Reviewer's report

Title: Exploring the gap between hand washing knowledge and practices in Bangladesh: a cross-sectional comparative study

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Reviewer: Robert Aunger

Reviewer's report:

This study reports on the effectiveness of an intervention project in Bangladesh to increase handwashing over five years with five messages on hand washing practice. This BRAC study is a very large one (nearly 30K households), at national scale, but exhibits a number of weaknesses, as the authors note in their discussion. First, behavioural data is self-reported (although reported rates of handwashing are surprisingly low before eating; those after defecation are closer to those commonly reported elsewhere). Second, there was no control group, making it difficult to eliminate secular effects. Third, there are no indicators of knowledge of program messages or contact with project delivery to associate with observed changes in behaviour, making a causal link between project goals and outcomes difficult. Due to these flaws in study design, the results are quite weak, despite the large sample size. (Indeed, this raises the question of why such a large sample was felt to be necessary?) This is a pity, as relatively simple changes to design could have made the study much more meaningful.

As for the results themselves, the results concerning education, water availability, and handwashing material availability have been seen in many previous studies of handwashing (in fact, the socioeconomic factors are seen in nearly any intervention study). The access to TV effect could be due to exposure to other handwashing messages in advertising. The gap between knowledge and practice is universal. So there is very little that is novel here.

Nevertheless, the paper should be published to document this large-scale effort to change behaviour, even though it provides only weak support for the program. I would therefore advocate publication, with more detail about the intervention materials and delivery methods, improved statistical rigour in the presentation of the results, and acknowledgement of the design weaknesses to aid readers with interpreting the study's significance.

Minor Essential Revisions
1. Figures should include error bars to show significance of the results.
2. It would help interpretation and potential use by other handwashing projects to know the content of the messaging, and to know the method of delivery of the messages (which could coincide with the TV result if broadcast, for example, and provide some indication of exposure to BRAC messaging).
3. Table 3 indicates the biggest effect is being a member of an NGO. What does
this imply for handwashing? Is it likely that NGO members are exposed to other health-related programming than the BRAC effort?

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

Quality of written English: Needs some language corrections before being published

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.