Author's response to reviews

Title: Evidence of an Emerging Hookah Use Trend among University Students: A Cross-Sectional Comparison between Hookah and Cigarette Use

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Author's response to reviews: see over
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Thank you for the opportunity to revise our manuscript. Based on the feedback, we have made extensive changes. We believe that the new manuscript is now much more concise and appropriate for the readers of BMC. We understand that the manuscript will need re-review and look forward to the reviewer’s thoughtful consideration.

**Editorial changes:**

1. Please include some context information in the Background Section of your Abstract.

   We added two sentences to lead into the project but also maintain the concise nature of the abstract format.

2. Competing interests - Please include a 'Competing interests' section between the Conclusions and Authors' contributions. If there are none to declare, please write 'The authors declare that they have no competing interests'.

   This information has been added – none of the authors have any competing interests to report.

3. Authors' contributions - Please include an 'Authors' contributions' section before the Acknowledgements and Reference list.

   This section has been added to reflect the joint and extensive efforts for this manuscript.

4. You indicated that the study was approved by the IF IRB - please define IF.

   It is the UF IRB which was defined previously. We verified that this is correctly reflected in the manuscript. We are happy to revise and re-state University of Florida if needed.

**Referee 1:**

**SPECIFIC COMMENTS**

**MAJOR COMPULSORY REVISIONS**

1) The purpose of this study indicates the survey was aimed at assessing multiple types of tobacco use, but the Introduction focuses primarily on the background literature of cigarette and hookah smoking. I suggest reorganizing this section, and including a broader overview of recent changes in the tobacco product landscape.
We apologize for the confusion and appreciate this concern. Taking into consideration all of the responses from both referees, we have decided to focus the paper to better detail the relationship between hookah and cigarettes. While the original survey was intended to assess multiple tobacco product use, there remains less prevalence of smokeless (especially snus) than was predicted for college populations. Additionally, there is little information regarding cigar use that this paper adds. The story that this survey yielded was the ever-growing popularity of hookah and how it relates to cigarette use. We feel this new version is a much more concise presentation of findings with a depiction of the relationship.

2) The methods section lacks important information about why hookah specific questions were included (i.e., where and with who used). Are there additional questions for other tobacco use methods that are not reported here?

We didn’t explain clearly the first time what we had asked. Here is the revised information from the methods section:

Respondents who reported hookah use were also asked to describe the social setting, whether they smoked with others or alone, and where they typically smoked hookah.

The paragraph in the results section that relates to this information is:

Among hookah smokers, the vast majority (73%) reported ONLY smoking with friends/others and an additional 22% reported usually smoking with friends/others. Only 4% reported usually smoking by myself while no one reported ONLY smoking when by myself. With regard to location, nearly all (90.2%) reported smoking in a restaurant/café/bar; 85.4% reported also smoking in a friend’s home/apartment; 51.4% reported smoking in their own home/apartment or dormitory; and 7.3% reported smoking in their parents’ home/apartment.

These results were in the original manuscript and remain in the revised version. With the now more concise focus of hookah and cigarettes, hopefully this information stands out more.

3) Like the Introduction, the Discussion focuses on cigarette and hookah smoking and relatively ignores findings for cigar smoking and smokeless tobacco use. Either the purpose of the study should be amended or additional discussion of these products should be included.

As mentioned in #1, the purpose was amended to better focus on hookah and cigarette use.

MINOR ESSENTIAL REVISIONS

ABSTRACT

4) Methods should name the tobacco products assessed.

The methods section of the abstract now reads:

Tests for associations (chi-square and t-test) and predictability (logistic regression) were conducted to assess differences between cigarette and hookah users.
5) Results should mention cigars/smokeless tobacco use rates.

This was not included as now the focus of the paper is the relationship between hookah use and cigarettes.

METHODS:
6) Information concerning when the study was performed is crucial, please include.

