Reviewer’s report

Title: Does Korea have hidden female smokers? Smoking rates according to self-reported surveys versus biological markers

Version: 4
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Reviewer: Igor Burstyn

Reviewer’s report:

This is a very important paper that is generally well executed. However, there are some methodological deficiencies and simplifications in presentation that can improve the quality of the article further. The MAJOR COMPULSORY REVISIONS follow:

1. Statistical significance test (Chi-square) and estimates of kappa’s (measured of agreement) are irrelevant to aims of the manuscript. I strongly advise to remove them as they are merely a distraction.

2. It is common for national survey to employ sampling weights and to incorporate these in analyses, as is the case with data used by the investigators: http://www.ncbi.nlm.nih.gov/pmc/articles/PMC4017741/. This matter is important to estimates of prevalence of smoking, at the very least. Please re-estimate prevalence using sampling weight to allow inference to source population (main aim) rather than just the sample (of little general interest or use for policy).

3. The authors admit subjective nature of cut-off of cotinine test in defining true smoker (in methods and discussion top of p 10). There is a method to incorporate this uncertainty in analysis instead of making a subjective/random choice. Please see http://www.ncbi.nlm.nih.gov/pubmed/19395685 and incorporate features of their approach into your calculation.

4. Results: please present 95% confidence limits on all percentages and proportions; these will be affected by sampling weights in the case of prevalence at the very least (see above).

5. Table 1: remove p-values and replace them with 95% CI: hypothesis-testing is irrelevant to the main aim because estimation of the magnitude of effects is more important than whether there is qualitative difference in numbers among various strata. The 95%CI should reflect uncertainty in definition of smoker (see point 3 above).

6. Table 2: add 95% CI. It is also important to present raw counts of self-reported and “true” smokers (based on cutoff adopted for the used in the paper). To achieve this, I request additional table that just has the raw counts, new Table 2. Then the following table (new Table 3) will be as current Table 2 (leaving out kappa) but also showing 95%CI that reflect further uncertainty in definition of smoker (see point 3 above). Please note that there is no limit on pages in on-line
journals so huge tables are OK and, in fact, most desirable here.

7. 235-241: the arguments about importance of government policies and need for more money to further decrease smoking rate is rather naïve and most likely wrong. In any case, it does not relate to aims of the paper. The authors could say that they problem of women in Korea smoking is clearly underestimated but they should abstain from offering solutions because they did not study the issue; it is for this very reason that there was a long-standing and very wise ban on discussion policy implications of empirical survey in top epidemiologic journals. Please do not mar excellent technical analysis by extremely superficial lip service to policy analysis: leave that for another paper.

**Level of interest:** An exceptional article

**Quality of written English:** Acceptable

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

**Declaration of competing interests:**

I do not declare any COIs.