Author's response to reviews

Title: Prevalence of risk factors for non-communicable diseases in the Mekong Delta, Vietnam: results from a STEPS survey

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Author's response to reviews: see over
Dear Dr Norton,

Re: Submission of revised manuscript 1612781332645693

Thank you for your consideration of our manuscript entitled “Prevalence of risk factors for non-communicable diseases in the Mekong Delta, Vietnam: results from a STEPS survey”.

We found the referee comments to be very helpful and have revised the manuscript accordingly. I hereby submit the revised manuscript for consideration for publication in the *BMC Public Health*.

The corresponding author for this manuscript will be Dr. Au Bich Thuy, Tel: 61 3 6226 4716, Fax: 61 3 6226 7755, E-mail: bau@utas.edu.au. We hope that you find this revised manuscript to be suitable for publication.

Yours sincerely

Au Bich Thuy
## Point-by-point responses to referees’ comments:

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| Referee 1 | The referee states that “limited knowledge” is generated from the survey and that the paper needs to be made “more interesting to international readers” | We must have failed to clearly convey to the referee the two major contributions made by this paper:  
1. The hitherto unreported unfavourable risk profile of older women relative to men in this population. This occurs despite the women having almost no exposure to two of the major NCD risk factors (smoking and alcohol);  
2. The new information that the risk profile of this predominantly rural population is markedly different to that previously reported for Vietnam based on big city surveys, and hence that the big city surveys may not provide representative information for the 80% of the population who live outside Ha Noi and HCMC.  
Additionally, the big city surveys made use of convenience samples and were not population-based. To clarify the importance of these contributions, we have replaced the following paragraph on page 10 of the Discussion:  

We found that tobacco smoking and alcohol consumption were much more common among men than women, with two-thirds of men being current smokers and nearly 40% of them consuming alcohol weekly compared with 1% or less of women. The men were more active, with half of them having a high level of physical activity, and fewer of them were overweight or obese (using the WHO recommended Asian cutpoint of BMI $\geq 23$ kg/m$^2$). Women generally had a less favourable NCD risk profile, particularly at older ages. The oldest women in this sample had similar mean levels of SBP and higher BG and TC than their male counterparts in all but the youngest age group. These differences persisted after adjustment for BMI and measured behavioural risk factors (tobacco smoking, alcohol consumption, fruit and vegetable consumption, and physical activity). Factors that we did not measure in this survey, and which may account for the elevated risk of women, were hormonal status, saturated fat consumption and salt intake. |
The first principal finding of this study was that older women in this representative sample generally had an unfavourable NCD risk profile. The sex differences in SBP and TC persisted after adjustment for BMI. This has not been reported previously for Asian populations, but it mirrors reports for some Western populations that blood pressure and TC of men and women converge with advancing age [1-3]. For BG, we found a statistically significant stronger cross-sectional increase with age for women that was diminished by adjustment for BMI but strengthened by additional adjustment for behavioural risk factors. This cross-sectional pattern of increasing levels of BG with age for women, and higher levels for women at older ages, appears not to have been reported previously. Factors not measured in this survey, and which may account for the elevated risk among women, were hormonal status, saturated fat consumption and salt intake.

The second principal finding was the risk profile of this predominantly rural population of Vietnam was markedly different to that reported previously for the two major cities. (continues)

