

Ref: Submission ID 412dcda0-e599-471c-8112-847bbe2c2758

Dear Dr Moreau,

Re: "Mental health consequences of military sexual trauma : results from a national survey in the French military"

We are pleased to let you know that your manuscript has now passed through the review stage and is ready for revision. Many manuscripts require a round of revisions, so this is a normal but important stage of the editorial process.

Editorial Board Member comments

Reviewers asked for revision. Please point-to-point address all concerns, mainly the methodological issues and improve the formal presentation.

To ensure the Editor and Reviewers will be able to recommend that your revised manuscript is accepted, please pay careful attention to each of the comments that have been pasted underneath this email. This way we can avoid future rounds of clarifications and revisions, moving swiftly to a decision.

Once you have addressed each comment and completed each step listed below, please log in here with the same email you used to submit your manuscript to upload the revised submission and final file:

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CHECKLIST FOR SUBMITTING YOUR REVISION

1. Please upload a point-by-point response to the comments, including a description of any additional experiments that were carried out and a detailed rebuttal of any criticisms or requested revisions that you disagreed with. This must be uploaded as a 'Point-by-point response to reviewers' file.

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To support the continuity of the peer review process, we recommend returning your manuscript to us within 21 days. If you think you will need additional time, please let us know and we will aim to respond within 48 hours.

Kind regards,

Yuan-Pang Wang
Editorial Board Member
BMC Public Health

Reviewer Comments:

Reviewer 1

The focus of this paper is to assess the correlation between various forms of MST, including sexual harassment,

coercion, and sexual assault, with PTSD and depressive symptoms among men and women serving in the French military. The authors sampled a random sample, oversampling women, across 18 military units (120 individuals per unit), achieving an impressive participation rate of 76%. Analytic sample included 1268 men and 232 women. The study focuses on a timely and very critical topic, and postulates that this study addresses a gap in the MST literature focusing on non-US military group and including both genders. However, some aspects of the methodology and analyses are difficult to understand/follow, and to tie back to the introduction in terms of how this study fills gaps in literature.

I have provided several comments and potential issues below for the authors to consider.

Abstract

- Background states MST is particularly prevalent among women, yet the vast majority of this sample is men so unclear why not only study women or incorporate MST among men in background.

While MST is more prevalent among women, the number of cases is greater among men because they represent 80% or more of the military population. In France 15% of men had an experience of SH and 3% experienced sexual assault as indicated line 126.

- Presentation of results is hard to follow (e.g., odds of depression and PTSD reported in same sentence). Also unclear what the increase is relative to in the reporting (I believe it is individuals with no MST).

We have revised the result sections to separate the results for depression and MST and clarified that the comparison group are servicemembers reporting no MST

Introduction & Overarching Comments

- The 'personal communication' referenced on p 3 is not sourced in the reference list. That reference should be included, and it would be useful to know if that is the only study on MST in French military. In other words, review literature on MST in French military in more detail, or be more explicit about the dearth of evidence and what has not been adequately studied.

There are no other studies reporting on MST in the French military. We have made this more explicit in the introduction. The COSEMIL study is the first to explore sexual trauma in the French military. We have indicated this in the introduction line 129. The results from the COSEMIL study described in the introduction are included in a paper exploring determinants of MST in the French military currently under review. We have revised the introduction, to indicate the absence of other MST estimates in France. "These figures, which are the first MST estimates in the French military" line 129

- In multiple instances throughout the paper, there is a mismatch between the statement/position and references cited. Suggest the authors conduct a thorough quality control check on all references to ensure they support corresponding statements in the text. A few examples:

o P3, '...human rights violations have profound implications for service people's health and wellbeing, especially...for military personnel as compared to civilians' (3,6) Although an important study to reference, Stander et al does not employ a comparison group of civilians and it is focused on prediction of sexual aggression rather than consequences.

o P4, line 86 references 13 to support the mental health effects of MST, but that reference is for the CES-D.

Thank you for noting this. The error is likely linked to the conversion of the reference list into word document. We have checked in corrected the references numbers in all the text

- Related to statement on P 3 noted above, it seems important to support this statement by enumerating why MST may be more damaging for military personnel than civilians, to further provide rationale for this target population (given these relationships have been well-established in the general population).

