Reviewer's report

Title: Educating on professional habits: Attitudes of medical students towards diverse strategies for promoting influenza vaccination

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Reviewer: James A Feldman

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Review

"Educating on professional habits: Attitudes of medical students towards diverse strategies for promoting influenza vaccination."

This is a non-randomized cluster trial that attempts to examine the effects of three strategies to encourage influenza vaccination among 538 medical students in Barcelona, Spain. The goal of increasing vaccination rates among medical students is clearly important and there are limited studies that have examined various strategies to increase participation rates. Although the objective is important, I believe that revising the study to indicate that this is an exploratory or pilot study would be consistent with the limitations and threats to validity that are described in detail below. Given that prior influenza vaccination is likely such a powerful predictor of future vaccination, the target for any intervention strategy would exclude those with prior vaccination in order to measure the effect of any intervention strategy.

Major limitations:

1. This is a cluster trial in that the interventions are assigned to the class (group) level. However, the authors do not provide a power calculation based upon the cluster design nor is the effect of clustering considered in the analysis. The group assignment was not randomized. The clusters do not appear balanced (78 in the web, 15% with ward experience (noted by authors)).

2. The interventions are not described with sufficient detail. Was the tri-fold brochure just distributed? How was the video presented? The authors should describe how the interventions were actually administered in greater detail in the Methods. Was there any measurement of whether the students were actually exposed to the intervention (read the brochure, went to the web etc)?

3. The survey instrument was administered only once after the intervention. The authors attempt to use regression methods to determine whether a strategy was associated with the outcome of “intent to get vaccinated.” Association should not be considered causative without a pre-post measure immediately before and after the exposure.

4. The outcome measure “intent to get vaccinated” may not be the same as actually getting vaccinated.

5. Analytic plan. The authors have used a stepwise logistic regression model.
Many epidemiologists would discourage such an approach for model building. The authors do not provide a description of the model performance (goodness of fit- R squared, Hosmer and Lameshow, c statistic) as recommended for the reporting of logistic models. Were any of the variables such as having previous vaccination tested for multicollinearity with predictors such as “recommend vaccination” since model building assumes independent predictors?

6. Limitations- the authors state that the major limitation is that the Web contained fewer students. One cannot draw valid conclusions about the effectiveness of any of the strategies in modifying influenza vaccination in the target population. A before-after design, demonstrating that the student was exposed to the intervention and including as an outcome measure the proportion actually receiving the vaccine would be required to indicate that any intervention strategy modified behavior. Previously vaccinated students would best be excluded from a study that tests the effects of an educational intervention on planned or completed influenza vaccination. The conclusion that “offline strategies may not be as effective” or that any specific strategy is more effective should be framed within the limitations of this study.

Other limitations:

7. Non-response bias. The authors could describe the nonparticipants-characteristics if known, group assignment etc.

8. Please clarify P.6 the response to the question “hospital counts on them for vaccination promotion” conclude “no significant difference to this question p=0.008 comparing quite a lot or a lot to the other options- Please comment.

9. Table 1-include proportion by group who had prior vaccination

Summary:

The paper could be revised to indicate that this was an exploratory or pilot investigation designed to 1) determine factors predictive of intention to obtain the influenza vaccination among Spanish medical students and 2) examine potential educational strategies to increase the proportion of students who get vaccinated. The major finding from the study seems to be that prior vaccination is a very powerful predictor of future vaccination intent. A more rigorous investigation would be required to determine whether an educational intervention can significantly affect vaccination behavior and whether a specific type of intervention is more effective. Finally, the authors could consider an educational campaign to increase medical student vaccination in the context of the extensive literature to improve health care worker vaccination rates. Other strategies that could be considered to increase vaccination rates include a “vaccine day” or making vaccination readily available to the classes, instituting a mandatory vaccination policy etc. According to several reviews, including the APHA (see http://www.apha.org/advocacy/policy/policysearch/default.htm?id=1410) even aggressive campaigns to increase influenza vaccination do not achieve a target of 70% without a mandate.
Specific review comments for BMC Education

1. Is the question posed by the authors well defined? Yes, the question is well defined.

2. Are the methods appropriate and well described?- No, the methods are not provided with sufficient details about the interventions. There is no sample size based upon an estimated effect of the intervention strategy in a cluster trial. The instrument was only administered post intervention. This is a major concern when one tries to draw conclusions about the effect of an educational intervention on attitudes or behavior (planning on getting the vaccination).

3. Are the data sound? See above comments regarding study design, analytic plan.

4. Does the manuscript adhere to the relevant standards for reporting and data deposition?
   The authors do not report the performance of the logistic model, testing for multicollinearity and use a stepwise model to adjust for confounding.

5. Are the discussion and conclusions well balanced and adequately supported by the data?
   The conclusions are more definitive than would be appropriate for the study given the major limitations. Presenting this as an exploratory or pilot study would seem more appropriate.

6. Are limitations of the work clearly stated?
   No. See above.

7. Do the authors clearly acknowledge any work upon which they are building, both published and unpublished?
   The references are appropriate regarding medical student influenza vaccination. I believe that the authors could place the vaccination of medical students in the context of the literature on interventions to improve vaccination in health care workers. One would suspect that if the goal is to achieve a very high rate of vaccination, educational interventions are unlikely to be effective as the sole strategy. The authors could briefly discuss the effect of educational interventions (and other strategies) on vaccination acceptance in other health care workers.

8. Do the title and abstract accurately convey what has been found?
   Yes

9. Is the writing acceptable?
   The paper is clearly written.

**Level of interest:** An article whose findings are important to those with closely related research interests

**Quality of written English:** Acceptable
**Statistical review:** No, the manuscript does not need to be seen by a statistician.

**Declaration of competing interests:**

I declare that I have no competing interests.