<table>
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<tr>
<th>Point 2</th>
<th>The referee states that “the study is confined to just one province of one country”</th>
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<td>This is the first study to provide information on the NCD risk profile of people in the Mekong Delta. There are approximately 18 million inhabitants in this region of Vietnam, and they comprise 21% of the Vietnamese population. Additionally, it provides new information that may be more representative of the NCD risk profile of the 80% of the population who live outside the two big cities.</td>
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<th>Point 3</th>
<th>The referee states “the analysis is somewhat routines and comparisons are made only with a few Vietnamese studies”</th>
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<td>Very limited information on NCD risk factors is available for Vietnam, and the information is restricted to survey results from convenience samples of just a few districts of Ha Noi and HCMC. This is the first study to provide representative population-based data for Vietnam.</td>
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<tr>
<th>Referee 2</th>
<th>Major compulsory revisions</th>
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Point 1 | The referee states “the second objective (to study the associations between surveyed risk factors) is less clear. It would benefit the paper greatly to clarify which associations would be examined specifically and why. This should also involve stating some hypotheses, especially in light of previous studies”
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| We agree that the second aim is not clear. To clarify, we have replaced the following paragraph on page 4 of the Background:

This study aimed to describe the prevalence of risk factors for NCD in a rural Vietnamese sample from the Mekong Delta using standardised survey methodology developed by the World Health Organization (WHO) - the STEPwise approach to surveillance of non-communicable diseases (STEPS) [4]. In addition, the associations between surveyed risk factors were examined to help explain the differences in prevalence found in this sample when compared to the big city samples of Ha Noi and HCMC.

with this paragraph:

This study aimed to describe the prevalence of risk factors for NCD in a rural Vietnamese sample from the Mekong Delta using standardised survey methodology developed by the World Health Organization (WHO) - the STEPwise approach to surveillance of non-communicable diseases (STEPS) [4]. In addition we compare estimates for men and women in this sample, and our results to those of previous surveys conducted in the two big cities and investigate possible explanations for the differences found.

In lieu of stating hypotheses, we provide a better explanation and justification for the analyses undertaken. Those analyses amount to investigating whether the differences in prevalence of raised BG and blood pressure (the outcome factors) between men and women in this sample could be attributed to differences in behavioural risk factors or BMI (the explanatory factors). Additionally, we draw inferences about whether the difference in the estimates of these outcome factors between our sample and the big city surveys could be attributed to the differences in the study factors.

Point 2 | The referee states “The questions and rationale of this study should be discussed, not only in relation to the study of the big city samples of
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| When the Epidemiological Field Laboratory (Fila) of Bavi was established in 1991, Bavi was a district of the Hatay province bordering Ha Noi province. The Bavi district is a small area (410 square kilometres) with a population of 238,000 and is located 60 kilometres west of Ha Noi. It has since been reclassified as a district of Ha Noi province.
Ha Noi and HCMC but also in relation to the 2005 Bavi district study. In particular, the reader needs to understand how the present study constitutes an addition to the findings of the Bavi district study (other than the obvious fact that the location is different)”

We have two concerns about data from FilaBavi. Firstly, although the district “…was considered typical of Vietnam in socioeconomic and health status” (Chuc NTK, Diwan VK: FilaBavi, a demographic surveillance site, an epidemiological field laboratory in Vietnam. *Scand J Public Health* 2003, 31 Suppl. 62:3-7), in reality the population of Bavi is extremely poor with average income of just UAD 78 in 2005 when GDP per capita in Vietnam was USD 3071. The average landholding is just 532 square metres. We do not consider that Bavi provides representative data for rural Vietnam, and certainly not for the riverlands of the Mekong Delta where income is much higher and land holdings are much larger. As evidence that the health status of the population of Bavi is atypical of that of other parts of Vietnam, the reported prevalence of overweight (BMI \(\geq 25 \text{ kg.m}^2\)) in 2005 was only 3.0% (men) and 3.5% (women). These percentages are less than one third of the respective prevalence in Can Tho, and a sixth of those in the big cities. Secondly, a series of intervention studies designed to improve the health of the population of FilaBavi have been conducted since the late 1990s. We expect these community interventions will have had, and will continue to have, an impact on the health status of the population.

The referee asks that more information be provided about Bavi in order to explain how the present study adds to the findings from FilaBavi. We have added a brief summary of the argument above to the Discussion section by replacing the following sentence on page 11:

Nothing has been reported for the population of the Mekong Delta, where residents have a distinctively different lifestyle.

with this sentence:

There have been some data reported for the population of Bavi [5], an extremely poor district of Hanoi [6], but the findings from this study are unlikely to represent the risk profile of the population of the Mekong Delta where income is much higher and land holdings are much larger.

