Author's response to reviews

Title: Characterizing the sexual life-course of women prior to self-reported entry into sex work in south India from a cross-sectional survey: implications for STI/HIV prevention programming

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Author's response to reviews: see over
July 18, 2012

Dear Dr. Dukers-Muijrers,

We thank the editorial team and reviewers for their insightful review and helpful suggestions. We have tried to address each comment and clarify the information presented in this paper.

The manuscript has been re-written to improve upon the quality of written English. We have revised our analysis to address concerns about the methodology and lack of multivariate analysis. We also describe, in additional detail, the key standardized questions used in the survey. The responses to reviewer and editorial comments are detailed below.

We look forward to your consideration of the revised manuscript (enclosed under separate upload both in track change version and in a no track change version). The page numbers referred to in our comments below are to the no track change version.

Best regards,

Marissa Becker, MD
Assistant Professor
Response to Editorial Comments:

1. Copyediting:
After reading through your manuscript, we feel that the quality of written English needs to be improved before the manuscript can be considered further. We advise you to seek the assistance of a fluent English speaking colleague, or to have a professional editing service correct your language. Please ensure that particular attention is paid to the abstract.
   - Thank you for this helpful suggestion. We have edited and revised all sections of the manuscript, including the abstract.

2. Title page: It should contain, at minimum, the names, institutions, countries and email addresses of all authors, and the full postal address of the submitting author. The list of authors in the manuscript should be written exactly as they are in the submission system, both in style and order. The preferred style is 'First name Initial Last name' (e.g. Joe F Bloggs).
   Please include email addresses for all the authors on the title page, using the following format:
   AB: abcd@institution.ac.uk
   EF: efgh@generic.co.uk
   IJ: IJKL@corporation.com
   - We have made these changes to the title page.

3. Please change 'Introduction' to 'Background'.
We have made this change to the manuscript.

4. Please include a Conclusions section within the manuscript.
   - A conclusion section has been added (page 14).

5. Please re-arrange the following:
   ^Competing Interest
   ^Authors' Contribution (please rename 'Contributorship' to this)
   ^Acknowledgment
   - We have re-arranged these sections, and changed the headings.

6. Please place the Figure Legends after the References.
   - We have re-arranged these sections.
7. Please remove the visible vertical lines of the Tables. Please ensure that the order in which your tables are cited is the same as the order in which they are provided. Every table must be cited in the text, using Arabic numerals. Please do not use ranges when listing tables. Tables must not be subdivided, or contain tables within tables. Please note that we are unable to display vertical lines or text within tables, no display merged cells: please re-layout your table without these elements. Tables should be formatted using the Table tool in your word processor. Please ensure the table title is above the table and the legend is below the table. For more information, see the instructions for authors on the journal website.

- We have formatted the tables according to the instructions for authors.
Response to comments from Reviewer 1

Reviewer's report:

Summary of the paper

This is a very interesting paper retrospectively exploring the vulnerabilities of sexually-active women to HIV/STI before they identify themselves as ‘sex workers’. Although a cross-sectional study design does not lend itself very well to examining behaviour over a prolonged period of time, using significant events in the respondent’s own life as a memory aid helps to punctuate their sexual history in a way that would make it easier for them to recall. The purpose of the exercise is to uncover possible reasons for why female sex workers in Karnataka seem to be at risk of HIV so early in their sex work career, the implication being that perhaps they maintain high-risk sexual behaviour for a few years before they formally become members of that group. It is this ‘transition period’ (from first sex to self-identification as a sex worker) that the study focusses on, looking at what happens during it, and how its length is determined by what happens during it. The comparison between devadasi and non-devadasis is very interesting because it seems for the former the move from first sex act to becoming a sex worker is more predictable (even if the transition period shows variability), while for the latter, it is difficult to say, except retrospectively from the point when they have indeed become sex workers, whether their behaviour was going to lead to official sex work.

