater than the number who died in the line of duty in Unite States [11]. In South Korea, there were also more suicides than on-the-work deaths in firefighters during the last decade, according to an informal report from the National Fire Agency.” Please, see lines 58 – 62. Reports about US firefighters came from Forbes. However, since there was no formally published report about this issue in South Korea, we have contacted the Fire Policy Division in Health Management Team from National Fire Agency to acquire statistics on the number of suicides and deaths in the line of duty in the past ten years.

7) In line 69 & 83, language

=> We have checked the lines. Please see line 75 and lines 88.

8) In line 92 please provide rationale for working outside as risk factor for suicide

=> To the best of our knowledge, there is no previous finding about the association between suicide and occupational stress from physical work environment. Considering that there have been previous reports suggesting that various occupational stress from work condition impact suicidal ideation, stress from physical work condition in firefighters may be a possible correlate of suicidal ideation. We inserted two references about the association between occupational stress and suicidal ideation in this part [19] and [20]. Please, see line 97 in revised manuscript.

9) In line 108, avoid causal language in Cross sectional studies

=> Thank you. We rewrote the aims of this study avoiding causal language the last paragraph in Introduction section. Please, see lines 111 – 117.

2. Methods

1) How were missing data handled?

=> Participants having missing data were excluded in the logistic regression analysis. Thus, a total of 45,555 participants were included in this analysis. We corrected ‘(N = 45,698)’ to ‘(N = 45,555)’ in the title of Table 2. In addition, in the statistical analysis section, we included the sentence, “In the logistic regression analysis, 143 participants with missing data were excluded; thus, a total of 45,555 participants were included in the analysis.” Please, see lines 253 – 257.

2) In line 137-143 (please, see lines 146 – 162), why were the outcome variable assessed with only one item? Why did the authors choose to dichotomize this variable, and thereby losing sorely needed variance? Why were "rarely" used as the cut-off for suicidal ideation, rather than sometimes? Would changes in 2 and 3 above change any of the conclusions in
this study? Could the authors provide a reference showing that rare suicidal ideation is related to completed suicide?

=> First of all, we’ve thoroughly considered the problem with assessing suicidal ideation with one question. In the Discussion section of revised manuscript, we acknowledged that assessing suicidal ideation with only one question is the limitation that could be addressed in the future study (please, see lines 367 – 370). However, in many studies, one direct question with dichotomous fashion was asked to assess whether participants had potential suicidal ideation or not. For example, Bossarte et al (2012) used the question “Has there been a time in the past 12 months when you thought of taking your own life?” to assess suicidal ideation in veterans. In addition, Stanley et al (2015) used the question, “Since becoming a firefighter, have you ever had thoughts of killing yourself?” to assess the suicidal ideation during career among firefighters. We also used one item from SBQ-R, Item 2, which was a direct question about the frequency of suicidal ideation in the previous year. It reads “How often have you thought about killing yourself in the past year?” A response of ‘2’ from the SBQ-R Item 2 indicates that the respondent had thought about suicide once in the previous year. Therefore, a score of greater than 2 on Item 2 indicates that the respondent thought about suicide more than once in the past year, while a score of 1 indicating that he or she did not have past-year suicidal ideation. Since this study focused on the presence of past-year suicidal ideation, we dichotomized the SBQ-R item 2. As you mentioned, dichotomizing the variable makes us lose the information of variance related to the frequency of suicidal ideation. To provide information of the frequency of past-year suicidal ideation among firefighters, the distribution of responses from SBQ-R Item 2 is provided below. As presented, the number of respondents with a score of 3 – 5 was very small.

<The frequency of score of the SBQ-R item 2>

<table>
<thead>
<tr>
<th>Response</th>
<th>frequency</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>40827</td>
<td>89.3</td>
</tr>
<tr>
<td>2</td>
<td>3806</td>
<td>8.3</td>
</tr>
<tr>
<td>3</td>
<td>780</td>
<td>1.7</td>
</tr>
<tr>
<td>4</td>
<td>169</td>
<td>0.4</td>
</tr>
<tr>
<td>5</td>
<td>116</td>
<td>0.3</td>
</tr>
<tr>
<td>total</td>
<td>45698</td>
<td>100</td>
</tr>
</tbody>
</table>

Furthermore, when the cut-off score was changed to 3, the results remained relatively similar with the results from the analysis on the outcome variable using cut-off score = 2. The results are shown below. This result indicates that the correlates of having suicidal ideation more than once in the previous year are also related to the frequency of past-year suicidal ideation.