<p>| Minor essential |  |</p>
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<th>Revisions</th>
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| **Point 1** | The referee states “More information on the location of the present study and its characteristics would be useful for the reader (see point #2 in the previous section)”
| **We have added the following sentences to the Introduction:** |
|  | Home to 21 percent of the country’s population, the Mekong Delta – literally the “nine dragon river delta” – is the far southern region of Vietnam. The tributaries of the Mekong River act as a transport network and deposit alluvium, increasing the fertility of the soil that produces abundant harvests of rice and other crops [7]. The river system is also a significant source of food to the population via the fish it supplies. |
| **Point 2** | The referee states “In the Measurements section, it was stated that the questionnaire was "modified with expanded and optional questions to suit local needs." These modifications should be described further, as they add interest to a study that applies standardized methodology”
| **We have added the following sentences to the Methods:** |
|  | Extended questions were questions in the STEPS instrument modified by adding locally relevant response options (that described types of work specific to the local area, for example). Optional questions were new questions added to the instrument because they were deemed locally important (in relation to passive smoking, for example). All the modifications were done in accordance with the WHO STEPS manual [4]. |
| **Point 3** | The referee states “The Statistical Methods section should identify explicitly which variables were treated as exposure and/or outcome variables in the different analyses (this relates to point #1 in the previous section)”
| **In reporting each analysis undertaken, we provide a better explanation and believe that doing so has clarified this issue. Additionally, we have added the following sentence to the Methods:** |
|  | In regression analyses, we investigated whether differences between men and women in change in SBP, BG and TC with age could be explained by differences in the four behavioural risk factors or BMI. |
| **Point 4** | The referee states “the authors should clarify to the readers what is meant by “complex survey analysis methods””
| **We have replaced the following sentence on page 7 of the Methods:** |
|  | Complex survey analysis methods were used to estimate the prevalence of study factors. 
| **with this sentence:** |
|  | Analyses were performed using STATA software version 9.2. Complex survey analysis methods were used to estimate the prevalence of study factors taking
into account the sampling design and the sampling weight of each participant.

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<th>Point</th>
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<td>5</td>
<td>The referee states “Table 1: add p-values for the differences of the characteristics between men and women”.</td>
<td>We have added p-values for these sex differences to Table 1.</td>
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<td>6</td>
<td>The referee states “Tables 2 and 3: 95% CI are not what is presented. Either calculate the 95% CI or change the heading of the column (SE?)”.</td>
<td>We provided 95% confidence intervals, but apparently in a confusing manner. We have revised Table 2 and 3 by replacing the 95% CI column with standard error (SE) values.</td>
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<td>7</td>
<td>The referee states “In the Results section (page 8), fruit and vegetable consumption between men and women in the different age groups appears not to be significantly different, as the confidence intervals overlap”.</td>
<td>We agree, and have deleted the paragraph in question.</td>
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<td>8</td>
<td>The referee states “In all the tables, present blood pressure findings as &quot;hypertension&quot; using the definition provided in the Methods section (i.e. as one variable, rather than SBP and DBP separately)”</td>
<td>As requested, we have removed the blood pressure data from Table 3, and now report categories for normotensive and hypertensive participants. We have substantially revised Table 4 (see Point 9).</td>
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<td>9</td>
<td>The referee states “Table 4 should be re-done using multivariate regression analysis to control for age (and possibly education). However, Table 4 (and all the figures) should be reconsidered in line with comment #1 in the previous section (i.e. specific hypotheses regarding associations”</td>
<td>Because we are not investigating specific hypotheses regarding associations between measured factors (see Major compulsory revision Point 1), we have removed the data on behavioural risk factors from Table 4</td>
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We have rewritten the References to follow the appropriate format.