- We thank the reviewer for this feedback, and helpful summary.

Discretionary revisions

1. Introduction: Would be useful to have some background (as sentence or two) about devadasis vs non-devadasis: things such as – their relative distribution in the area, what determines whether a sex worker is a devadasi or not (e.g. are you born into it?) and how definite is it that a devadasi young adolescent will enter sex work?

- Thank you, we have included additional information in the background (paragraph 3, pages 4-5), and information about distribution (Methods, Study setting and population, paragraph 1, page 6).

2. Page 3, 1st paragraph, 2nd last line: Since this introductory paragraph is about the whole of India, it would be good to include references to intervention programmes
that are from a different region and not just those administered by KHPT.

- We have included references to FSW programmes across the country (Background, paragraph 1, page 4).

3. Page 3, 2nd paragraph: A clearly stated definition of the ‘transition period’ would be useful so that the reader can access it easily. Something like, “In this paper, we define the transition period to be ….”

- Thank you for the helpful suggestion. We have added this in the Background (paragraph 1, page 4).

4. Page 3, 3rd paragraph, 5th line: Not entirely clear why “an older man who is
able to pay large sums of money” makes him high-risk for HIV. Is that because he often ‘does’ first night ceremonies, or is an active client of FSWs?

- We have added this information to the background (paragraph 1, page 5). HIV prevalence among clients increases with age (and correlated with duration of paid sex)[1, 2]. We have clarified that the dedication ceremony partner is a client.

5. Page 3, 3rd paragraph, 5th line: Sentence says: “Secondly, FSWs may not identify as sex workers until well after they first receive money or gifts…” This suggests too much pre-determination, and it would read better to say: “Secondly, women may not identify themselves as sex workers well after….”

- We have removed this sentence.

6. Page 4, 2nd paragraph, line 4: Would be good to have a sentence about this other study whose methods this one is based on, especially as it is in a different geographical context.

- Thank you. We have added this information to the background (paragraph 2, page 5).

7. Methods, Page 5, 1st paragraph, line 5: How is ‘client’ defined? Defined by the respondent? An explanation would be useful.

- A ‘client’ was by the respondent based on an option of choices (and free text if the response was ‘other’). We have clarified this in the methods (Definitions and statistical analysis, paragraph 1, page 7)

8. Page 5, 1st paragraph, line 9: The migration profiles are unclear, for instance, migrant FSWs practice sex work outside their home district for >2 weeks/year – where do they (do they?) practice sex work for the rest of the year? And in contrast, do the local FSWs practice all year?

- We have clarified this information in the methods (Definitions and statistical analysis, paragraph 1, page 7). Mobile and migrant FSWs also work at their place of residence (in addition to outside their home district).

9. Page 5, 2nd paragraph, line 3: “These key events reflect the major transitions among sexually active women, but were modified…” Since the stages are only true for sex workers, not all sexually active women, might be better to say something like: “These key events are similar to major transitions among sexually active women but were modified..”.
• Thank you for this helpful suggestion. We have made this change (Methods, Definitions and statistical analysis, paragraph 1, page 8).

10. Results, Page 7, Sexual behaviour during transition period, line 2: No need to refer again to the previous study on which methods based.

- This has been removed.

11. Page 7, comparing 1st para, last sentence AND 2nd paragraph, last sentence: I find these two sentences a bit confusing, might need some clarification. It seems devadasis who had long-term partnerships with first sexual partners were less likely to recall 1st sex act as commercial, but among FSWs that did recall 1st sex as commercial (the majority of whom are devadasis), nearly half (45.9%) did have a long term partnership with 1st sexual partner, while the other half did not. Both these statements may be true, but it would just help to describe this relationship more clearly.

- We have re-organized the results section to separately discuss the profile of FSWs most likely to experience a first commercial sex (Results, Characterizing sexual-life course, paragraph 2). We found that 82.9% of Devadasis reported a commercial first sex (Table 1). And 48.4% of Devadasis formed a long-term relationship with their first partner. Within this subgroup, a commercial first sex was more common among women who did not form a long-term partnership with their first partner (Table 2).