<Logistic regression on suicidal ideation more than two times in the previous year>
<table>
<thead>
<tr>
<th>B</th>
<th>S.E.</th>
<th>p</th>
<th>OR</th>
<th>CI</th>
<th>lower</th>
<th>upper</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>0.004</td>
<td>0.005</td>
<td>0.425</td>
<td>1.004</td>
<td>0.994</td>
<td>1.014</td>
</tr>
<tr>
<td>Sex</td>
<td>0.693</td>
<td>0.102</td>
<td>0.000</td>
<td>2.000</td>
<td>1.636</td>
<td>2.445</td>
</tr>
</tbody>
</table>

**Marital status**

<table>
<thead>
<tr>
<th>B</th>
<th>S.E.</th>
<th>p</th>
<th>OR</th>
<th>CI</th>
<th>lower</th>
<th>upper</th>
</tr>
</thead>
<tbody>
<tr>
<td>Married</td>
<td>-0.019</td>
<td>0.100</td>
<td>0.852</td>
<td>0.981</td>
<td>0.807</td>
<td>1.193</td>
</tr>
<tr>
<td>Divorced/separated/widowed</td>
<td>0.759</td>
<td>0.162</td>
<td>0.000</td>
<td>2.136</td>
<td>1.554</td>
<td>2.934</td>
</tr>
</tbody>
</table>

**Current duty**

<table>
<thead>
<tr>
<th>B</th>
<th>S.E.</th>
<th>p</th>
<th>OR</th>
<th>CI</th>
<th>lower</th>
<th>upper</th>
</tr>
</thead>
<tbody>
<tr>
<td>EMS</td>
<td>-0.252</td>
<td>0.089</td>
<td>0.005</td>
<td>0.778</td>
<td>0.653</td>
<td>0.926</td>
</tr>
<tr>
<td>Officer</td>
<td>0.205</td>
<td>0.091</td>
<td>0.024</td>
<td>1.227</td>
<td>1.027</td>
<td>1.467</td>
</tr>
<tr>
<td>Religion</td>
<td>0.098</td>
<td>0.069</td>
<td>0.156</td>
<td>1.103</td>
<td>0.963</td>
<td>1.264</td>
</tr>
<tr>
<td>Recent trauma</td>
<td>0.516</td>
<td>0.085</td>
<td>0.000</td>
<td>1.675</td>
<td>1.419</td>
<td>1.977</td>
</tr>
<tr>
<td>Occupational stress</td>
<td>0.097</td>
<td>0.024</td>
<td>0.000</td>
<td>1.102</td>
<td>1.051</td>
<td>1.154</td>
</tr>
<tr>
<td>Emotional labor</td>
<td>0.098</td>
<td>0.008</td>
<td>0.000</td>
<td>1.103</td>
<td>1.086</td>
<td>1.120</td>
</tr>
<tr>
<td>PTSD</td>
<td>1.173</td>
<td>0.104</td>
<td>0.000</td>
<td>3.233</td>
<td>2.635</td>
<td>3.967</td>
</tr>
<tr>
<td>Depression</td>
<td>2.670</td>
<td>0.110</td>
<td>0.000</td>
<td>14.446</td>
<td>11.649</td>
<td>17.914</td>
</tr>
</tbody>
</table>

Additionally, we have tried a multivariate regression analysis with continuous scores of SBQ-R item 2 and the results are shown below. This result of the regression on continuous variable showed that the frequency of suicidal ideation is associated with the correlates of the presence of suicidal ideation. However, we did not include these results in the Result section, because we think they are redundant..

**<Multivariable regression on the frequency of past-year suicidal behavior>**

<table>
<thead>
<tr>
<th>B</th>
<th>SE</th>
<th>T</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>0.001</td>
<td>&lt;0.001</td>
<td>2.465</td>
</tr>
<tr>
<td>Sex</td>
<td>0.06</td>
<td>0.008</td>
<td>7.898</td>
</tr>
</tbody>
</table>
Divorced/widowed/separated (marital status) 0.101 0.014 7.273 < 0.001
Religion 0.001 0.004 0.223 0.823
Officer (current duty) 0.062 0.006 10.688 < 0.001
Fire suppression (current duty) 0.028 0.005 5.557 < 0.001
Recent trauma 0.053 0.004 12.192 < 0.001
Occupational stress 0.016 0.001 11.005 < 0.001
Emotional labor 0.01 <0.001 22.347 < 0.001
PTSD 0.397 0.013 30.792 < 0.001
Depression 1.124 0.019 60.332 < 0.001

3. Results

1) In line 241-260, these two paragraphs are largely overlapping; authors should consider deleting the first.