We have added a sentence line 131 describing the reasons why MST may have greater consequences in the military, including heightened risk of re-victimization and barriers to accessing support, due to deployment, fear of social ostracism, and professional sanctions (Bell).

"In particular, military personnel are at heightened risk of re-victimization given their living conditions and face multiple barriers to accessing support, due to deployment, fear of social ostracism, and professional sanctions (1,4,8)"

- The authors highlight that few studies assess cumulative effects of sexual stressors on mental health especially in the military context (note typo, p 3). The following summary of Street study suggests that odds ratios were established for depression and SH and SA respectively, but not the cumulative effect. Further it seems this

study does not assess cumulative effect as separate models are run for each of the 'types' of sexual aggression (rather than sequentially adding to model or assessing interactive effects). It would be helpful if authors clarified the methods, if in fact the intention is to assess cumulative effects, or to refine introduction to set up research questions more directly.

We have clarified our summary of the Street article. Street defines 2 measures: sexual harassment in the absence of assault, and sexual harassment including assault, including most serious physical aggressions. We have revised our outcome measure to build on Street's investigation distinguishing sexual comments alone from more serious forms of aggression and revised our measure to address the review's comment about cumulative effects as 48% of respondents who experience sexual oppression report several types of aggression. The small sample size experiencing some events and the high correlation between different forms of aggression prevent including all types of aggression in a single model. Therefore we created a categorical measure including no MST, MST in the form of comments alone, MST involving 1 type of sexual oppression and MST involving several types of sexual stressors including 1 type of oppression. This new categorical variable allows a distinction between different forms of sexual stressors and an assessment of the effect of a cumulation of sexual stressors on mental health.

We have revised the method section line 231-234, Tables 2-4 and the result section accordingly.

- Sentence on p 4 starting with 'few authors..' seems to have a word missing – the statement notes that MST has more deleterious effects for men, but does not provide more detail which would be helpful in interpreting gender differences.

While the literature on gender differences in MST sequelae is scarce, there are a number of reasons why men may experience greater deleterious outcomes, summarized in Bell's article "Impact of Gender on Reactions to Military Sexual Assault and Harassment" we have added to our reference. We have clarified and expanded the sentence summarizing these reasons in the introduction line 165.

"A few authors who have explored gender patterns of mental health disorders related to MST suggest more deleterious effects for men than women, as men may be more likely to experience repeated physical assault, are less likely to disclose and seek care and less likely to receive social support than women as sexual aggression threatens their gender identity (10). Other studies however, have reported greater psychological distress following sexual harassment among women (11)."

- The information about the role of work environment on sustaining MST (86-89) doesn't flow very well in the overall introduction. It's unclear if this is the main basis for studying the target population (French military).

We have deleted the sentence.

Methods

- Authors note they oversample women, with a ratio of 1:5 women to men, but do not report ratio in target population.

Women represent 16% of the French military. We have added this information in the method section line 183

- COSEMIL study should be referenced upon first mention.

We have added the reference.

- Some aspects of recruitment were unclear- including modality of initial recruitment post-selection (e.g., letter, email, etc) inviting participants to informational session. It's unclear if this study was conducted while on duty (i.e., encouraged by Command) or if recruitment was done outside of on duty hours.

Recruitment was encouraged by command that sent out the information about the information session. During the information session, participants were informed they were free to decline participation with no sanctions. The Command was not informed about who participated or didn't.

We have clarified these aspects in the method section, lines 197 and 202.

"Selected individuals were invited by the unit commander to participate in an information session during on-duty hours"

"In particular, participation was anonymous, and participants incurred no sanctions if they declined participation."

- Throughout the Methods and subsequent discussion, the authors reference 'depression symptoms' and 'PTSD'; however the only assessment for both conditions involved a screener. It is not appropriate or accurate to refer to 'PTSD' (yes/no/subthreshold) from a screener and no clinical interview. Therefore, this outcome should be clearly described as symptoms and a positive screen.

Thank you for this comment. We have rephrased throughout the manuscript.