The first line of the methods section now reads:
We developed a computer-based survey instrument to collect information on study participants’ tobacco-related behaviors and demographic characteristics during the months of November and December, 2009.

7) Information about the matching back to university registrar data for weighting (page 4; page 5; page 6) should be consolidated to the Data Analysis section. It is distracting to refer to weighting in three different areas of the methods.

Thank you, this is now only referenced in the data analysis section.

RESULTS:
8) Headings are needed for this section.

Subheadings have been added and the results should now be more concise as the paper is focused solely on cigarettes and hookah.

9) Results for dual tobacco use are limited to individuals who reported hookah and cigarette smoking. Please provide justification why other concomitant tobacco use patterns are not included.

The wording has been clarified and the focus on hookah and cigarette smoking should now address this concern.

DISCUSSION:
10) General writing style/quality for this section could be improved. For example, the terms “potential trend” and “emerging trend” seem overused. Additional headings would also be beneficial.

Headings were added and many of the “potential trend” and “emerging trend” phrases were removed.

11) The description of the intercept sampling approach in the limitations section (page 13) is too detailed, please condense.

This was done and the limitations section is now:

**Limitations.** The intercept sampling approach remains a form of convenience sampling, however, every 10th student was approached in the effort to reduce systematic bias.
Additionally, the data were then weighted to the registrar’s list of currently enrolled students in the same academic semester to further create a more representative sample of the general student population. The prevalence results presented here are also only representative of one university in the southeast region of the United States. In general, the prevalence and patterns of tobacco use vary by locale. Similarly, states differ on policy restrictions for tobacco use in work places, public spaces, restaurants, and bars. However, the present information is useful for understanding the use of traditional and emerging tobacco products at a major U.S. university.

DISCRETIONARY REVISIONS

12) Line numbers would be helpful throughout the manuscript.

Line numbers have been added.

13) Page 14: “With current use prevalence approximately the same...” This sentence is awkward please revise.

Thank you. The sentence in the conclusions now reads:
The prevalence rate for current use of cigarettes and hookah was close and if the availability remains high, hookah may surpass cigarettes in current use as well.

Referee 2:

1) By far my biggest concern: The authors seem to have a bit of indecision regarding the focus of this paper. The title clearly presents it as a paper focused on hookah and much of the paper is heavily focused on hookah. Yet the data— and several points sprinkled throughout the paper—reference other tobacco products assessed. If the authors want to focus on hookah, then I would recommend constructing the whole paper and Tables to do the same.

Thank you. Referee 1 had similar concerns and we now are submitting the paper with the focus on cigarettes and hookah. We believe the manuscript now is much more clear and concise.

   a. If the authors do want to expand to include other tobacco products, then the introduction and Discussion needs to be more inclusive of these other tobacco products. I would also recommend clarifying that the cigar category is ‘little cigars/cigarillos’ as the term cigar suggests large cigars as well.

As noted above, we chose to follow the recommendation that we focus on hookah and cigarettes so the mention of other products has been removed from the paper.

2) The title is a bit misleading in that hookah tobacco use surpasses cigarette use among University students as current use is the same and cigarettes were used more often than hookah in the past month. Although this is clear in the text, it could be made more clear in the title as well.

The title proposed is now:
Evidence of an Emerging Hookah Use Trend among University Students: A Cross-Sectional Comparison between Hookah and Cigarette Use

3) Although the authors presented raw numbers and weighted percentages, it would be helpful (given the sampling approach) to add a bit of discussion about how the sample compared to the larger University population and the degree of correction that was needed (especially across demographics) to make the data representative.

To address this, we added the unweighted raw sample data numbers to Table 1. Now the reader can assess ways in which the sample was weighted to be representative of the enrolled student population during the same semester.

4) My second largest concern: the data analysis was simplistic and could benefit from additional analysis beyond frequencies and chi-square tests. The authors state several significant p-values and associations and yet it is difficult to know whether these associations would remain after controlling for potential covariates. I would recommend doing some regression analysis to expand on their findings.