We have clarified the second aim of the paper (see our response to referee 2, Major compulsory revisions, Point 1).

This study is a survey of the Can Tho population using STEPS methodology. The sample was not a sub-sample from a national study.

We have moved the following sentence on page 7 of the Results to the Subjects and sampling section of the Methods on page 5:

The sample of eligible subjects consisted of 2683 persons of whom 73.7% (1978/2683) participated in this survey.
| **Point 4** | The referee states “More information is needed about how the questionnaire was filled, and the staff involved in data collection and taking measurements. These points were mentioned in the last paragraph of the discussion. I think it’s more appropriate to mention them in the methodology section.” | We have replaced the following paragraph on page 6 of the Methods:

Biochemical measures included fasting total cholesterol (TC) and fasting blood glucose (BG) measured in capillary blood using a Roche Diagnostics Accutrend Glucometer. All measurements were performed in accordance with the WHO STEPS protocols [4]

with these paragraphs:

Biochemical measures included fasting total cholesterol (TC) and fasting blood glucose (BG) measured in capillary blood using a Roche Diagnostics Accutrend Glucometer.

Data collection staff were medical doctors, laboratory technicians and medical students. They underwent intensive training and supervision provided by the Menzies Research Institute. A pilot study was conducted to test survey instruments and procedures before actual data collection. Questionnaires were administered by face-to-face interviews. All measurements were performed in accordance with the WHO STEPS protocols [4] at a clinic set up at 16 different field testing sites. |

| **Point 5** | The referee states “In the first paragraph of the results, the last sentence was correct for men but not for women”.

The sentence was correct for both men and women but, to clarify, we have replaced the sentence:

The most common occupation was farming.

with this sentence:

The most common occupation (particularly among men) was farming. |

| **Point 6** | The referee states “The numbers presented in the second paragraph...” | The referee was correct. The second paragraph on page 8 of the Results section presented information from additional analyses, which was not presented in the tables. |
in the results reading table 2 were not found in the table nor could be derived from it”.

| Point 7 | The referee states “In the discussion the author mentioned that the residents of Mekong Delta have distinctively different lifestyle. This needs to be explained further either by providing reference documenting these differences or by listing the differences in the discussion. I would suggest that the author provide some background information about the study region and compare it to the general population in Vietnam”.

We have provided more background information about the study region in the Introduction as described in our response to Point 1, Minor essential revisions of referee 2 above. |
| Point 8 | The referee states “The second paragraph of the discussion is just a repetition of the results. I would suggest that the author put more analytical import in it or remove it. This applies to different parts of the discussion”.

We have revised this paragraph (see our response to referee 1, Point 1). We have also modified other parts of the Discussion where appropriate. |
| Point 9 | The referee states “access date for online references should be added”

We have rewritten the References to add access dates for electronic resources. |
| Point 10 | The referee states “The information presented in figure 1 and 2 can be presented in one figure showing the relation between hypertension and body mass index adjusting for age. Otherwise, the author need to

We experimented with combining the figures, but found the result to be lacking in clarity. Therefore, instead of combing the figures, we have provided more information on the relation between hypertension and BMI adjusting for age by replacing the following sentences on page 10 of the Results:

Hypertension prevalence increased linearly with BMI (p = 0.020 for men and p <
present the results adjusted for age in the text”.

| Point 11 | The referee states “Tables 2 and 3 columns were labelled % + 95CI while the numbers presented were either standard deviation or standard error. Needs proper labelling” | We have revised Table 2 and 3 by replacing the 95% CI column with standard error (SE) values. |
|-point 12 | The referee states “Table 2. There are % signs next to alcohol consumption results for women. The table needs editing and clarification as mentioned earlier” | We have revised the table accordingly. |
| Discretionary revisions | The referee gives suggestions for some minor changes in the text and tables. | We thank the referee and have revised the paper as advised. |