Reviewer's report

**Title:** Peer-based behavioral health program for drug users in China: A pilot study

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**Reviewer:** Patrizia Carrieri

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This study reports results from a peer-based intervention for HIV risk reduction for drug users detained in rehabilitation centers.

The design of the study is a non randomized interventional study with 2 groups: one group is represented by individuals exposed to a peer-based educational intervention for HIV-STI risk reduction while the “control” group receive a standard intervention for HIV-STI risk education provided by health staff. Three assessments are planned for each individuals enrolled in the study: at baseline (M0), at approximately 3 months (M3) and between 2 (?) and 23 months which is the last assessment (ML). For reasons of feasibility, the intervention group is enrolled in one center while the “control” group is enrolled in another center. At baseline the two groups differ for sex, ethnicity and education. Individuals enrolled in the intervention group had a lower educational level.

The outcomes were improvement in HIV knowledge, and behavioral change (injection and sexual) measured at M3 and ML.

The paper reports an interesting experience in a context with recent major improvements in access to care for opioid dependence with methadone program scale-up. However, the criminalization of drug use and the following forced treatment create a context where peer-driven intervention could have their place and potentially have a significant impact on HIV-knowledge and risk behaviors.

The introduction is well written and the rational of conducting this study appropriately developed, but the results and their interpretation in the discussion could benefit from an additional analysis.

1. It is unclear whether the intervention was conducted only between M0 and M3 or even later.

If a person received more than on intervention this should be recorded and the impact of the number of interventions on the outcomes at M3 and ML studied.

The authors should report the fact that the peer-intervention was the same for all enrolled individuals in the intervention group if true and indicate when it was conducted. otherwise explain differences.

2. The second point which remains unclear is when the second asessement was performed. There is a great variability and it is possible that, if the intervention is not repeated, individuals assessed later could report more HIV-risk behaviors and exhibit lower levels of HIV knowledge.
I will provide suggestions about how to control for this variability in the statistical methods comments (point 4).

3. If possible, it would have been useful to compare those who refused participating and participants.

4. The authors compare outcomes between the intervention and the control group separately at M3 and then at ML. This makes sense but a statistical analysis taking into account the longitudinal design of the study and the baseline difference in the group to be compared would have been more appropriate.

In other words, the authors should conduct an analysis using a mixed model for each outcome (linear or Poisson model) to take into account the two repeated measures on the same individual at M3 and ML.

This model should include the term indicating the type of intervention (peer-drive vs. standard one) and be adjusted for baseline knowledge, the variables which are different at baseline for the two groups (sex, ethnicity, education) and include a time variable to assess temporal trend of the outcomes. This would allow the authors to better appreciate the differences between the 2 groups, considering that the peer-intervention group has lower level of education and this could affect the comparison towards the null hypothesis (we presume that individuals with lower levels have more difficulties to learn the new concepts during the peer-education intervention). In other words, if the baseline education level is not entered in the model it is possible that the true differences between the two groups are under-estimated.

5. Sensitivity analyses: The heterogeneity of the time of the second assessment should be taken into account in the analysis, by classifying individuals according to whether the second assayessment ML took place within the first or during the second year. 

Once the authors have identified the final mixed model for the whole dataset and evaluated the impact of the peer-driven intervention, they can perform two sensitivity analyses. The first will run the final mixed model identified on a restricted dataset, i.e. excluding those whose second follow-up occurred in the second year. The second sensitivity analysis will run the same model on a different restricted database by excluding those whose second follow-up occurred during the first year.

This sensitivity analyses will allow the authors to confirm the impact of the peer driven intervention in the short and long term. If the numbers are too small, the variables significant when using the whole data-set may be no longer significant in the subgroups, but it is important to verify that coefficients are similar to those obtained from the whole dataset.

6. The authors added more individuals in the control group due to unexpected attrition rate; I think it would be better to add this information clearer since the beginning in the methods section and incorporate them in the comparative analyses with the control group. No intermediate analyses with the partial set of individuals in the control group should be conducted as this may be misleading for the reader.
7. The English should be revised as some paragraphs are not completely clear.

**Level of interest:** An article of importance in its field

**Quality of written English:** Not suitable for publication unless extensively edited

**Statistical review:** Yes, and I have assessed the statistics in my report.

**Declaration of competing interests:**

I declare that I have no competing interests