=> Thank you for the suggestion. Accordingly, we deleted the sentences which you commented in the second paragraph of Results section. The sentences deleted are bellow.

“Participants with suicidal ideation in the past year were older and work longer than those without suicidal ideation. Participants with suicidal ideation in the past year were more female, divorced/separated/widowed, and officer as a current job position than firefighters without suicidal ideation in the past year. Also, participants with suicidal ideation in the past year recently more experienced traumatic events, had higher levels of occupational stress and emotional labor, and had higher rate of probable PTSD as well as depression than firefighters without suicidal ideation in the past year.”

2) In line 253, language

=> Your feedback is much appreciated. As suggested, we have checked this line for language. Please, see line 273.

3) In line 258 (please, see line 278), very narrow CI for emotional labor, is this correct?

=> The CI for emotional labor ranged between 1.087 and 1.103. The reason for a very narrow CI is the very small S.E. of emotional labor. We included Beta estimate and standard error of variables in Table 2 in revised manuscript.

4. Discussion
1) In line 266 (please see line 287 in revised manuscript), what are these numbers in the general Korean population?

=> The 1-year prevalence of suicidal ideation during the past year in the general Korean population is described in the following sentence. “A nationwide study conducted by the Korean Epidemiologic Catchment Area Study Replication (KECA-R) in 2016 showed that the 1-year prevalence of suicidal ideation in the general Korean population was 2.9% using the Korean version of the Composite International Diagnostic Interview.” Please, see lines 287 – 290. For reference, the Korean version of the Composite International Diagnostic Interview assesses suicidal ideation with the question “Have you ever thought seriously about committing suicide?” and “How old were you last thought of suicide?”

2) In line 276 (please see line 297 in revised manuscript), are there differences between US and Korea in the general population?

=> The 1-year prevalence of suicidal ideation is slightly higher in the US than in South Korea. It is reported that the annual prevalence of suicidal ideation in adults is 4 percent in the US (Piscopo, Lipari, Cooney, & Glasheen, 2016). For reference, the World Health Organization conducted community surveys in many countries and found that the 12-month prevalence of suicidal ideation (thoughts) was approximately 2 percent in 21 countries (Borges et al., 2010).

3) In line 290 (please see line 310 in revised manuscript), careful with causal language.

=> Thank you for pointing this out. We rewrote the sentence as follows. “Results showed that PTSD and depressive symptoms were factors most strongly correlated with suicidal ideation in the previous year among demographic, occupational, and clinical characteristics.” Please see lines 310 – 312.

4) In line 338, (please see line 359 in revised manuscript) the cross sectional design not only "may" limit, it does limit.

=> Thank you for the comment. “May” was deleted.

Reviewer 2

1. Regarding method, most of the instruments being used have translation and psychometric properties explicitly described, except for SBQ-R and Beaton et al self-report measure of traumatic events. Details would be desirable.

=> First of all, we added the details of the two scales, SBQ-R and Beaton’s traumatic event list. Please see lines 146 – 162 and 165 – 180.

=> In Measures section in revised manuscript, we added the internal consistency of each measure based on the present sample: PCL-5 $\alpha =$ 0.961, PHQ-9 $\alpha =$ 0.905, Difficult physical environment of KOSS $\alpha =$ 0.464, Emotional damage of KELS $\alpha =$ 0.947. The low value of the internal
consistency of “Difficult physical environment” of KOSS might be because the subscale of KOSS comprises of three items assessing distinct stressors such as “my workplace is clean and comfortable”, “I am exposed to dangerous work and possibility of high risk of accidents”, and “I have to work for a long time taking uncomfortable posture.” The previous study, which developed and validated the KOSS, has reported that the internal consistency of “Difficult physical environment” of KOSS was α = 0.564.

2. English language should be carefully reviewed.

=> Thank you for the comment. We have checked for English language carefully.