- Authors use PCL to assess PTSD, but it is not clear if an index trauma was the basis for participant's

responses to the screener- in other words, was Criterion A established? There is no reference provided for the cutoffs used to categorize participants as no/low-sub- and full PTSD symptoms. 'Full' PTSD is not a standard way of describing a positive screen on PCL, perhaps the authors mean that the participant endorsed symptoms across all diagnostic criteria. Finally, it's not clear what version of PCL was used- DSM IV or 5?

The 17 Likert items of the PCL_M measure correspond to DSM-IV. We have added this information in the method section line 171. Our PTSD score is a total symptom severity score summing all 17 items. Criterion A is not included in the 17 items, but established through the set of MST questions that relate to personal experience of a traumatic event in the last 12 months.

- The definitions of various forms of sexual aggression, ranging from sexual comments to assault, is very difficult to decipher. These various forms are not set up neatly in introduction either, other than to note that cumulative effects haven't been established and that all may have effects.
- It would be useful if the authors define MST in the introduction. In current formulation, sexual harassment in form of repeated sexual comments alone is included as a form of MST, but that does not align with US VA's conceptualization (National Center) and generally seems more consistent with sexual aggression versus trauma. I think it's fine if there is a more inclusive definition, but authors should set that up in introduction and clearly establish types of MST aligned with study measures.
- In methods, authors report deriving SH/SA outcomes from three sources and reference Table 1, but Table 1 does not denote which sources the specific measures were drawn from.
- Description of models is difficult to follow.

We have revised Table 1 to report more clearly on the different forms of sexual stressors. Specifically, Table 1 provides a distribution of each type of stressor regardless of whether the respondent experienced other stressors. We report on the 4 categorical measure of MST in Table 2, which captures a graduation in the seriousness of the aggression from No MST, to sexual comments with no other stressors, to 1 sexual oppression including any form of coercion, unwanted attention or assault (with or without repeated sexual comments) and final multiple sexual stressors

We have updated the introduction to define MST (lines 116 to 121)

"Military sexual trauma defined by the US federal law as a psychological trauma resulting from sexual violation while serving on active duty, is increasingly recognized as major public health concerns, given its prevalence and health sequelae (1-5). MST involves a range of sexual violations along a spectrum of harm, from unwelcomed sexual advances, requests for sexual favours and other verbal, behavioural and or physical conduct of a sexual nature, generally referred as sexual harassment (SH) as well as attempted or forced sexual contact, characterized as sexual assault (SA) (6) "

We also updated the method section text to more clearly describe the 4 categorical measure of MST, which captures the graduation of seriousness in lines 230-234

We also created a four categorical measure capturing a graduation of MST severity as well as a cumulation of experiences 1) no MST 2) MST in the form of repeated sexual comments alone, 3) MST involving 1 type of sexual oppression (either coercion or repeated verbal unwanted sexual attention or sexual assault), 4) MST involving several types of sexual stressors including at least one form of sexual oppression.

Results

- It is not clear how results in Table 1 fit with those reported at the end of Table 2. For instance, SA among men is 3.9% in Table 1 and 3.5% in Table 2 (same n). The figures for SH do not match between tables, so explanation is needed to interpret adequately.

Thank you for spotting this error. We found an error in the code of the sexual assault variable and therefore reran the entirety of the analysis and updated all Tables accordingly. Results are mostly unchanged. We have updated the results section accordingly.

We have also updated Table 1 in response to the reviewer's previous suggestion about clarifying the different measures. Table 1 presents the frequency of each stressor, regardless of other experiences, while Table 2 presents the 4 categorical measures distinguishing exclusive categories (MST, sexual comments alone, 1 form sexual oppression and several sexual stressors).

- It's not clear where the bivariate results are presented in tables – Table 3 presents proportions but no statistical tests.

We did not add p values in Table 3 to improve readability but have added p values in the text lines 298, 322 and 323.

- In reporting results, authors use terminology that suggest a longitudinal design which is misleading at best. For example, p 7 line 162, authors report that depressive symptoms 'rose' among women with MST, when in fact changes in symptoms over time was not assessed. Rather the findings show that one group had significantly higher symptoms, so had greater likelihood of reporting depressive symptoms. P 8, 'we found that mental health sequela increased as forms of aggression became more severe' is not reflective of study design or results. This language should be corrected throughout to accurately represent findings.

