Author's response to reviews

Title: Does South Korea have hidden female smokers? Discrepancies in smoking rates between self-reports and urinary cotinine levels

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Author's response to reviews: see over
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With best wishes

Ms April Rada
on behalf of Prof Amy Eyler

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Reviewer's report
Title: Does Korea have hidden female smokers? Smoking rates according to self-reported surveys versus biological markers
Version: 4 Date: 18 August 2014
Reviewer: Sun Kim

Reviewer's report:
Although the manuscript provides valuable information on the characteristics of Korean women who are more likely to underreport their smoking, it cannot be accepted in its current state because it has many flaws.
First, the introduction lacks information about the strong gender-based social norms toward smoking in Korea.

- Information on gender-based social norms toward smoking in Korea is now included.

Second, the method section is not clearly described. The authors use Korea and South Korea interchangeably. Please be consistent with either Korea or South Korea.

- The methods section has been revised and expanded. I now use South Korea whenever possible. When only the word Korea is part of a proper name, I leave it unchanged.

In addition, the authors erroneously assert that the current work is the first one reporting hidden female smokers in Korea. The first study was done by Jung-Choi et al. (2012) that was cited in this paper. Above all, the manuscript is not suitable for publication unless it is extensively edited. For details, please see below.

- I regret having implied that this is the first study reporting hidden female smokers in Korea. I have revised my description of this study's original contribution as follows:

This is the first study to analyze the annual trends of actual smoking rates in South Korea by reflecting the results of biomarker tests.

- I revised my paper after receiving your comments and those of your fellow-reviewer, and had it edited by a professional editor. It was edited for readability, sentence structure, and grammar. I believe it is now suitable for publication.

Title:
Please consider changing the title to something like this: Discrepancies in smoking rates between self-reports and urinary cotinine levels: A case of women in Korea.

- Your suggestion is persuasive. So I changed the title partially, as follows:

Does South Korea have hidden female smokers? Discrepancies in smoking rates between self-reports and urinary cotinine levels

Abstract:
1. The first sentence is somewhat misleading given that Korea is a developed country.

- Thank you for pointing this out. I have revised this sentence and a sentence in the Background as follows:

Female smoking is perceived very negatively in East Asian countries such as South Korea, Japan, and China, as well as in Islamic countries. These countries show much greater gender differences for smoking than America and European countries.

2. Line 24, change “that” to “those (i.e., data)"

- I now refer to data in the plural form throughout my paper.
3. Lines 25-27, the sentence is not clear. Please consider revising.
   - I have had my paper edited for readability, sentence structure, and grammar.
4. Line 28, please delete, “In addition” because a chi-square must be conducted in order to compare smoking rates between self-reports and urine cotinine levels.
   - I revised this sentence. The other reviewer advised me to remove chi-square. So, I removed it and added the number of participants, 95CI and gap(SRs value – UCC value).
5. Lines 33-34, please consider revising the sentence. For example, “The rates of smoking among women 7.1% based on self-reports and 18.2% by urinary cotinine tests, and the rates for men were 47.8% and 55.1%, respectively.
   - I revised the sentence to read as follows: The current smoking rate among women is 7.1% based on official smoking rates, and 18.2% based on urinary cotinine tests. The rates for men are 47.8% and 55.1%, respectively.
6. The negative predictive value for men was lower than that for women. Is this correct?
   - Yes. I checked again and added the 95% CI.
7. One single study cannot confirm but only supports the notion that hidden female smokers exist in Korea.
   - I realize that my meaning was not clear. I meant to convey that even though self-reported studies are used to estimate the rates of smoking, because they are convenient and economical, they tend to underestimate the real numbers because smoking is not socially desirable, and people will under-report for that reason. I have written this clearly now, and have three references to support my statement [5-7].
8. Lines 40-41. Please revise the sentence using “although the difference was steadily decreasing.”
   - I have changed this sentence to read as follows:

   This study shows that the actual female smoking rate is significantly higher than that reported officially, but also that the gap is decreasing steadily.

Background:
Lines 50-51, please delete with regard to smoking because they are redundant given that the words, “This gender difference” refers to smoking.
   - Thank you. The words have been removed.
Line 52, please delete the words “in smoking according to gender” because they are redundant.
   - They have been removed.
Lines 54-55, a grammar error in “the male smoking rate is at least ten times the female smoking rate.” Also please provide references to support the statement.
   - This phrase has been removed.
Lines 58-59, change a National Health Promotion Law to the National….
   - I have changed the reference to the Law for the Promotion of the Nation’s Health. The sentence now reads as follows:

   However, both an anti-smoking campaign initiated by citizen activists in the late 1980s, and the introduction of the Law for the Promotion of the Nation’s Health that regulated smoking in 1995, have affected South Korea’s smoking rates which have been steadily decreasing.