Reviewer 3

1. Introduction

1) In the introduction section, the authors should explain multiple statements in more detail. For example, the authors state that: ”South Korea in particular, is a country with a markedly high rate of suicide for the past several years" (48-49). Are there any explanations/causes for the high suicide rate in this country? Is the suicide rate higher compared to other countries? Could it be a registration issue? Please explain in more detail.

=> Thank you. As suggested, we added the below sentences. Please see lines 50 -51.

“According to the World Health Organization, the suicide rate in South Korea was 26.9 per 100,000 persons ranking 4th highest in the world [2, 3].”

It is reported that suicides in elderly and students contribute to a high suicide rate in South Korea (World Population Review, 2019). Traditional South Korean culture is heavily dependent on Confucian philosophy, especially the notion of filial piety, in which children are expected to care for their aging parents. However, in the 21st Century with Westernization, this traditional culture is largely disappearing. Elderly people are increasingly committing suicide to minimize financial burden on their families. As for students, there is high level of pressure to succeed academically. Without academic achievement, they may feel they have dishonored their families, leading to increased rate of suicide. In addition, alcohol use, sleep deprivation, stress, and poor social relationships can put students at increased risk of suicide. We did not insert these specific reasons because it is out of the scope of the manuscript.

2) Overall, the authors should check the introduction section again on spelling and grammar (for example sentence 47; "worlds" is not correct). Also, other sentences should be checked again (for example; 87 - 89).

=> Thank you. We checked the spelling and grammar, as suggested. And we rewrote the sentence of lines 87 – 89 (please, see lines 92 – 93).
3) Add a reference at the end of the sentence "Suicide is one of the leading causes of death worldwide for adult individuals" (48). Same for other sentences (for example 55 – 56, see lines 58); please add a reference. Also, please reformulate this sentence (56 – 58, see lines 58 - 62).

=> We added a reference [1] at the end of the sentence “suicide is one of the leading causes of death…” (Please, see line 48).

=> We added two references [9] and [10] in lines 58 and corrected the language from ‘suicidal ideation’ to ‘suicidal behaviors’ in the first sentence of the second paragraph (please see line 58 in revised manuscript). Also, we rewrote the sentences in lines 58 – 62.

4) In the manuscript, it is stated that "the number of firefighters who died from suicide was higher compared to the number of people who died in line of duty" (55 – 58, please see lines 58 – 60 in revised manuscript). The source the authors used is a newspaper article of Fisher (2018) entitled "more firefighters committed suicide in 2017 than died in line of duty". This article is focused on the situation in the US while the manuscript is specifically focused on firefighters in South Korea. The authors should change this and use suicide data/ references from South Korea instead of US. Is there any data available illustrating the severity of this problem in South Korea? Please revise this in the introduction section.

=> Since there is no formal report about this issue; we have contacted the Fire Policy Division in Health Management Team from National Fire Agency to acquire statistics on suicide and death in the line of duty in the past ten years. We modified the sentence as suggested by Reviewer 3. Please see lines 58 – 62.

“It was recently reported that the number of firefighters who died from suicide was greater than the number who died in the line of duty in the United States. In South Korea, there were also more suicides than on-the-work deaths in firefighters during the last decade, according to an informal report from the National Fire Agency.”

5) The authors introduce a study in this section, without describing it. Please further explain what kind of study you are referring to (design, aim?); sentence 60 – 64.

=> We rewrote the sentences as follow. Please see lines 64 – 68.

“One previous study has tried to determine the career prevalence of suicidal behaviors, including suicidal ideation, plans, and attempts by analyzing data obtained from a sample of 1,027 current and retired firefighters in the United States (US). This study reported very high rate of suicidal ideation, plan and attempt in US firefighters compared with the general population [13].”

6) “Since the study”, must be revised in "since this study" (sentence 61, see line 68 in revised manuscript).

=> As suggested, it was corrected.
7) Please insert more references (90 - 97).

=> We inserted two studies as reference numbers [19] and [20]. Please, see line 96 – 97.

8) Aims are not clear, suggestion to make it more specific. For example, the first aim is to measure the 1-year prevalence of suicidal ideation among firefighters in South Korea. Why is only suicidal ideation measured? And for example not suicide plans or suicide (attempts)? The authors should state this more explicitly in the introduction (terms are mixed. The second aim is to investigate whether and how various factors related to occupational stress and demographic characteristics impact recent suicidal ideation in this population. Please write down which factors. Be specific.

