

PEER REVIEW HISTORY

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ARTICLE DETAILS

TITLE (PROVISIONAL)	THE POSSIBLE ABSENCE OF A HEALTHY-WORKER EFFECT: A CROSS-SECTIONAL SURVEY AMONG EDUCATED JAPANESE WOMEN
AUTHORS	Nishikitani, Mariko ; Nakao, Mutsuhiro; Tsurugano, Shinobu; Yano, Eiji

VERSION 1 - REVIEW

REVIEWER	Karri Silventoinen, PhD Population Research Unit Department of Social Research University of Helsinki Finland
REVIEW RETURNED	30-Mar-2012

GENERAL COMMENTS	<p>This study analyses the health conditions of Japanese housewives and employed women graduated from a university in Tokyo. The study found that contrast to Western industrialized countries, the health status of employed women in Japan is poorer suggesting that the demands of Japanese working life compromises the health of females. This result is interesting indicating that societal condition can have profound effect on socio-economic health differences. I have, however, some concerns about this paper.</p> <p>The introduction could be more focused to developed countries. It would be interesting to get more information in which countries better health of employed women when compared to housewives has been reported. On the other hand it is not relevant information that illiteracy rate in housewives is higher in some populations because this surely is not the case in Japan.</p> <p>It would be interesting to get more information on the university from which the study participants were graduated. I believe that this is Teikyo university because the ethical permission is granted by a board in this university.</p> <p>The response rate is reported wrongly because it should be calculated from all persons who were initially contacted. This is actually correctly reported and discussed in Discussion but should be done so also in Data and methods section. The response rate is very low, but this may partly be because the contact information is not updated which should not bias the results. Do authors have any estimate how many did not respond because of wrong contact information and how many got the original invitation but did not reply? Is there any estimate whether the proportion of housewives in these data is similar than in these cohorts of university graduates in Tokyo in general which would help to evaluate how representative the sample is?</p>
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	<p>In the analyses all outcome measures are treated equally even when they are very differently associated with working. For example sleeping problems and skipping breakfast are natural consequences of busy work life but interesting question is whether they manifest themselves as poorer health. I would suggest that the authors would conduct one analysis more and study whether the difference in anxiety about health remains when the other factors are adjusted for. This analysis would give more information about causal pathways between working life and less than optimal health.</p> <p>Problem in the question about anxiety about health is that it does not measure only health itself but also demands. Is it possible that working women are anxious about health simply because they are not sure whether they can survive in work which is not a problem for housewives. It seems that for satisfaction for health the effect size is lower and not statistically significant which may support this assumption. There is little the authors can do for this, but this very possible source of bias should at least to be discussed.</p> <p>It would be interesting to know what is the health status of women working part timely. The burden from work in them is not likely to be so severe than in full-timely working women and thus health status is expectedly better.</p> <p>The authors found evidence about the healthy worker effect in this population as well because 13% of housewives reported that they had retired because of health reasons. Are the results different if these women are excluded from the analyses?</p> <p>An obvious limitation of the study is that only self-reported information on health is available and thus employment status can affect directly how to answer the question (see my comment above).</p> <p>It would be interesting if the authors would discuss what type of policy implications their results have in Japan and internationally. Are, for example, the working conditions for females better in Western countries when compared to Japan which could explaining why the healthy worker effect is seen in those countries or is the possibility of Japanese women to stay at home actually good because it gives more opportunities when compared to women in Western countries?</p> <p>As a minor issue I think that 'study participant' is a better term at least in this kind of observational study than 'study subject'.</p>
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REVIEWER	<p>Kentaro Murakami, PhD Assistant professor Department of Social and Preventive Epidemiology School of Public Health University of Tokyo Japan No competing interests</p>
REVIEW RETURNED	17-Apr-2012

GENERAL COMMENTS	<p>1. This study addresses an interesting research topic. However, I feel that there are certain areas that require work as described below.</p>
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	<p>2. Title: It does not seem that the title is based on the present findings, given that employment status was associated with only a few of the variables examined (in Table 3). For example, while there was an association between employment status and anxiety about health (an important outcome measure), there was no association for dissatisfaction with health (another important outcome measure). Why did you describe that working women in this study are sick? I rather consider that working women in this study are generally “healthy” considering their satisfaction with present status (about 80%), satisfaction with health (more than 69%), and participation in annual health checkup (more than 80%). Conversely, housewives in this study may not necessarily be “healthy” given a somewhat high percentage of dissatisfaction with present status (38%). More importantly, I do not consider it is appropriate to use the words healthy or sick only based on subjective measures of health status or behaviors, without any objective measures of health status (e.g., blood).</p> <p>3. Hypothesis: What is your main hypothesis? There are too many outcome measures (in Table 3), making the interpretation difficult. My suggestion is that you concentrate on only a few variables, e.g., self-rated anxiety about health, dissatisfaction with health, and satisfaction with present status.</p> <p>4. Page 7 Line 3: When was this survey conducted?</p> <p>5. Page 7 Line 7: Response rate should be 16.5% as mentioned in the discussion (although I am not sure how this percentage was obtained) rather than 92.9%.</p> <p>6. Page 7 Line 15: Why did you put the ref 11 for this sentence?</p> <p>7. Page 8 Line 8: How was the ref 28 based on the question on self-rated health status (a main outcome measure in this study)? Please describe the rationale.</p> <p>8. Page 9 Line 11: Why did you consider having preschool-aged children and shift-work status for only the analysis of sleep-related variables but not of other behaviors you examined including breakfast and smoking? Do you have any rationale or hypothesis for this?</p> <p>9. Page 9 Line 9: You mentioned that marital status was included in the analysis as a confounding factor. However, the distribution of employment status (housewives, working women with family demands, or working women without family demands) and marital status (yes or no) was almost completely same as shown in Table 1; almost all subjects in the categories housewives and working women with family demands are married while almost all subjects in the category working women without family demands are not married. Thus the adjustment for marital status is nonsense at all. In the case of comparison between housewives and working women with family demands, consideration of marital status is not needed at all. In the case of comparison between housewives and working women without family demands, you cannot distinguish the effect of employment status and marital status at all.</p> <p>10. Analysis: It does not seem that comparison between housewives and working women without family demands is useful mainly because of strong collinearity between employment status and marital status. Thus I strongly suggest that you concentrate on comparison between housewives and working women with family demands, as both are usually married in Japan while working women without family demands are not usually married, as shown in this study.</p> <p>11. Analysis: Do you have any information on employment condition (e.g., full time or part-time) for working women? Is it justified to combine full time workers and part-time workers in this analysis? If</p>
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	<p>so please describe the rationale with appropriate references.</p> <p>12. Analysis: How many subjects were included in the main analysis? Please show the number of subjects clearly in all tables.</p> <p>13. Table 3: Why are some figures bold in Table 3? The reason should be described to footnote.</p> <p>14. Page 17 Line 6: Is the sentence correct? Please check.</p> <p>15. Page 18 Line 10: I do not consider this sentence is true; at least some of male Japanese workers with family demands do devote themselves to the home. What kind of evidence supports the sentence?</p> <p>16. Page 18 Line 13: I do not consider this sentence is true again; at least some of Japanese working women do not suffer from the burden of multiple roles of work and home much like single mothers do. What kind of evidence supports the sentence?</p> <p>17. Page 18 Line 16: This paragraph should be deleted because of no publication (no evidence). Alternatively, a more detailed description should be added (some results with statistical testing).</p> <p>18. Page 19 Line 1: To support this sentence scientifically, I suggest you should put some evidence or statistics to show that the students in this national university really come from various areas and different socioeconomic backgrounds.</p> <p>19. Page 19 Line 5: It may be reasonable to consider that the results are not generalized mainly because of a considerably low response rate. Alternatively, please add more evidence that the present population can be considered representative of well-educated women.</p> <p>20. Limitation: limitations on self-reported nature of all variables used (e.g., no objective measures of health status) should be considered and discussed.</p> <p>21. Minor: Please add line numbers.</p>
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REVIEWER	<p>Torill Bull, PhD Postdoctoral researcher Department of Health Promotion and Development Faculty of Psychology University of Bergen Norway.</p> <p>No competing interests.</p>
REVIEW RETURNED	25-Apr-2012