A logistic regression model was added to assess the adjusted odds for both demographic variables and if cigarettes predicted hookah use. This is mentioned in the data analysis and the following was added to the results section:

Table 4 includes predictors of hookah use with covariates in the model. Across all levels of use (ever, yearly and current), hookah users tended to be younger. With all demographics as covariates, Hispanics reported significantly (OR range 4 – 7) more hookah use than the reference group. Additionally, whites reported approximately 3 times (OR range 3.5 – 5) more hookah use than African Americans. There was very little sex difference for hookah use, except that males reported 1.7 times (CI 1.1, 2.4) more current hookah use than females. This difference no longer existed, however, when current cigarette use was added to the model. Across all levels, the strongest predictor of hookah use was cigarette use during the same timeframe. If respondents had ever used a cigarette they were 15.7 times (CI 11.6, 21.3) more likely to have also ever used hookah; yearly cigarette users were 11.2 times (CI 7.9, 15.9) more likely to have used hookah; and current cigarette users were 6.6 times (CI 4.2, 10.4) more likely to be current hookah users, all while controlling for demographic predictors.

These findings support the conclusions that females are smoking hookah at similar rates to males; that Hispanics and whites are the highest users; and also indicate the relationship between cigarette and hookah use, implying concurrent use of at least two tobacco products.

5) It would be helpful to know exactly how the prevalence of hookah use in this study compared to other national studies. There is a sentence in the Discussion about rates being similar to other studies, but how similar and what is the sample of those studies? Although a reader could look that
Prevalence. Other studies [3-4,7-8] have reported similar rates of hookah use, but hookah smoking lagged behind cigarette smoking in those studies. The overall prevalence for ever (46.4%), past year (28.4%), and current use (9.9%) are similar to those reported for a University sample in 2008 by Primack et al [3], reporting ever use at 40.5%, past year use of 30.6% and current use of 9.5%. Grekin and Ayna [2], however, found much lower rates in a University sample with only 15% ever used and 12.4% past year use (this study did not report current use). Eissenberg et al [4] reported higher rates (ever 48.4%, past year 43.4%, and current 20%) in their college study of Introduction to Psychology students. However, the cigarette rates from the same sample [4] were significantly higher than their hookah rates and even the national averages for cigarette use with ever cigarette use at 73%, past year use 57.7% and current cigarette use 41.5%. Finally, in a sample of eight universities, Sutfin et al [7] also reported similar ever use prevalence of 40.3%, but a much higher current use of 17.4%. All of these studies indicate growing popularity of hookah, while the current study shows it may even be becoming more popular than cigarettes.

6) The Discussion was a bit erratic. The authors jumped from one topic to another and it was difficult to follow the line of thought. I would recommend re-organizing and streamlining the discussion so it was clear what point was being addressed. For example, the authors started to discuss the hookah results and then switched abruptly to cigarette smoking results, then went to hookah, followed by other tobacco products. It just didn’t read clearly.

Hopefully reducing the focus to only cigarettes and hookah already helped tighten the discussion section. Further effort was made to ensure that it flowed from the results and provided a clear, concise story, including subtitles in the discussion section that mirrored the results section.

7) Regarding the discussion again—the authors start to defend several aspects of the study (representative, sampling approach) yet don’t preface this by stating that there were limitations. It helps the reader to set it up that you are about to discuss limitations, or else it seems disjointed to suddenly be defending an aspect of the study.

Thank you. We added a subheading for “limitations” – BMC did not list this as a heading so if this is not acceptable for the journal we’ll revise further to ensure the reader understands it is the limitations section of the discussion section.

8) A minor editorial note—the authors would benefit from additional proofing of their manuscript as there are several inconsistencies in where hyphens are used, how the U.S. is displayed, comma placement (or lack thereof), the way 10th is written, etc.

Thank you, this was likely left from sections that multiple authors took responsibility for. The first author was mistaken in not addressing this issue prior to submission.