Line 59, change smoking rate to smoking rates.
   - This change has been made.
Line 59, please consider using a different verb such as “affected” instead of “caused.”
   - I have used the word affected, as suggested.
Lines 66-69, revise the sentence stating from “Consequently” because the sentence does not flow from the previous one with the transitional word.
• I have had my entire paper edited for readability, sentence structure, and grammar.
Lines 71-72, please revise the sentence for the flow of reading.
• I have had my entire paper edited for readability, sentence structure, and grammar.
Line 75, change estimate to the past tense and this sentence needs citations.
• I have addressed this point.
Lines 80-81, please revise the sentence using correct grammars.
• I have had my entire paper edited for readability, sentence structure, and grammar.
Lines 80-84, A significant discrepancy in Korean female smoking rates between self-reports and urinary cotinine levels has been previously reported. So, please state clearly what the main purpose(s) of the study was (were) and what the study would add to the existing knowledge in the field.
• I now describe the aims and contribution of this study as follows:

The aims of this study were, first, to compare smoking rates based on self-reported survey results and UCC test results, and second, to estimate actual smoking rates by year using a biological marker. It is the first study to analyze the annual trends of actual smoking rates in South Korea by reflecting the results of biomarker tests.

Methods:
The font size should be consistent throughout the main text.
• I am now using Helvetica 11 for the main text.
Please describe more how the data were collected. Were there any subjects selected more than once during the assessment period? Were the participants randomly selected or conveniently recruited?
The following text is excerpted from my revised paper, and addresses your questions.

The KNHANEs 20 households were selected from 192 areas by probability sampling. The primary sampling unit was administrative unit (i.e., eup-myeon-dong), the secondary sampling was done by census, and the tertiary sampling was done at the household level. All members of the selected households were included as survey participants.

This survey comprises three areas: physical examinations, health-related surveys, and nutrition surveys. During the study period, examiners visited different areas using a mobile examination vehicle and conducted check-ups that include blood and urine tests, X-rays, and oral examinations. The examiners also conducted a self-reported health survey that posed questions regarding health behaviors, clinic use, and quality of life. One week following the check-ups and health surveys, a nutritional survey was conducted through a home visitation. In principle, all participants were investigated in all three areas. The SRs were carried out during face-to-face interviews.

Data were gathered from a study population of 26,593 adults over 19 years of age who responded to the question regarding smoking on the KNHANEs between 2008 and 2011. From the above population, 14,086 respondents were selected for further analysis, because their urine-cotinine data were made available for use. The survey was approved by the Institutional Review Board (IRB) of the KCDC (approval nos.2008-04EXP-01-C,2009-01CON-03-2C,2010-02CON-21-C,2011-02CON-06-C). The KNHANEs has a stratified multistage sampling design that examines all household members above the age of one.

There was no description of measures used in the study. The authors should have briefly
introduced these measures.

- A sub-heading called Measures is now included, as follows:

  The current smoking rate is based on the definition of a smoker as someone who has smoked at least 100 individual cigarettes in his or her lifetime and who, at the time of interview, reported smoking every day or some days. Measurements of urine-cotinine concentration (UCC) are taken using gas chromatography-mass spectrometry, specifically with the detector model Clarus 600T of Finland PerkinElmer. The indicators used in the measurement are cotinine and diphenylamine (Aldrich, USA). The UCC threshold for identifying smokers is generally set at 20–100ng/ml [7, 12, 13], but the Society for Research on Nicotine and Tobacco has suggested that the standardized threshold of urine cotinine be set at 50ng/ml [14]. It should be noted that this suggestion for standardization reflects a Western model that does not necessarily apply to the characteristics of South Korea or other Asian countries. In South Korea, for instance, studies involving interviews and longitudinal observations of certain populations have suggested UCC thresholds as low as 20ng/ml can indicate smokers [15]. Admittedly, however, such a low threshold is not sensitive to the detection of cotinine owing to unrelated factors such as secondhand smoking. Therefore, the present research used one of the generally accepted threshold levels of UCC $\geq$ 30ng/ml[16].

Lines 90-95, please reorganize the whole paragraph by clearly stating how the sample of the KNHANES was selected and who interviewed participants.

- Some sentences were added and the paragraph was reorganized.

Lines 95-96, please consider deleting the sentence starting from "It was conducted" because the study included data only collected between 2008 and 2011 during which the survey was conducted annually.

- This sentence has been removed.

Lines 100-105, this paragraph describing data collection should appear before Measures.