THE STUDY	<p>While the study design and description overall are clear and appropriate, there are a few minor comments I would like to make:</p> <p>1) I would like a better description of the health anxiety outcome measure</p> <p>2) I would like a statement of 'status satisfaction' is referred to on page 8 line 8. By reading statements later in the paper I assume this is satisfaction with employment status, but it needs to be clarified at first mention.</p> <p>3) on page 7 the study population is well described, but I find there should also be a mention of the response rate of the 1,630 out of the initial 9,864 invitees. However, it is redeeming that this low initial response is discussed later in the paper.</p> <p>4) I would like a brief description of the differences between a 'health check-up' and a 'medical consultation'.</p> <p>5) the abstract/key messages are mostly accurate, but in the key messages on page 3, line 46, it is difficult to understand what is</p>
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	<p>meant by 'The social environment should be reconsidered'.</p> <p>6) I find it unusual to insert the brackets for references AFTER the punctuation marks instead of before.</p>
RESULTS & CONCLUSIONS	<p>Overall, I find the results and conclusion very well presented, but there are some minor comments:</p> <p>1) On page 10 line 23, again I would like the type of status satisfaction specified.</p> <p>2) on the same page, I would like a specification for why preschool-aged children and those working shifts were excluded, and which of the groups (total subject or those without preschool-aged children/shift work) the authors considered to be most relevant group to focus on.</p> <p>3) On page 14, the sentence beginning on line 10 (Although - - -) is a bit unclear. I guess there should be a mention that this refers to working women without family demands, as those with family demands do not show a higher tendency to dissatisfaction?</p> <p>4) On page 18, in line 45, there should be a specification of which data (own, or national), in the statement ' ..., since we analysed the data after adjusting for educational background'.</p> <p>5) I find your results really interesting. I would have liked it a lot if you could have focussed a little bit more on the potential ways in which the Japanese culture differs from other OECD countries and therefore might explain this differing pattern of employment status and health. I guess that might be what you refer to in the key messages when you say 'social environment'? Could this be reinforced as a message? Do you think cultural expectations or work conditions are the strongest explanatory factors for the lack of a healthy worker effect?</p> <p>6) The differences from housewives are larger for the group of working women without family demands. Could you comment upon this?</p>
GENERAL COMMENTS	<p>Overall, I find you have written a very interesting paper with a high level of precision, despite my comments and wishes for some clarifications. I hope it will soon find its way into the literature!</p>

VERSION 1 – AUTHOR RESPONSE

Reviewer: Karri Silventoinen, PhD

Population Research Unit

Department of Social Research

University of Helsinki

Finland

This study analyses the health conditions of Japanese housewives and employed women graduated from a university in Tokyo. The study found that contrast to Western industrialized countries, the health status of employed women in Japan is poorer suggesting that the demands of Japanese working life compromises the health of females. This result is interesting indicating that societal condition can have profound effect on socio-economic health differences. I have, however, some concerns about this paper.

Thank you for your comments, please see our responses below.

The introduction could be more focused to developed countries. It would be interesting to get more information in which countries better health of employed women when compared to housewives has been reported. On the other hand it is not relevant information that illiteracy rate in housewives is higher in some populations because this surely is not the case in Japan.

We added the information of these developed countries in the Introduction. For illiteracy, we thought that this would be related to low education and low-skilled occupations, even among developed countries. We modified the expression as follows:

--> In many industrialised countries, unemployed women, including full-time housewives who do not engage in paid work, are generally assumed to have poorer health than do employed women. This assumption has been confirmed with subjective measurements, such as self-rated health assessments, in Denmark, Finland, Norway, and Sweden;^[1] Spain;^[2] and the United States ^[3] and by objective measurements, such as mortality rates, in Sweden ^[4] and Spain.^[5] Thus, most countries have a shared perception that women engaging in paid work are generally healthier than are housewives; several recent studies have used this finding to assert that being a housewife is a risk factor for poor health status and is related to poverty, low education, and low-skilled occupations.^[6–8]

It would be interesting to get more information on the university from which the study participants were graduated. I believe that this is Teikyo university because the ethical permission is granted by a board in this university.

Along with your interest regarding which university was involved with this survey, many other readers may also be interested in the same point. We have, however, made a commitment to the alumnae that we would never reveal any personally-identifiable information. The name of the university is not personally-identifiable information, but this university has specific characteristics and has a long history of almost 140 years as a school. In addition, this university is relatively small in size: the present students per one grade only number 500. The name of this university is very well known, and the number of alumnae and related persons (including researchers and employees) is small. Thus, the alumnae and related persons perceive the name of the university as personally-identifiable information. We would appreciate that in the interest of protecting participant confidentiality, our study results can be accepted without revealing the name of the university.

The response rate is reported wrongly because it should be calculated from all persons who were initially contacted. This is actually correctly reported and discussed in Discussion but should be done so also in Data and methods section. The response rate is very low, but this may partly be because the contact information is not updated which should not bias the results. Do authors have any estimate how many did not respond because of wrong contact information and how many got the original invitation but did not reply? Is there any estimate whether the proportion of housewives in these data is similar than in these cohorts of university graduates in Tokyo in general which would help to evaluate how representative the sample is?