Overall, nearly half (45.9%) of women who experienced a first commercial sex formed long-term partnerships with the first client. We separately discuss this finding in the section on characterizing sexual life-course histories (Results, Characterizing sexual life histories, page 10).

12. Page 7, 3rd para, 2nd last sentence: Within the subgroup of those who had a commercial 1st sex act, although the average difference, between those with and without a long-term partner, in the transition period is 3.9 years, these differences are quite different for devadasis and non-devadasis (where there is hardly any difference, figure 2) and I wonder why they are being clubbed together in the results?

- We have re-organized the analysis, and stratified the examination of transition time by type of first sex, and have used typology as a covariate.

This was done because not all traditional FSWs experienced a first
commercial sex. For HIV prevention programming, understanding the transition time from first commercial sex to self-reported entry into sex-work was felt to be important. We have clarified the importance of the covariate (typology) when reporting the results of the multivariate linear regression (which was added in this revised paper) (Results, Characterizing sexual life histories, page 10).

13. Page 8, Discussion: This describes the relative significance of the variables that were examined in this study well, but it would benefit from more discussion about other variables that might be important in shaping the lifecourse of the respondents, but may not be about sexual behaviour – such as changing levels of domestic responsibilities, financial security, the presence of young children and so on. Especially because only 266 (204 devadasis, and 62 non-devadasis) said they had a commercial 1st sex act so the majority did not have this event that, perhaps unfairly, suggests a bias that predicts their eventual entry into sex work

- We have added this to the discussion section
14. Discussion: I wonder if using ‘age at…’ as the way to recall menarche, 1st sex, 1st commercial sex etc. is prone to errors by respondents, especially given that the majority are illiterate. In my own research in North India, I found people struggling to remember/report their current age, let alone their ages when events happened in the past! If the situation is similar here, it may be worth a specific mention in potential recall bias.

- We agree, and have included this in the discussion section (paragraph 2, Page 13) Unfortunately, this is the best measurement option we had at our disposal given the (a) cross-sectional nature of the study, and (b) the variability in the time-frame women were asked to recall. When we have conducted studies asking women to recall events in the last 3 to 6 months, have been able to use external markers (such as a major recent religious or secular holiday).

15. Discussion: Sex workers who become HIV-aware have been seen to improve their consistent condom use with clients/occasional partners, but continue in their low condom use with regular, trusted partners – this is known from the existing literature. What this study is adding is that the same kind of risk from regular partners exists at a time when they do not consider themselves to be sex workers (since only a minority had occasional partners in the transition period, with the median number of these partners being 1) – this should be made more explicit. And this risk during the transition period for sex workers should be compared analytically to women who do not become sex workers but are still potentially at risk because of their regular partners being high-risk.

- Thank you. We have added further detail to this section to make the relevance of this finding more explicit (Discussion, paragraph 2, page 12).

16. Table 1: How old are the oldest FSWs? Will be good to know how far back they were having to remember to recall their 1st sex act, and their sexual history in the interim until becoming sex workers <=5 years before the study.

- The oldest FSW was 32 years old. We have added this information to the results section (paragraph 1, page 9).

17. Figures 1 and 2: Nice way to demonstrate sexual life histories – visually appealing and easy to understand.

- We thank the reviewer for this feedback.
Minor essential revisions

1. Page 6, Results, Study Population, line 2-3: The numbers (332, 507, 171) only add up to 1010.
   
   - Thank you. We have corrected this error (should read 333, 507, 171);
   
   [Results Study population, paragraph 2, page 8]

2. Page 9, 1st para, line 9: There is a superscript ‘3’ without a corresponding footnote.
   
   - The footnote was an error, and has been corrected
Response to comments from Reviewer 2

Reviewer’s report:

General

The authors conducted a cross-sectional study with female sex workers (FSW) from India and present an analysis of their sexual behaviors before participants self identified themselves as FSW. Although the authors’ idea is quite original, there are several flaws in their study design. This study is not robust enough to conclusively ‘reconstruct FSW sexual trajectories’. This paper does not meet BMC Public Health standards, but could be resubmitted to another journal (most probably as a short report)

- We thank the reviewer for these important and helpful comments. We agree that using retrospective data to reconstruct sexual trajectories is not as robust as using longitudinal data. We therefore followed previous a method described by Boileau et al [3]. We also agree that univariate analysis was insufficient to distinguish categories of sex-workers according to the transition points identified in the analysis. We therefore performed a multivariate analysis as suggested (please see below). We agree that the term ‘reconstruction’ is too optimistic given the limitations of cross-sectional data, even after conducting a multivariate regression. We have removed this term, and couched our objective in more careful terms (to describe and characterize sexual-life course histories, Background, page 5).

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Major Compulsory Revisions

1. The authors dichotomized their sample into “devadasi” and “non-devadasi”, however it is not clear why they did it. Are devadasi more at risky for HIV/AIDS and other sexually transmitted infections? If so, they need to explain why. Also, the sample was initially dichotomized, but all analysis were conducted using all participants. Its very confusing, is it important or not for a FSW to be considered a ‘devadasi’? and if this group is important somehow, then all analysis should
compare devadasi and non-devadasi... for instance, the abstract present percents for all participants, there is not a single result comparing devadasi vs. non-devadasi FSW...

- We have included the rationale behind distinguishing FSWs according to whether they practice a traditional (Devadasi) or non-traditional form of sex-work in this region (Background, pages 4-5). Traditional sex work can be thought of as a 'typology' of sex work, similar to how we often distinguish brothel-based vs. street-based sex workers in the literature and in HIV/STI prevention programming.

Compared with non-Devadasis, traditional sex workers in this region have a two-fold greater risk of HIV [4]. However, it is the first sexual encounter and the sexual life-course of Devadasi that is expected to be inherently different from non-Devadasis [5, 6]. The overall practice of sex work among Devadasi has been examined using ethnographic studies [5, 7], but the differences in sexual histories prior to formally entering the sex-trade between these two typologies had yet to be quantified. As per the reviewer’s suggestion, we have stratified the descriptive tables (Tables 1, 3) by sex-work typology, and included typology as a covariate in the univariate and multivariate analyses (Tables 3, 4).

2. Key study assumptions are just too flaw... to ask a FSW exactly when she started considering herself a sex worker is a very complex question, each participant can define ‘sex work’ in a different way. For instance, some might say that since they started receiving gifts, drugs or money for sex, they became sex workers. Others might only consider sex work when they started receiving money. Others could even not consider sex work when their clients are ‘regulars’, therefore, perceived as stable/long-term partners...Its just impossible to standardize this. The research question is very important, but seems more suitable to be answered using a hybrid study design that includes qualitative data.

- We thank the reviewer for raising this important issue. We agree that the ‘self-reported’ start of sex work can have a different meaning for different women who receive money or gifts in exchange for sex. In this study, the following question was used: “In which [year] and [if able to answer, month] did you first enter sex-work
or start taking clients, when sex-work is defined as the receipt of money or gifts in exchange for sex?“ and “At what age [years]...[as above]?” We reported results based on the second question. We have provided this detail in the methods (Methods, Definitions and statistical analysis, page 7).