We have revised the language accordingly line 295.

"Thus, the proportion of depressive symptoms was higher among women who experienced repeated sexual comments alone, as well as women who experienced one form of sexual oppression (coercion, repeated verbal unwanted attention or assault) or multiple sexual stressors compared to those who reported no MST ($p=0.002$)".

Discussion

- Although the topic is clearly of high importance, the unique contributions of the study are not clear, or the case could be made stronger. The relationship of ST and psychological effects is well-established in the civilian literature, and there is a literature on effects in the military. Some of the review articles citing relevant literature in military settings is not referenced, e.g., <https://pubmed.ncbi.nlm.nih.gov/31975872/>). If the main purpose of the study is to test relationships established in US context or/and to establish prevalence of SA, that should be made clearer. If it is to establish prevalence, the small group of women participating would make this a weaker design for that purpose. If it is to show effects of MST, the novel contributions need to be made clearer (even in a more comprehensive review of what is or is not known for French military).

As now noted in the introduction, this study is the first to evaluate recent MST sequela in the French military, and more generally to assess MST sequela in none US settings. They contribute to the generalizability of previous research, replicating those results in a different setting, using a different sampling methodology (probability sample instead of convenience sample or administrative data set, which only records MST and mental health among individuals who report MST and consult a healthcare provider.

We have summarized the contributions of the study at the end of the discussion.

- 1) We show that common forms of verbal sexual stressors mostly neglected from SA prevention programs affect women's mental health,
- 2) We reduce selection bias by using a probability sampling strategy rather than convenience or administrative VA data. Most research in the US do not rely on probably sampling or have response rates of about 20%. VA administrative data mostly reports on veterans rather than active duty, and are therefore unable to adjust for workplace environment. In addition, like facility-based data, they can only capture recorded MST and mental health among those who consult and report these issues to a provider,
- 3) This is the first study to investigate MST sequela in Europe. Therefore our study contributes to the generalizability of MST sequela findings among women, which have almost all been based in the US. Unlike the few studies that test for gender differences, we find stronger associations for women than men. A lack of policies and programs addressing women's needs in the French military compared to the US may partly explain these results, but we believe our results call for more qualitative work to understand gender differences in context as gender disparities seem to vary across studies. We have added a sentence to this effect in the discussion section line 407.

- Authors note in limitations that cross-sectional design prohibits causal interpretation, but that findings are largely consistent with other research, again bringing the impact into question for the study in terms of knowledge contributions.

The replication of study findings in different settings using different sampling methodologies is important in establishing generalizability. In addition, while cross sectional, the study investigates recent events (MSt in last 12 months and current PTSD and depression scores). This allows for adjustments that are not possible in retrospective cohorts where data on the workplace environment are not available.

We have added a sentence to this effect in the discussion line 420. "In addition, the cross sectional design allows investigation of recent events (MSR in the last 12 months), while adjusting for workplace environment, data that are not available in retrospective administrative data.

- The gender differences are not really interpreted sufficiently in the discussion.

There are few studies reporting on gender differences in MST sequela (as noted by Bell's review) and all of the research is conducted in the United States among non representative samples. We find a stronger association for women than men which has not been reported in the past. While we do not have an explanation of the gender disparities based on the current data we suggest qualitative data would be useful to better understand how women's experiences and mental health needs are different from men to guide an institutional response.

We have added a paragraph in the discussion to discuss gender differences line 384

Contrary to previous reports (7), we found a stronger association between sexual stressors and psychological distress for women compared to men. The reason for these gender discrepancies is not known and calls for qualitative research to better understand how men and women experience and cope with sexual stressors in the

French military context to guide the institutional response. The need to address women's psychological distress is pressing as they suffer the cumulative burden on being more likely to be exposed to MST, to more severe forms of MST to suffer greater psychological sequelae from these sexual stressors.