We corrected the final response rate from 92.9 % to 15.4 % according to your comment, and added the information of a first response rate of 16.5% based on another reviewer's comment.

--> In February 2007, we sent reply, postage-paid postcards to all 9,864 female alumnae who graduated from the university between 1983 and 2006 to ask them to participate and received agreement cards from 1,630 (16.5% response rate) by the end of March.

We don't have any idea about the rate of un-updated contact information, because the alumnae association controls this information and we as researchers were not able to access this information. However, we guessed that the rate of un-updated information was relatively small, because the association of alumnae told us they covered almost all alumnae members. In fact they send an alumni bulletin at regular intervals each year and they would not use un-updated information for our survey. We added our thoughts about the effect of un-updated information on a low response rate as the following:

--> The effect of not updating contact information on the low response rate remains unknown, but can be estimated as very small because the alumnae association frequently uses this contact information to send alumnae bulletins at regular intervals.

In the analyses all outcome measures are treated equally even when they are very differently associated with working. For example sleeping problems and skipping breakfast are natural consequences of busy work life but interesting question is whether they manifest themselves as poorer health. I would suggest that the authors would conduct one analysis more and study whether the difference in anxiety about health remains when the other factors are adjusted for. This analysis would give more information about causal pathways between working life and less than optimal health.

We agree with your idea that there is causal pathway between a poor lifestyle and poor health such as health anxiety. However, we felt these outcomes were independent via the viewpoint of screening for predominant health problems based on cause of death. For example, health anxiety is indicative of self-perceived symptoms for depression, which happens following excess stress and preceding suicide. Suicide seems to be unlikely in the generally-healthy women's group, but it was the first cause of death among this population in Japan. Therefore, we thought this health indicator would be useful in looking at our study participants. The second most common cause of death is cancer. As cancer has been known to have a strong association with lifestyle factors, we would like to set this independently as an indicator. For health check-up and related knowledge, we think of these as preventive behaviors. Thank you for your valuable suggestion. We hope you find it acceptable that our thoughts on assessing the causal pathway of these health indicators will be in the next study.

The explanation for health outcomes was insufficient. In order to present our study purpose more clearly, we added the reasons for these outcome selections in the main text of the Methods as follows:

--> **Health status and behaviour: Self-rated health, lifestyle, preventive behaviour**
Because study participants were expected to be generally healthy and their cooperation with this study was solicited via mail, we used subjective health indicators in the questionnaire. Among women aged 20–44 in Japan, suicide and malignant neoplasm account for almost 60% of the causes of death.[28] For this reason, we used health outcomes to assess health status preceding suicide and lifestyle-related diseases, self-rated health, lifestyle, and preventive behaviour and knowledge.

We also re-arranged the order of explanations of each outcome, the presentations of these results and summarized in accordance with the priority of the selected health indicators. Please see the changes in the Methods, Results, and Tables.

Problem in the question about anxiety about health is that it does not measure only health itself but also demands. Is it possible that working women are anxious about health simply because they are not sure whether they can survive in work which is not a problem for housewives. It seems that for satisfaction for health the effect size is lower and not statistically significant which may support this assumption. There is little the authors can do for this, but this very possible source of bias should at least to be discussed.

We totally agreed with you that health anxiety measures demands along with health itself. We attempted an additional analysis with weighted full-time regular workers (indicated as an employee that is a permanent worker), who were considered having more job demands, and confirmed that the poor health risk increased. We added the information regarding job contract status in the Methods and Results sections, and the discussion of the nature of health anxiety based on your comment in the third paragraph of the Discussion section. The changes were as follow:

--> (Methods) Working women were asked to report average working hours per month, employment contract based on the Labour Survey in Japan,[25] and shift-work status.

-->(Results) The age distribution of working women with family demands was similar to that of housewives, but their marriage rate (93%) was significantly lower than that of housewives (98%). Most working women were employed as permanent workers (59%), and their subjective economic condition and length of tenure at their current job were similar to those of housewives. However, more working women than housewives were satisfied with their present job status (82%). In other words, the proportion of housewives satisfied with their full-time housewife status was less than the proportion of working women satisfied with their employment status.

The demographic characteristics of working women without family demands were very different from those of housewives. Most working women were young (median age, 29 years), not married (98%), and living alone or with someone other than a partner or child. Although most were employed as permanent workers (79%), a significantly lower proportion (32%) of working women than of housewives (47%) described their economic status as upper or upper-middle class. However, working women were significantly more satisfied with their present job status (78%) than were housewives (62%).

--> (Discussion) Anxiety about health was an important subjective symptom among the working-age population because this cohort was exposed to many sources of psychological distress.[29] As previous studies have indicated, questions about anxiety related to health measure not only health itself but also expectations.[33] Anxiety about health among working women may derive from their jobs in that they may be unsure about whether they can survive in a work situation, a factor that was not a problem for housewives. According to a previous longitudinal study, the health status of female workers in Japan with both regular and fixed-term employment deteriorated after 2004. An a posteriori hypothesis suggested that the increase in precarious non-regular work may have been the main cause of the deterioration in workers' health.[34] The working conditions of non-regular workers are known to be very poor compared with those of regular workers in terms of salary and welfare systems,[26] and opportunities to be a full-time regular worker are very limited. Indeed, it is often the case that only new graduates became regular workers.[35] The system governing the labour market and working conditions may contribute to workers' demands to maintain and improve their health.

It would be interesting to know what is the health status of women working part timely. The burden from work in them is not likely to be so severe than in full-timely working women and thus health status is expectedly better.

We took to heart your deep insight into this matter. As in the preceding response, full-time regular working women (indicated as a employee who is a permanent worker) showed a higher risk of poor health status, and it is consistent with your suggestion here. However, the results were not so simple, because other types of working women, such as part-time workers, dispatched workers, term-limited workers, and self-employed workers, showed an additionally higher risk of poor health, if they were without family demands. We would like to focus on the effect of the differences between workers and housewives (unemployment) and in this study consider this with their demands. We think that an assessment and discussion about differences in employment status will be in a future study. We appreciate your understanding regarding our study purpose and future plans.

The authors found evidence about the healthy worker effect in this population as well because 13% of housewives reported that they had retired because of health reasons. Are the results different if these women are excluded from the analyses?

We did analyze excluding these women that retired for health reasons. Most odds ratio increased over the results including these housewives. From this result, the average health status of those retired housewives were expected to be worse than that of the total housewives population.