We have clarified that both approaches to obtaining the ‘self-reported start of sex work’ are standardized questions currently used in integrated biological and behavioural surveys in India and elsewhere [4, 8, 9]. The HIV/STI prevention programmes in India use this question to categorize sex workers by duration in sex work. Therefore, the estimate (‘self-reported start of sex-work’) used in the study is standardized should be informative across studies and programmes. However, as the reviewer pointed out – entry into sex-work can have different meaning for different FSWs. We therefore anticipated differences in when women ‘perceived’ the time at which they entered the sex-trade. We used the time from a first commercial sex to ‘self-reported start of sex work’ in order to quantify the variability in the timing of perceived entry into sex-work. In order to do this, we externally defined a first commercial sex (based on individual questions specific to what happened at first sex). Hence, the transition period was expected to vary according to when a woman defined her ‘start of sex-work’. And this variability was examined using univariate (and now, multivariate) linear regression to categorize ‘groups’ of women according to the time from their first sex to ‘self-reported sex-work’. We have clarified that the aim of the research question was to examine which factors were associated with variability in length of transition period. As per the reviewer’s suggestion below, we have conducted a multivariate linear regression to ensure that the sexual behaviors and partnerships prior to ‘self-reported’ start of sex work were independently associated length of transition period (Table 4).

- The ‘start of sex work’ has never been assessed by studying women before they self-identify as a sex-workers. And our findings highlight the important point made by the reviewer: women do not consider themselves to be engaged in sex-work while in a long-term partnership with their first client.

- We agree that a qualitative examination of this question is needed to clarify what it means for women to ‘enter sex-work’, and have included this in our discussion
(Discussion, paragraph 6, page 13). However, we feel the quantitative data presented here are a first attempt to (at the very least) examine differences in the transition period of FSWs.

- We have clarified the above three points in the methods (Definitions and statistical analysis, page 76), and discussion (paragraphs 2, 3, and 6, pages 11-12). We have clarified this important issue in limitation section (Discussion, paragraph 6, page 12).

This reviewer strongly recommend authors to conduct multivariate analysis, percents and exploratory analysis are interesting, but completely inadequate for a scientific paper based on cross sectional study...

- We thank the reviewer for this helpful suggestion to strengthen the methodology of the paper. We have performed a multivariate analysis of the association between key transition points and length of transition period (table 4), and a multivariate analysis to profile FSWs most likely to experience a commercial first sex (table 2).
INTRODUCTION: Please include one paragraph describing the Devadasi tradition and why it increases FSW vulnerability into HIV/AIDS and other STI.

- We describe the Devadasi tradition, and why differences could be expected in their sexual history, and the 2-fold increased prevalence of HIV in this subgroup. (Background, paragraph 1, page 5).

INTRODUCTION, 2nd paragraph: “21% of FSWs are HIV positive before their second year in sex work” - please include here more info about this data, is it based on a representative sample of FSW? If that’s the case, how the study was able to collect representative data from a hard to reach and hidden population such as FSW?

- We have provided additional detail for this reference. The data is based on representative cross-sectional behavioral and biological surveys that were conducted after extensive mapping of high-risk groups (at a district-level) in India. (Background, paragraph 2, page 4).

INTRODUCTION, 3rd paragraph: “until they self-identify as sex workers, they will not have direct access to established HIV prevention programs”. Please explain this statement. Only sex workers have access to HIV prevention programs in this region? What about women (non-sex workers)? there is no intervention in place targeting this group?

- We have provided additional details surrounding this statement (Background, paragraph 1, page 4; Discussion, paragraph 3, page 11). The statement refers to targeted HIV prevention interventions designed for FSWs [10], which are different from broad HIV prevention messaging for the general population in India.

METHODS, 1st paragraph: Is registration into preventive programs compulsory? If not, how is it reinforced among FSW from this region? According to authors, “An estimated 20,493 women practice sex work across the three district” - please explain how this estimative was reached, and how reliable it is.

- Registration in the prevention programmes takes place at time of first contact with
between an FSW and a peer-educator (another FSW who works with the programme) or an outreach worker. We have clarified this in the methods section (Study setting and population, paragraph 1, page 6).

- We have provided additional detail regarding the enumeration of FSWs in this region (Methods, Study setting and population, paragraph 1, page 6).