=> Thank you for the thoughtful comments. We described suicidal behaviors to include suicidal ideation, plan, and attempt in the first paragraph of the Introduction section. Even though it is necessary to investigate suicidal behaviors in firefighters, currently no other data regarding suicidal plans and attempts is available in this population. Hence, we focused on suicidal ideation in the previous year to investigate correlates of suicidal ideation and to suggest the annual rate of suicidal ideation in firefighters. Aims of this study were rewritten more specifically, as follows. Please, see lines 111 – 117 in revised manuscript.

“In this study, we conducted a nationwide survey on past-year suicidal ideation and its correlates among 45,698 firefighters in South Korea. The purpose of this study was twofold: 1) to determine the 1-year prevalence of suicidal ideation in firefighters and 2) to investigate whether and how various factors related to demographic characteristics (age, sex, marital status, and religion), occupational factors (current duty, traumatic experience in the previous year, stress from physical work condition, and emotional damage from emotional labor), and clinical symptoms (PTSD and depression) are correlated with past-year suicidal ideation in this population.”

2. Methods

1) A major problem with self-report, is that results and outcomes are mainly subjective. Participants are often biased when they report their own experiences or symptoms. The authors should be more open/ honest about these methodological issues and limitations of the study. It is very likely that the authors will find differences in the prevalence rate for suicidal ideation when replicated. Although the authors have accepted this shortcoming, they have not been as clear about them as they should. In my opinion, they should discuss this limitation of the study in the discussion or conclusion section more extensively.

=> Thank you for the advice. We added comments regarding the limitation from self-report in the Discussion section as follows.

“The current study collected data from a web-based self-reported questionnaire. Self-report assessment has a wide range of tendencies for participants to respond inaccurately to questions and recall bias could have possibly influenced the results. Standardized interviews would provide
a more accurate and detailed information regarding the prevalence and correlates of suicidal ideation in the population of firefighters.” (Please, see lines 362 – 367).

2) Furthermore, the sample size of this study is very large (45,698 Korean firefighters). Because of this large sample size, it is very likely the authors will find significant associations. In this case, the authors should ask themselves what the clinical relevance of these found associations are. The authors should be open about this and make possible recommendations for future research.

=> Thank you for your valuable advice. We totally agree with your opinion. In conclusion, female gender, divorced/separated/widowed marital status, current position of an officer, recent traumatic experience, and high level of occupational stress and emotional labor were significant correlates of suicidal ideation in the past year even after controlling the effects of PTSD and depression in this study. We think these factors are consistent with our clinical experiences related to high risk of suicide ideation in Korean firefighters. We described explanation why each factor could be related with the suicidal ideation in Korean firefighters. However, correlate is just correlate. We cannot prove the causal relationships with cross sectional design in this study. Thus we added comments regarding the implication of this study and suggestion for future study in the Conclusion section as follows.

“These findings suggest that keeping in mind and early detection of these correlates may be important in protecting firefighter from the risk of suicide. Longitudinal studies are needed to determine the causal relationships among these correlates, suicidal ideation, and completed suicide.” (Please, see lines 377 – 380).

3) To measure suicidal ideation, the authors used one item of the SBQ-R. I think that this is a big drawback given the fact that suicidal ideation is considered to be one of the main outcomes in this study. Measuring suicidal ideation in the past year using only one item is not very reliable. The authors should describe this limitation more extensively in the discussion/ conclusion section. Also, the authors should mention something about the reliability and validity of this scale (please add a reference). The authors changed this scale into a dichotomous outcome (no suicidal ideation/ suicidal ideation with a score higher than 2). As a consequence, there is no information on the frequency of suicidal ideation among firefighters which can actually be very informative/ relevant. Do the authors have data on the frequency of suicidal ideation from this survey?

=> Thank you for your thoughtful comment. We also see this as a major limitation of our study and acknowledged that assessing suicidal ideation with only one question is the limitation to the generalization of these results in revised manuscript (please see lines 367 – 370). Also, we added the information about the validity of this question in revised manuscript (please see lines 156 - 159).