	With family demand	Without
Anxiety (general)	2.14 (1.26-3.27)	4.13 (1.68-10.1)
(Physical)	1.82 (1.06-3.14)	2.16 (0.80-5.85)
(Mental)	1.81 (0.85-3.87)	4.42 (1.41-13.9)
Dissatisfaction with health	1.75 (2.03-3.00)	2.24 (0.84-5.97)
In sufficient breakfast	1.82 (1.12-2.95)	5.17 (2.11-12.7)
Smoking	2.00 (0.25-15.8)	7.60 (0.65-88.8)
Sleep shortage	1.74 (1.14-2.63)	4.24 (1.71-10.5)
Dissatisfaction	1.63 (0.86-3.09)	2.48 (0.88-7.04)
Difficulty in entering	1.32 (0.81-2.14)	1.91 (0.63-5.78)
Waking	1.53 (0.70-3.35)	1.36 (0.39-4.72)
Early waking	0.87 (0.58-1.32)	1.28 (0.56-2.97)
	2.64 (1.23-5.65)	3.20 (1.09-9.36)
	0.89 (0.57-1.40)	0.57 (0.24-1.37)
	1.84 (0.96-5.53)	0.22 (0.44-3.37)
	1.33 (0.84-2.08)	1.41 (0.58-3.42)

Quality	2.30 (1.02-5.18)	1.86 (0.87-6.06)
	0.87 (0.57-1.33)	0.75 (0.32-1.78)
	1.50 (0.78-2.87)	1.11 (0.40-3.04)
Health checkup	3.84 (2.50-5.89)	12.4 (3.62-42.1)
Medical consultation	1.34 (0.87-2.06)	2.49 (1.03-6.03)
Knowledge health care (work (community))	1.57 (0.86-2.85)	1.73 (0.58-5.21)
	1.31 (0.75-2.28)	4.25 (1.68-10.8)

We touched upon the results of additional analysis as you suggested in the main text, and added our interpretation in this discussion section. In addition, we corrected the percent of housewives who retired because of health problems, and added their number, as following:

--> When asked in the survey why they chose their present status, 15% of housewives ($n = 36$) answered that they retired from work because of their own health problems (data not shown). We conducted an additional analysis including those housewives who had retired for health reasons and found that the risk for poor health was higher among working women. This result indicates that housewives who had retired for health reasons were in poorer health than were housewives in general.

An obvious limitation of the study is that only self-reported information on health is available and thus employment status can affect directly how to answer the question (see my comment above).

In response to your above comment, we described the limitations of self-reported information on health and touched upon the association of employment status and these health outcomes in the third paragraph of the Discussion. We are going to fully use your suggestion in our next report.

It would be interesting if the authors would discuss what type of policy implications their results have in Japan and internationally. Are, for example, the working conditions for females better in Western countries when compared to Japan which could explaining why the healthy worker effect is seen in those countries or is the possibility of Japanese women to stay at home actually good because it gives more opportunities when compared to women in Western countries?

We added information about Japan's situation in the view of supporting housewives economically. We do not compare social systems with other countries, but our examples often become topics of newspaper articles and news as atypical problems in Japan. Therefore, we expect that readers in various countries can understand the specific situation of Japan and difference with their own countries. Please see the discussion.

--> Although the job assistance available to working women is inadequate, several systems support housewives in Japan. For example, Japan has had a universal public pension and health insurance system since 1961, and all citizens must participate in these systems. Japan's pension system provides full-time housewives with various privileges under certain conditions.[37] If a citizen's spouse is a salaried worker and the citizen's annual income is less than 1,300,000 yen (GBP10,000 based on a 130 yen/pound exchange rate), the citizen qualifies for a national pension without paying premiums. The health insurance system is based on the same principle, and salaried workers married to low-income citizens reap some benefits in terms of tax exemptions. In the context of the sex gap characterising earning [37] and participation in economic activities,[23]

this spousal support system is utilised primarily by women. Additionally, housewives who are divorced or widowed are granted privileges in their tax and social welfare allowances. Indeed, the conditions under which a widow can claim exemption differ by sex. Until 2009, allowances for dependent children were provided only to women in Japan. These aspects of the social environment may encourage healthy women to remain in the home and improve their health.

As a minor issue I think that 'study participant' is a better term at least in this kind of observational study than 'study subject'.

Thank you for the suggestion. We have changed this to "study participants."

Reviewer: Kentaro Murakami, PhD

Assistant professor

Department of Social and Preventive Epidemiology

School of Public Health

University of Tokyo

Japan

No competing interests

1. *This study addresses an interesting research topic. However, I feel that there are certain areas that require work as described below.*

Thank you for your valuable comments and suggestions. We addressed each of your comments and revised the manuscript regarding your comments as follows.

2. *Title: It does not seem that the title is based on the present findings, given that employment status was associated with only a few of the variables examined (in Table 3). For example, while there was an association between employment status and anxiety about health (an important outcome measure), there was no association for dissatisfaction with health (another important outcome measure). Why did you describe that working women in this study are sick? I rather consider that working women in this study are generally "healthy" considering their satisfaction with present status (about 80%), satisfaction with health (more than 69%), and participation in annual health checkup (more than 80%). Conversely, housewives in this study may not necessarily be "healthy" given a somewhat high percentage of dissatisfaction with present status (38%). More importantly, I do not consider it is appropriate to use the words healthy or sick only based on subjective measures of health status or behaviors, without any objective measures of health status (e.g., blood).*

We think that increasing health anxiety and poor health lifestyle can predict a possible sick status preceding depression and lifestyle-related disease. Therefore, we added an explanation regarding the selection of health outcomes. The detail reason and explanation were described in the response for your next comment (3), please see below. Here, we amended the title, because it was possible that the previous version was too assertive as you commented. Please see the new title below:

--> THE POSSIBLE ABSENCE OF A HEALTHY-WORKER EFFECT: A CROSS-SECTIONAL SURVEY AMONG EDUCATED JAPANESE WOMEN

3. *Hypothesis: What is your main hypothesis? There are too many outcome measures (in Table 3), making the interpretation difficult. My suggestion is that you concentrate on only a few variables, e.g., self-rated anxiety about health, dissatisfaction with health, and satisfaction with present status.*

The explanation for health outcomes was inadequate and that was likely why you felt the interpretation was difficult. In order to present our study purpose more clearly, we added the reasons around these outcome selections in the main text of the Methods as follows:

--> Because study participants were expected to be generally healthy and their cooperation with this study was solicited via mail, we used subjective health indicators in the questionnaire. Among

women aged 20–44 in Japan, suicide and malignant neoplasm account for almost 60% of the causes of death.[28] For this reason, we used health outcomes to assess health status preceding suicide and lifestyle-related diseases, self-rated health, lifestyle, and preventive behaviour and knowledge.