- Thank you. I have moved this information to appear before Measures.

Lines 101-102, describe how participants were informed about the mobile health examination. Did the study include any individuals visited the mobile examination site? Were there any inclusion and exclusion criteria?

- I added some additional information.

Lines 107-108, the definition of current smokers differed from what is widely adopted in literature. To be current smokers, individuals should have smoked at least 100 cigarettes in their lifetime and are also currently smoking either every day or some days.

- The definition used is that followed the CDC and KCDC:Persons who reported smoking at least 100 cigarettes during their lifetime and who, at the time of interview, reported smoking every day or some days.

Results and Discussion sections also contain many grammar errors and unclear statements and should be revised with editorial help. From now on, I will only address content issues.

- Thank you for your comments. I have had my entire paper edited for readability, sentence structure, and grammar.

**Results**

Please consider using self-reported rates instead of official smoking rates. Please report chi square values on significant differences between self-reports and urinary cotinine tests for men and women.

- The text now reads as follows:

  The current smoking rate of adult males according to the SRs is 47.8%, while the
current smoking rate according to the UCC is 55.1%. The smoking rate among males was 55.1% according to the UCC, which is 7.3% higher than the official smoking rates (SRs). In particular, the female smoking rate according to the UCC (18.2%) was more than twice as high as the official smoking rate indicated by the SRs (7.1%).

Another reviewer commented that the statistical significance test (Chi-square) and estimates of kappa’s (measures of agreement) are irrelevant to aims of the manuscript and strongly advised me to remove them as they are merely a distraction. For this reason, they have been removed.

Line 137, it seems that the results reported from this line are based on the self-reported smoking rate. If this is the case, the line should start with a new paragraph.

- I revised the statement.

Lines 139-141, what is the base of comparing smoking rates between single-person and two-or more-person households?

- I revised the statement and reorganized the paragraph.

Discussion

Lines 183-184, please revise the sentence because it is somewhat misleading given the study by Jung-Choi (2012) reported the same finding.

- I revised the statement as follows:

  The present study assesses the response accuracy of SRs regarding smoking status in South Korea using UCC. It is the first study to analyze the annual trends of actual smoking rates in South Korea by reflecting the results of biomarker tests.

Lines 188-190, it is difficult to understand the statements? I am not sure whether the accuracy differences by gender was larger in South Korea than any other countries or is larger in some other countries than in South Korea?

- The accuracy difference between genders is larger in other countries than in South Korea. This information is now included in the paper.

Please discuss more about the findings regarding the decreasing rate of participation in urinary cotinine tests and what may have contributed to the decrease.

- This discussion has been revised as follows:

  Unfortunately, KNHANEs no longer performs urine-cotinine tests as of 2012. There are two reasons for this: the government tobacco policy budget decreased and the fact that hardly any studies utilize this indicator. The present study shows that the accuracy of the smoking rates as reported by SRs was very low, especially among females. Therefore, to accurately gauge smoking rates, it is necessary to reinstitute, consistently study, and utilize the tests in this category.

Reviewer’s report

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

Version: 4

Date: 25 September 2014

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.

- References to statistical significance and estimates of kappa have been removed from the text.

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).

- The detailed calculation process, which was absent from the methods section, has been added. In all calculations, individual weighted factors were used according to the KCDC guidelines. In addition, integrated weights were applied due to the merged years.

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.

- The ROC curve (optimal point) of the current data indicated the following values: overall 106 ng/ml, male 136 ng/ml, and female 72 ng/ml. However, our research team considers these figures too high. The gold standard specified by the SRNT (Verification. Biochemical verification of tobacco use and cessation. Nicotine Tob Res 2002;4:149e59.) is 50 ng/ml. Previous studies conducted in South Korea proposed a lower cut-off point of 20 ng/ml (Kang, 2003). UCC is a biomarker with relatively low sensitivity to passive smoking (Haufroid, 1998). Furthermore, considering the fact that the frequency of being exposed to intensive second-hand smoke is very low in South Korea, the current study selected 30 ng/ml as the cut-off point.

- In addition, I have checked the article you suggested. Given that UCC data were available for only some of the subjects in the database used for the study, a real smoking rate prediction method based on Bayesian theory was considered a suitable approach, and hence added.

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).

- I have added this information.

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).

- I removed the p and added the 95% CI, number of respondents in Table1.

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.

- I added the 95% CI and number of respondents.

7. 235-241: the arguments about importance of government policies and need for more money to further decrease smoking rate is rather name and most likely wrong. In any case, it
does not relate to aims of the paper. The authors could say that their 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.

- I have now removed this.

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.