=> We used one item from SBQ-R, Item 2, which was a direct question about the frequency of suicidal ideation in the previous year. It reads “How often have you thought about killing yourself in the past year?” According to the validation study for the SBQ-R (Osman et al, 2001), Item 2 had the second largest effect size for differentiating between suicidal-risk and non-
suicidal participants in both clinical and nonclinical adult samples (item 1 had the largest effect size for it), which was described in revised manuscript (lines 156 – 159). For reference, in many studies to date, a direct question regarding thoughts about suicide was used to assess suicidal ideation. For example, Bossarte et al (2012) used the question “Has there been a time in the past 12 months when you thought of taking your own life?” to assess suicidal ideation in veterans. Also, Stanley et al (2015) used the question, “Since becoming a firefighter, have you ever had thoughts of killing yourself?” to assess the suicidal ideation during career among firefighters. A response of ‘2’ from the SBQ-R Item 2 indicates that the respondent had thought about suicide once in the previous year. Thus, a score of greater than 2 on Item 2 indicates that the respondent thought about suicide more than once in the past year, while a score of 1 indicating that he or she did not have past-year suicidal ideation. Since this study focused on the presence of past-year suicidal ideation, we dichotomized the SBQ-R item 2. As you mentioned, dichotomizing the variable makes us lose the information of variance related to the frequency of suicidal ideation. For providing information of the frequency of past-year suicidal ideation among firefighters, we show you the distribution of responses for the SBQ-R item 2 and the results of additional regression analyses on the continuous variable as well as on the variable using cut-off score = 3. Please see the tables and comments in pages 5 – 7 in this letter.

4) Sentence 148 – 150 (please see lines 170 – 172 in revised manuscript); please insert reference regarding low incidence of gun shots in South Korea.

=> In South Korea, the possession of firearms is prohibited by law. We described this fact in the manuscript as follows (please see lines 170 - 172).

“We excluded two stressors related to gunshots due to generally low incidence of gunshots in South Korea due to strict gun control laws. In South Korea, only government-authorized personnel can own or carry guns. Gun culture is notably absent outside of the military and gun ownership and death ranks among the lowest in the world [33].”

5) The authors used for a number of measurements a Korean version (for example KELS, KOSS). However, some questionnaires that were used in this study are developed in the US and do not contain a Korean version (such as Beaton et al.). Do the authors expect that this might influence the outcome/results? Please explain further in the paper.

=> We modified the list of traumatic events, originally presented by Beaton et al to be appropriate for Korean firefighters; this is described in the Methods section. We used the Korean versions of PHQ-9 (Han et al., 2008) and PCL-5 (Kim et al., 2017), and two scales have been validated in the Korean population. We inserted the reference about the Korean version of PCL-5 in the description of PCL-5. We did not expect that this might influence the outcome/results of this study because the translation was done by a bilingual psychiatrist in the original study using Beaton et al’s questionnaire. For reference, KELS, KOSS, PHQ-9, and Beaton et al’s list have been used in the previous studies regarding various mental issues in Korean firefighters such as Kim et al (2018a), Kim et al (2018b); Park et al (2018). The detailed information of these articles was described in the reference section at the end of this letter.
6) In subsection "the presence of recent exposure to traumatic events" a total of 11 items were excluded for the survey of this study. For several of these items, the authors explained why they excluded them. However, not all items are mentioned. Please state for the other items why they were excluded from the survey. Please insert reference regarding the sentence "we excluded two stressors related to gunshots due to the generally low incidence of gunshot incidence in South Korea" (148 – 150; please see lines 170 – 172 in revised manuscript).

=> We selected only 22 items that had higher stress levels (compared with the other 11 items according to the results presented by Beaton et al. The 11 items excluded were fracture of extremity, render aid to adult stabbing victim, render aid to gun shot, adult dead on arrival, experience musculoskeletal strain, death of patient after long resuscitation, CPR-patient in cardiac arrest, completed suicide hanging, inappropriate dispatch, render aid-attempted suicide, and adult dead on arrival-natural causes. We modified the sentence as follows. “Twenty-two items were selected among the original 33 incident stressors based on the previous result of rating the stressfulness of the 33 stressors [32].” (Please see lines 167 – 168 in revised manuscript).

In addition, we inserted the fact that possession of gun is prohibited strictly by law in South Korea in the manuscript as follows.

“We excluded two stressors related to gunshots due to generally low incidence of gunshots in South Korea due to strict gun control laws. In South Korea, only government-authorized personnel can own or carry guns. Gun culture is notably absent outside of the military and gun ownership and death ranks among the lowest in the world [33].” (Please see lines 168 – 172 in revised manuscript).

<References>


Suicide rate by country population [http://worldpopulationreview.com/countries/suicide-rate-by-country/]