4. *Page 7 Line 3: When was this survey conducted?*

This survey was conducted between February and May in 2007, which was added where you had commented.

5. *Page 7 Line 7: Response rate should be 16.5% as mentioned in the discussion (although I am not sure how this percentage was obtained) rather than 92.9%.*

We added information regarding the response rate of our survey in “Study population” of the Methods section.

Please see the related changes regarding your comments 4 and 5.

--> In February 2007, we sent reply, postage-paid postcards to all 9,864 female alumnae who graduated from the university between 1983 and 2006 to ask them to participate and received agreement cards from 1,630 (16.5% response rate) by the end of March. We then mailed self-administered questionnaires in April, and received 1,515 responses (valid response rate, 15.4%) by the end of May.

6. *Page 7 Line 15: Why did you put the ref 11 for this sentence?*

This reference has assessed the relationship between dietary pattern and several socioeconomic status. There are a few studies that use “housewife” as a category in socioeconomic status among Japanese populations. We cited this reference because it is a quite a valuable study that used housewives to assess their lifestyle.

7. *Page 8 Line 8: How was the ref 28 based on the question on self-rated health status (a main outcome measure in this study)? Please describe the rationale.*

We modified and added more information regarding the cited reference in order to clarify our study methods related to reference 28 (now 30).

--> Based on previous studies,[30] satisfaction in terms of health (well-satisfied and satisfied vs. not very satisfied and unsatisfied) was explored because level of health satisfaction was expected to predict the level of health status associated with lifestyle and sociodemographic characteristics.

8. *Page 9 Line 11: Why did you consider having preschool-aged children and shift-work status for only the analysis of sleep-related variables but not of other behaviors you examined including breakfast and smoking? Do you have any rationale or hypothesis for this?*

Thank you for reminding us that we did not describe the reason why we assessed the sleep problems with a consideration of shift work and small children. We added the explanation of our purpose to apply a stratified analyses on sleep-related parameters in the previous paragraph where we thought it was more suitable in the procedure. Because the study participants are

women and relatively young, we believe the factor of having small children has a more direct effect on their sleep problems rather than other lifestyle aspects such as breakfast and smoking. Please see the end of the first paragraph of the statistical analysis in the Methods section.

--> Because sleep problems were expected to be associated with irregular lifestyle patterns, such as those involved in shift work and parenting of small children, sleep-related parameters were analysed with and without these risk factors.

9. *Page 9 Line 9: You mentioned that marital status was included in the analysis as a confounding factor. However, the distribution of employment status (housewives, working women with family demands, or working women without family demands) and marital status (yes or no) was almost completely same as shown in Table 1; almost all subjects in the categories housewives and working women with family demands are married while almost all subjects in the category working women without family demands are not married. Thus the adjustment for marital status is nonsense at all. In the case of comparison between housewives and working women with family demands, consideration of marital status is not needed at all. In the case of comparison between housewives and working women without family demands, you cannot distinguish the effect of employment status and marital status at all.*

We attempted multiple analyses adjusted only for age, subjective economic condition, and satisfaction with present employment status, and obtained similar results, rather than an increased health risk of work in several health outcomes, and in those including marital status as adjusted variables. As you mentioned, the marital rates of housewives and working women with family demands were almost the same (98% and 93%), but this absolute difference of 5% indicated a statistically significant difference between the two groups ($p = 0.010$). Thus, in the consideration and risk assessment of employment status and family demands, even if the effect size were relatively small and appeared meaningless, we believe the adjustment of marital status makes sense.

For the comparison between housewives and working women without family demands, the adjustment of marital status might be meaningless, because married status was a trade-off of having paid work among them. Hence, we accepted your comment and re-analyzed it. As the result, we obtained an outcome that supported our hypothesis. Please see the re-analyzed results in Table 3, and related parts of the Result section.

10. *Analysis: It does not seem that comparison between housewives and working women without family demands is useful mainly because of strong collinearity between employment status and marital status. Thus I strongly suggest that you concentrate on comparison between housewives and working women with family demands, as both are usually married in Japan while working women without family demands are not usually married, as shown in this study.*

It is true that the relationship between housewives and working women without family demands is a trade-off, because we defined housewives as women that did not engage in paid work and lived with family members needing care. Our study purpose was to indicate the effect of "work" on health among women in Japan. As to your opinion, from the point of view that these two groups have similar demographic characteristics, it may be useful to show only the results of a comparison between housewives and working women with family demands. However, the health deterioration of working women with family demands would be explained by the burden of having "multiple roles," as discussed in our study. Again, our purpose was to show the effect of "paid work" on health among women working in Japan. To exclude the effect of having "multiple roles"

and the double burden, we had to compare between housewives and working women without family demands, because both did not have multiple roles. We would appreciate your understanding regarding our study purpose and accept that we adequately showed the results of comparison between housewives and two types of working women.

11. *Analysis: Do you have any information on employment condition (e.g., full time or part-time) for working women? Is it justified to combine full time workers and part-time workers in this analysis? If so please describe the rationale with appropriate references.*

We have information on employment condition as to their job contract, and added the information of job contract status in the Methods and Results sections, and a discussion of the nature of health anxiety based on another reviewer's comment in the third paragraph of the Discussion section.

Recently, many researchers have assessed the association between employment status and health, and found that a precarious working style deteriorates health. However, it would be complicated if family demand was added here. In fact, from our data, working women with family demand seemed to be in better health than working women without family demand, although the percentage with a precarious working style of the former was significantly higher than that of the latter. We think this controversial finding needs more detailed examination in a future study and we would like to focus here in this study on the effects regarding workers and housewives (unemployment) considering their demands. We appreciate your consideration of our study purpose and our future research plans.

--> (Methods) Working women were asked to report average working hours per month, employment contract based on the Labour Survey in Japan,[25] and shift-work status.

--> (Results) The age distribution of working women with family demands was similar to that of housewives, but their marriage rate (93%) was significantly lower than that of housewives (98%). Most working women were employed as permanent workers (59%), and their subjective economic condition and length of tenure at their current job were similar to those of housewives. However, more working women than housewives were satisfied with their present job status (82%). In other words, the proportion of housewives satisfied with their full-time housewife status was less than the proportion of working women satisfied with their employment status.

The demographic characteristics of working women without family demands were very different from those of housewives. Most working women were young (median age, 29 years), not married (98%), and living alone or with someone other than a partner or child. Although most were employed as permanent workers (79%), a significantly lower proportion (32%) of working women than of housewives (47%) described their economic status as upper or upper-middle class. However, working women were significantly more satisfied with their present job status (78%) than were housewives (62%).