METHODS, 1st paragraph: “We used conventional cluster sampling with probability proportional to size of the enumerated FSW population in each village within the three districts.” The authors included ONLY FSW engaged in some HIV prevention program, is this correct? If that’s so, the sample is completely biased towards those with access to NGOs and/or health facilities, and this must be acknowledged.

- We acknowledge this bias and have added it to the discussion (paragraph 6, page 10). We have also provided information about programme coverage (Methods, Study setting and population, paragraph 1, page 6). All studies published to date on FSWs will have some degree of sampling bias due to the hidden nature of sex-work. The bias is limited when the sampling frame is based on a reliable mapping exercise. Because of the high level of programme coverage, the sample frame captures the enumerated FSWs (based on mapping). However, we acknowledge that the study sample may still have missed hidden FSWs not captured by mapping.

METHODS, statistical analysis, 1st paragraph: Please include the time period for condom use (lifetime? last month? last 6 months?).

- We have added this information (Methods, Definitions and statistical analysis, paragraph 4, page 7). Based on pilot testing of the questionnaire with community researchers, level of condom-use for long-term partnerships was asked in reference to the entire duration of each separate partnership during the transition period. For the analysis, ‘always’ was used when FSWs reported ‘always’ for every partnership.

METHODS, statistical analysis, 2nd paragraph: “partnership status at time of
self-reported entry into sex work.” - this variable needs to be explained. What if a FSW has several sexual partners, some regular clients and other not. Regular clients were considered long term partnerships? It seems confusing to consider a regular client to be a stable relationship...., how was it recorded?

- We have added this information (Methods, Definitions and statistical analysis, paragraph 2, page 7). Respondents were asked to classify each ‘regular’ partner during the transition period (where ‘regular’ = partner with whom she had sex with on more than one occasion during the transition period). None of the regular partners were identified as ‘regular clients’, and the duration for each was >6 months. We therefore used the term ‘long-term partnership’ for the analysis and paper.

Why the authors considered “sample size within categories was greater than 10”? Please explain.

- We have added an explanation in the methods (Definitions and statistical analysis, paragraph 1, page 8). The sample size of >10 within cells of categorical variables was used to enable a meaningful classification of divisions after the univariate (and now, multivariate) analysis.

RESULTS
Is there any information about those who refused to participate (almost one-quarter of your sample size)?

- We provide additional information (and a comparison between respondents and non-respondents based on program registration data) in the Results section (paragraph 1, page 8).

My key concern here is that authors conducted only exploratory data analysis, not robust enough to underscore any research hypothesis at all... Table 1 and 2 are informative, as well as the figures... My criticism here is about the research question and how it was measured. If the key point was to better understand the so-called ‘transition period’ from sexual debut into engagement into sex work, a clear time point should be provided to all participants. For instance, the authors could explain that sex work engagement will be measured as any sexual contact where one received money, gifts or drugs. Since the authors let each participant to consider ‘sex work engagement’ according to their own
perception, the variable was not measured in a standardized manner. What was considered by one sex work as engagement in commercial sex, could be considered by another women as receiving a ‘gift’ from her partner... This confusion makes all analysis less reliable and, therefore, conclusions not sound enough...

- We thank the reviewer for raising this issue. We have tried to clarify that the questions asked of participants are standardized because they have been widely used to calculate ‘duration in sex-work’ [9, 11]. In this study, we defined a commercial first sex by asking specific questions about the first sexual encounter (sexual contact where one received money or gifts [and differentiated from dowry]; sexual contact where the respondent classified the first partner as a ‘client’; sexual contact that involved a dedication ceremony). The question used to obtain the age at entry into sex-work included providing participants with a definition of sex-work (‘receipt of money or gifts in exchange for sex’ or ‘taking on a client’) – this is a standard question used in current programmes and behavioural surveys in India [10-13]. These details have been added to the methods section (Definitions and statistical analysis, page 7) to clarify this important issue raised by the reviewer.