- The authors remark that the small sample of women is a limitation of the study, particularly given the focus on MST. However, they report a 76% participation rate, so it's not clear why they were underpowered for these analyses – did women have a lower response rate, for instance? Additionally, authors note that women were oversampled (1 woman for every 5 men), but the ratio of women to men serving in the French military was not reported.

We have now provided this information in the method section line 183. Women account for 16% of the French military. Given budget constraints and study feasibility (mobilization of multiple military units) it was not possible to enroll more military units. The study was not initially designed to assess the health sequelae of MST but given the prevalence of recent exposures, and the absence of data in the French army, we felt it was important not only to evaluate the prevalence and circumstances of MST (currently considered for publication in another journal) but to estimate the mental health impact to inform a public health response.

- Making policy recommendations based on a cross-sectional design, IF the goal is to assess association of MST with effects (vs prevalence) seems problematic.
Our study is the first to estimate MST and its association with mental health in the French military. Whether causal or not, we believe the level of MST and psychological distress and the strong associations observed are an impetus for action in the French army as there is no systematic MST and mental health screening in place and the French military healthcare providers need training and resources to address potential MST health sequelae.

Reviewer 2

Thank you to the authors for this engaging, well written, well executed and extremely important piece of research. I believe this research makes an important contribution to existing literature, expanding evidence beyond the lens of the US military to raise awareness of the prevalence of MST in France, the impact on mental health, and the need for immediate action.

I have a few comments which I believe need to be addressed before publication, but are really minimal revisions.

Background:

- What are the notable differences between the French and US military experiences and environment that might be worth including here?

- page 3 line 60, are these % of SH and SA in France relevant to SH and SA in a military setting only, not outside of?

The percentage

- line 64 - why might MST have more damaging health consequences for military compared to civilians?

We have added a sentence discussing the potential reasons why sexual stressors may have greater impact among military populations line 131

"In particular, military personnel are at heightened risk of re-victimization given their living conditions and face multiple barriers to accessing support, due to deployment, fear of social ostracism, and professional sanctions (1,4,8)"

Method:

page 6 line 31, should it be 'and' rather than 'or'?

Thank you, we have made the correction.

- was data on race and ethnicity collected? If not this should be a limitation, experiences of black and Asian women and men are likely to be different to white women and men.

We agree but for historical reasons (use of administrative data to deport Jewish families in France during WW2) it is mostly prohibited to collect data on race ethnicity. The CNIL (national ethical oversight agency) mostly disapproves any question on race and ethnicity. We traditionally use nationality and place of birth as potential indicators of discrimination. We have indicated this in the discussion line 423.

Results:

Table 2: Sexual orientation - does one have to of had sex to know their sexual orientation, someone could know they are attracted to the same sex and not the opposite sex and vice versa, even if they have not engaged in sexual activity. I'm not sure if you can do much about this now - but I think this is important to note or consider if there is another way to report that information - this categorisation could be considered reductionist and ill-informed.

We fully agree with this comment and have rephrased to “same sex partnerships” lines 236 & 343 and in the Tables

- PTSD measured using the PCL - M, what limitations might this have, in addition to being less sensitive to trauma experienced outside of the military, is it also less sensitive to sexually related trauma? The PCL-S, anchors to a specific trauma, and therefore is more likely capture PTSD related to sexual trauma than other PCL measures. However, to our knowledge, there are no studies comparing the association between different PCL measures and MST. We chose the PCL-M scale because it had been validated in a French military population and is the most widely used to explore MST sequela in military settings.

Discussion:

Page 8 line 202 Department of Defence - capital D's

We have made the correction.

- I'm not sure that I agree with using the term 'sexism' as this seems to minimise the experience of sexual harassment, which while sexual harassment may be motivated by or have an underlying mechanism of sexism, is more than mere sexism - it is enacted/behaviour which can be threatening and traumatic. I would consider rewording this to avoid minimising the experience of harassment.

We have reworded to verbal sexual stressors line 391.

Conclusion:

Page 9 line 234 - 'poor psychological...' is there a word missing here?

We added the word “health”

****Our flexible approach during the COVID-19 pandemic****

If you need more time at any stage of the peer-review process, please do let us know. While our systems will continue to remind you of the original timelines, we aim to be as flexible as possible during the current pandemic.