--> (Discussion) Anxiety about health was an important subjective symptom among the working-age population because this cohort was exposed to many sources of psychological distress.[29] As previous studies have indicated, questions about anxiety related to health measure not only health itself but also expectations.[33] Anxiety about health among working women may derive from their jobs in that they may be unsure about whether they can survive in a work situation, a factor that was not a problem for housewives. According to a previous longitudinal study, the health status of female workers in Japan with both regular and fixed-term employment deteriorated after 2004. An a posteriori hypothesis suggested that the increase in precarious non-regular work may have been the main cause of the deterioration in workers' health.[34] The working conditions

of non-regular workers are known to be very poor compared with those of regular workers in terms of salary and welfare systems,[26] and opportunities to be a full-time regular worker are very limited. Indeed, it is often the case that only new graduates became regular workers.[35] The system governing the labour market and working conditions may contribute to workers' demands to maintain and improve their health.

12. *Analysis: How many subjects were included in the main analysis? Please show the number of subjects clearly in all tables.*

We added the number and information in the bottom note of Table 3.

13. *Table 3: Why are some figures bold in Table 3? The reason should be described to footnote.*

We removed the bold emphasis, because they were unnecessary marks.

14. *Page 17 Line 6: Is the sentence correct? Please check.*

We are sorry that we had left the opposite expression in the process of revision. We corrected this sentence as follows:

--> The proportion of working women receiving health check-ups was significantly higher than that of housewives. However, this result must be interpreted carefully.

15. *Page 18 Line 10: I do not consider this sentence is true; at least some of male Japanese workers with family demands do devote themselves to the home. What kind of evidence supports the sentence?*

We agree with your idea that some Japanese men with family demands do dedicate themselves to their family. This is indicated in the study of Kato and Yamazaki, reference 18. Therefore, we changed the expression to the following:

--> male Japanese workers with family demands tend not to devote time to their domestic situations.

16. *Page 18 Line 13: I do not consider this sentence is true again; at least some of Japanese working women do not suffer from the burden of multiple roles of work and home much like single mothers do. What kind of evidence supports the sentence?*

We apologize for this ambiguous expression. This sentence reflected our thoughts based on our analogism of the relationship between the study results and social environment. We modified this part to the following:

--> we think that Japanese working women, similar to single mothers, may suffer from the burdens associated with holding multiple roles related to work and home

17. Page 18 Line 16: *This paragraph should be deleted because of no publication (no evidence). Alternatively, a more detailed description should be added (some results with statistical testing).*

We added a more detailed description about this preliminary study, and improved the related discussion to promote understanding of the purpose of this preliminary study. Please see this whole paragraph.

--> As a preliminary study, we analysed data from a nationally representative survey, the 2007 Comprehensive Survey of Living Conditions of the People on Health Welfare [38] to assess the effect of employment status on the self-rated health of women in the cohort aged from 22 to 44 years. Subjects were divided into three groups according to job status and marital status: married subjects engaging in housework ($n = 2,153$), married subjects engaging in paid work ($n = 2,989$), and unmarried subjects engaging in paid work ($n = 408$). We conducted similar multiple logistic regression analyses to estimate the risk for poor self-rated health. When married women engaging in housework were used as the reference group, the adjusted odds ratio of poor self-rated health among married working women was 1.00 (95% CI, 0.84–1.21) and that among unmarried working women was 0.96 (95% CI, 0.77–1.12). We found no evidence that working women had a significantly better health status than did housewives, even when income levels were subjected to greater control (upper 25% or lower 75%) to test the effect of socioeconomic status, which was used to approximate educational background. Although the definitions of the groups used in the preliminary study were not identical to those used in the present research, our study is consistent with these national data in terms of the health of working women in Japan.

18. Page 19 Line 1: *To support this sentence scientifically, I suggest you should put some evidence or statistics to show that the students in this national university really come from various areas and different socioeconomic backgrounds.*

We are not able to show statistics of this type of demographic information from this university due to study-participant confidentiality limitations. Instead, we added information regarding all national universities, and introduced a study for population dynamics in a metropolitan area. Because we used indirect evidence, we modified our description from an assertive expression to one of presumption in the related sections. Please see this paragraph.

--> A report issued by the Japan Association of National Universities indicated that more students with lower income levels attend national than private universities and that national universities can mitigate regional economic disparities between metropolitan and rural areas.[39] Metropolitan areas tend to attract more than the national average of individuals aged ~20 years, probably due the educational and employment opportunities available in such places.[40] Therefore, students are expected to come to these areas from a variety of locations around the country.

19. Page 19 Line 5: *It may be reasonable to consider that the results are not generalized mainly because of a considerably low response rate. Alternatively, please add more evidence that the present population can be considered representative of well-educated women.*

As we had already discussed with the low response rate and the lack of generalizing on the whole population as a study limitation, we could not find evidence to improve the representation of study participants. We would appreciate your consideration that our several modifications and additional discussion can substitute for such evidence.

We modified the expression of the study generalizability as follows:

--> Based on these findings and the study limitations, our results can be generalised as representative of well-educated women, a group whose numbers are expected to increase in the future.

And we added three paragraphs of discussion about reasons and possible bias from a low response rate.

--> We recruited study participants by asking for voluntary participation, and 16.5% of candidate subjects showed a willingness to participate. Moreover, the final response rate was 15.4%. We propose two reasons for such a low response rate. First, it is possible that some potential participants lacked confidence. This survey, which was conducted with the cooperation of the alumnae association, was the first experience available to this group via this channel. Indeed, the alumnae association had never released contact information for the purpose of a particular study. Due to the increased emphasis in Japan on the protection of personal information, many people have become very sensitive about the use of their private address, even for a purpose related to public welfare. This has been particularly so since the Personal Information Protection law went into effect in April 2005, which was just before this survey was conducted. Many potential respondents may have reacted with suspicion to our mailed solicitation of participation. In fact, the alumnae association received a number of inquiries to confirm that this survey was endorsed by the association. This would indicate that many potential participants were sceptical and did not take action.

The complexity of the study design may have been another reason for the low response rate. The survey was implemented in two phases, recruitment and participation. The complexity of the procedure may have operated synergistically with the aforementioned lack of confidence, in that potential respondents were unable to obtain more detailed information about our study, including the actual questionnaire, until they received the second mailing. Moreover, transfer students were unable to participate due to the two-phase procedure, because the school and fiscal years in Japan begin in April. The effect of not updating contact information on the low response rate remains unknown, but can be estimated as very small because the alumnae association frequently uses this contact information to send alumnae bulletins at regular intervals.

Thus, from the perspective of selection bias, study participants may have held positive attitudes towards public health and related research and maintained relatively stable lifestyles. The effect of the former tendency is ambiguous, but the latter tendency may have improved the accuracy of our findings given that life transition was a confounding factor.

20. *Limitation: limitations on self-reported nature of all variables used (e.g., no objective measures of health status) should be considered and discussed.*

We added this in the first mention of limitations of our study.

--> This study has several limitations. First, all variables were measured by self-reporting. Objective measures of health status, such as biochemical examinations and physiochemical studies, would be more appropriate for inclusion in evidence-based assessments of health status. It may be feasible to use objective measures to study individuals who belong to a particular health-related group, such as hospital patients, disease or accident survivors, and students in a maternity or parenting class, by visiting the appropriate venue. According to other questionnaire-based

research that relied on mailed surveys or interviews, the observed result should be interpreted as in the range of subjective health status.

21. *Minor: Please add line numbers.*

We apologize for making review more difficult without the line numbers. We will follow the manuscript format per the policy of *BMJ Open*; *Do not use the automatic formatting features of your word processor such as endnotes, footnotes, headers, footers, boxes etc. Please remove any hidden text.* (<http://group.bmj.com/products/journals/instructions-for-authors/formatting/>)

Reviewer: Torill Bull, PhD

Postdoctoral researcher

Department of Health Promotion and Development

Faculty of Psychology

University of Bergen

Norway.

No competing interests.

Thank you for your comments, please see our responses below.

While the study design and description overall are clear and appropriate, there are a few minor comments I would like to make:

1) I would like a better description of the health anxiety outcome measure

This was a concern shared by you and other reviewers, and as such, we described health anxiety in more detail, along with other outcome measures as follows:

--> Because study participants were expected to be generally healthy and their cooperation with this study was solicited via mail, we used subjective health indicators in the questionnaire. Among women aged 20–44 in Japan, suicide and malignant neoplasm account for almost 60% of the causes of death.[28] For this reason, we used health outcomes to assess health status preceding suicide and lifestyle-related diseases, self-rated health, lifestyle, and preventive behaviour and knowledge.

Anxiety regarding health (general, physical, and mental) was addressed to screen for symptoms of depression, which precede most suicides.[29] Based on previous studies,[30] satisfaction in terms of health (well-satisfied and satisfied vs. not very satisfied and unsatisfied) was explored because level of health satisfaction was expected to predict the level of health status associated with lifestyle and sociodemographic characteristics.

2) I would like a statement of 'status satisfaction' is referred to on page 8 line 8. By reading statements later in the paper I assume this is satisfaction with employment status, but it needs to be clarified at first mention.

Your suggestion is quite reasonable, and we added an explanation as follows:

--> In addition to job status and family demands (marital status and family members), participants were also asked about their age, place of residence (the first three zip-code digits), subjective socioeconomic status (upper, upper-middle, middle, lower-middle, or lower), satisfaction with present employment/unemployment status (well-satisfied and satisfied vs. not very satisfied and

unsatisfied), and the length of time at their present employment/unemployment status. Working women were asked to report average working hours per month, employment contract based on the Labour Survey in Japan,[25] and shift-work status.

3) *on page 7 the study population is well described, but I find there should also be a mention of the response rate of the 1,630 out of the initial 9,864 invitees. However, it is redeeming that this low initial response is discussed later in the paper.*

We modified the response rate in the Methods section, and added a discussion of this low response rate. Please see the changes in these sections.

--> (Methods) In February 2007, we sent reply, postage-paid postcards to all 9,864 female alumnae who graduated from the university between 1983 and 2006 to ask them to participate and received agreement cards from 1,630 (16.5% response rate) by the end of March. We then mailed self-administered questionnaires in April, and received 1,515 responses (valid response rate, 15.4%) by the end of May.

--> (Discussions) We recruited study participants by asking for voluntary participation, and 16.5% of candidate subjects showed a willingness to participate. Moreover, the final response rate was 15.4%. We propose two reasons for such a low response rate. First, it is possible that some potential participants lacked confidence. This survey, which was conducted with the cooperation of the alumnae association, was the first experience available to this group via this channel. Indeed, the alumnae association had never released contact information for the purpose of a particular study. Due to the increased emphasis in Japan on the protection of personal information, many people have become very sensitive about the use of their private address, even for a purpose related to public welfare. This has been particularly so since the Personal Information Protection law went into effect in April 2005, which was just before this survey was conducted. Many potential respondents may have reacted with suspicion to our mailed solicitation of participation. In fact, the alumnae association received a number of inquiries to confirm that this survey was endorsed by the association. This would indicate that many potential participants were sceptical and did not take action.

The complexity of the study design may have been another reason for the low response rate. The survey was implemented in two phases, recruitment and participation. The complexity of the procedure may have operated synergistically with the aforementioned lack of confidence, in that potential respondents were unable to obtain more detailed information about our study, including the actual questionnaire, until they received the second mailing. Moreover, transfer students were unable to participate due to the two-phase procedure, because the school and fiscal years in Japan begin in April. The effect of not updating contact information on the low response rate remains unknown, but can be estimated as very small because the alumnae association frequently uses this contact information to send alumnae bulletins at regular intervals.

Thus, from the perspective of selection bias, study participants may have held positive attitudes towards public health and related research and maintained relatively stable lifestyles. The effect of the former tendency is ambiguous, but the latter tendency may have improved the accuracy of our findings given that life transition was a confounding factor.

4) *i would like a brief description of the differences between a 'health check-up' and a 'medical consultation'.*

We have added some brief descriptions:

--> Both kinds of utilisation of health services involved preventive behaviours, but they differed in terms of phase and cost: the former was usually provided in the absence of any objective or subjective symptoms and almost all costs were covered by employers or local government; the latter was usually initiated in response to symptoms or suspicion of disease, and patients were responsible for at least 30% of consultation fee.

5) *the abstract/key messages are mostly accurate, but in the key messages on page 3, line 46, it is difficult to understand what is meant by 'The social environment should be reconsidered'.*

We modified it to be more specific:

--> The social environment that is presumed to support workers should be reconsidered

6) *I find it unusual to insert the brackets for references AFTER the punctuation marks instead of before.*

We apologize for this formatting issue. We will follow the reference format per the policy of *BMJ Open* (<http://group.bmj.com/products/journals/instructions-for-authors/formatting/>):

Citing in the text

References must be numbered sequentially as they appear in the text. References cited in figures or tables (or in their legends and footnotes) should be numbered according to the place in the text where that table or figure is first cited. Reference numbers in the text must be inserted immediately after punctuation (with no word spacing)—for example, [6] not [6].

Overall, I find the results and conclusion very well presented, but there are some minor comments:

1) *On page 10 line 23, again I would like the type of status satisfaction specified.*

We thought it made it difficult to understand that the present status indicated the difference between housewives and working women, so we added the following expression.

--> In other words, the proportion of housewives satisfied with their full-time housewife status was less than the proportion of working women satisfied with their employment status.

2) *on the same page, I would like a specification for why preschool-aged children and those working shifts were excluded, and which of the groups (total subject or those without preschool-aged children/shift work) the authors considered to be most relevant group to focus on.*

We added reasons for selection for these sub-groups in the statistical analysis of the Methods section according to another reviewer's comment. Please the following changes.

--> Because sleep problems were expected to be associated with irregular lifestyle patterns, such as those involved in shift work and parenting of small children, sleep-related parameters were analysed with and without these risk factors.

Additionally, we agree with your comment, and thus we added the results of this sub-group in the explanation of Table 1 indicating the reason for the selection, as the following:

--> Because shift work and/or pre-school-aged children were thought to be risk factors for sleep-related problems, the three groups were compared in terms of the proportions of participants with those risk factors. The housewives group contained the highest proportion ($n = 139$, 56.3%) of those with these risk factors; this was followed by working women with family demands ($n = 297$, 47.6%) and working women without family demands ($n = 79$, 18%). Those proportions reflect statistically significant differences among groups.

3) On page 14, the sentence beginning on line 10 (Although - - -) is a bit unclear. I guess there should be a mention that this refers to working women without family demands, as those with family demands do not show a higher tendency to dissatisfaction?

Yes, we would like to say that even though working women “without family” demands did not show significant dissatisfaction, they did indicate the highest prevalence in Table 2. We changed the condition of the multiple logistic regression analyses according to another reviewer's comment, obtained slightly different results, and modified the related part as follows:

--> Anxiety about health was more prevalent in working women without family demands, whereas anxiety about general and physical health was more prevalent in working women with family demands. Furthermore, working women without family demands showed a significantly higher risk of being dissatisfied with their health status.

4) On page 18, in line 45, there should be a specification of which data (own, or national), in the statement ' ..., since we analysed the data after adjusting for educational background'.

We described this preliminary study in more detail according to your comment and that of other reviewers. Please see this revised paragraph below.

--> As a preliminary study, we analysed data from a nationally representative survey, the 2007 Comprehensive Survey of Living Conditions of the People on Health Welfare [38] to assess the effect of employment status on the self-rated health of women in the cohort aged from 22 to 44 years. Subjects were divided into three groups according to job status and marital status: married subjects engaging in housework ($n = 2,153$), married subjects engaging in paid work ($n = 2,989$), and unmarried subjects engaging in paid work ($n = 408$). We conducted similar multiple logistic regression analyses to estimate the risk for poor self-rated health. When married women engaging in housework were used as the reference group, the adjusted odds ratio of poor self-rated health among married working women was 1.00 (95% CI, 0.84–1.21) and that among unmarried working women was 0.96 (95% CI, 0.77–1.12). We found no evidence that working women had a significantly better health status than did housewives, even when income levels were subjected to greater control (upper 25% or lower 75%) to test the effect of socioeconomic status, which was used to approximate educational background. Although the definitions of the groups used in the preliminary study were not identical to those used in the present research, our study is consistent with these national data in terms of the health of working women in Japan.

5) *I find your results really interesting. I would have liked it a lot if you could have focussed a little bit more on the potential ways in which the Japanese culture differs from other OECD countries and therefore might explain this differing pattern of employment status and health. I guess that might be what you refer to in the key messages when you say 'social environment'? Could this be reinforced as a message? Do you think cultural expectations or work conditions are the strongest explanatory factors for the lack of a healthy worker effect?*

We added information about Japan's situation in terms of how housewives in Japan are supported economically. We do not compare social systems within other countries, but examples we utilized are often topics of newspaper articles and news as atypical problems in Japan. Therefore, we expect that readers in various countries can understand the specific situation of Japan and difference in their countries. Please see the discussion below.

--> Although the job assistance available to working women is inadequate, several systems support housewives in Japan. For example, Japan has had a universal public pension and health insurance system since 1961, and all citizens must participate in these systems. Japan's pension system provides full-time housewives with various privileges under certain conditions.[37] If a citizen's spouse is a salaried worker and the citizen's annual income is less than 1,300,000 yen (GBP10,000 based on a 130 yen/pound exchange rate), the citizen qualifies for a national pension without paying premiums. The health insurance system is based on the same principle, and salaried workers married to low-income citizens reap some benefits in terms of tax exemptions. In the context of the sex gap characterising earning [37] and participation in economic activities,[23] this spousal support system is utilised primarily by women. Additionally, housewives who are divorced or widowed are granted privileges in their tax and social welfare allowances. Indeed, the conditions under which a widow can claim exemption differ by sex. Until 2009, allowances for dependent children were provided only to women in Japan. These aspects of the social environment may encourage healthy women to remain in the home and improve their health.

6) *The differences from housewives are larger for the group of working women without family demands. Could you comment upon this?*

We think that you mean the large difference observed in their basic characteristics, such as marital status, living situation, and age. As another reviewer commented, marital status was a trade-off with "having work" between these two group, so we re-analyzed or odds ratios without adjusting for marital status among them. Marital status and living situation were potential factors of definition for housewives and family demands, but the difference in age warrants additional comments. We believe that many Japanese women are still facing a choice between a career or marriage. We added our thoughts regarding this in the Discussion as follows:

--> We found a significant difference between housewives and working women without family demands in terms of demographic characteristics, especially among younger members of the latter group. Our data indicated that many younger workers did not marry and devoted themselves to regular paid work. In the context of the aforementioned labour market and working conditions, many Japanese women face a choice between a career and marriage. This situation may support the aforementioned assumption that workers feel unsure about whether they can survive in the work environment.

Overall, I find you have written a very interesting paper with a high level of precision, despite my comments and wishes for some clarifications. I hope it will soon find its way into the literature!

Thank you for your encourage comments. We would like to publish our findings over the world to improve whole workers' health.

VERSION 2 – REVIEW

REVIEWER	Karri Silventoinen, PhD Population Research Unit Department of Social Research University of Helsinki Finland
REVIEW RETURNED	11-Jun-2012

GENERAL COMMENTS	The authors have answered satisfactorily to my comemnts and I do not have any further comments.
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REVIEWER	Torill Bull Postdoctoral researcher Department of Health Promotion and Development Faculty of Psychology University of Bergen NORWAY
REVIEW RETURNED	27-Jun-2012

GENERAL COMMENTS	I find the authors have adequately addressed the issues I raised in the first round of reviews.
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