Author’s response to reviews

Title: Physical and mental health associated with intimate partner violence among women utilizing community health services in Gujarat, India

Authors:

Akiko Kamimura (akiko.kamimura@utah.edu)
Vikas Ganta (vikas-ganta@chai-india.org)
Kyl Myers (kylmyers@gmail.com)
Tomi Thomas (frtomithomas@chai-india.org)

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Author's response to reviews: see over
Dear reviewers,

We thank you and the reviewers for the careful attention to our manuscript. The reviewer's comments were very helpful in improving the text of the manuscript. We hope that our responses and the modifications fully integrate the reviewer's insights and sufficiently respond to their criticisms. Our responses to the reviewer's comments are detailed below.

**Reviewer #1**

**Reviewer comments:**
01. References missing in second last paragraph in Introduction on a few important points.

**Author response:**
As the reviewer 2 suggested drop childhood abuse and in-law abuse, the paragraph which you mentioned was entirely deleted.

**Reviewer comments:**
02. Details related to organization have been shared which is methodologically irrelevant. There is a need to write down scientific relevant methodology. I would suggest authors should read multiple articles to be able to understand how to write methodology. Here come some examples of methodology:

**Author response:**
Thank you very much for introducing your articles to us. We reviewed your articles and re-organized the method section and added more information.

**Reviewer comments:**
03. Study team says that they ensured the accuracy of translation but they do not mention how they do that, please explain the process.

**Author response:**
We included more detail information about the process. Please see page 5, last paragraph.
Reviewer comments:
04. Whether the PHQ questionnaire is validated in India or not and what is its validity in of the Gujrati version used
Author response:
PHQ-9 and PHQ-15 have been used in India but the information about validity is not available. We included this information in the method and the limitation sections. Please see page 8, paragraph 2; page 9, paragraph 1; and p. 17.

Reviewer comments:
05. Data analysis do not specify which type of regression analysis they used
Author response:
Multiple regression was used. We included the information in the manuscript. Please see page 10, last paragraph.

Reviewer comments:
06. The researchers used both chi square test and regression analysis, T test and regression analysis where they should be using either one of them. In result section select one and show tables accordingly.
Author response:
There were both categorical and continuous variables. To conduct the comparisons correctly, it was necessary to use both chi-square (for categorical variables) and t-tests (for continuous variables) because either one cannot be used for both categorical and continuous variables.

Reviewer comments:
07. Need to add more articles to refer pick from neighboring country.
Author response:
We added more articles from neighboring countries such as Pakistan and Bangladesh in the background and discussion sections.

Reviewer #2

Reviewer comments:
1. It would be very helpful to focus this paper on the physical and mental health outcomes of women who experience IPV. Presenting your data on multiple types of victimization (childhood abuse, IPV and in-law abuse) is very interesting, but I would recommend removing the data on childhood abuse and in-law abuse from the manuscript given that your multivariate results focus on IPV. The analysis of the various perpetrators, types of violence (physical, sexual, emotional), and frequency of violence experience is very interesting and could certainly be explored in-depth in another paper. Focusing on IPV will also allow you to go more in-depth in the Background and Discussion sections. Given that childhood abuse and in-law abuse are only included in Table 2, this information can be easily removed to bring greater focus to the paper.
Author response:
We removed data on childhood abuse and in-law abuse and focused only on IPV. We added prevalence of each type of violence incident to Table 2. But we do not have data on frequency of violence for IPV.

Reviewer comments:
2. Since your analyses are focused on IPV among ever-married women, it would be clearer to restrict all of your analyses to the 167 ever-married women who answered the IPV questions
rather than including the unmarried in your All Participants columns. This would help make the Results section clearer since you would not have to specify the ever-married population when describing your results.

**Author response:**
We included the 167 participants only for the analysis and revised the manuscript and tables accordingly.

**Reviewer comments:**
Abstract
3. Please revise according to comments on each section of the paper.

**Author response:**
We revised the abstract based on the revisions of the manuscript. We also changed the title accordingly.

**Reviewer comments:**
Background
4. Overall, it would be nice to see more synthesis of the information in the Background section. Currently it is more a list of numbers and risk factors. It would be especially helpful to synthesize the literature on the mental and physical health consequences of IPV, and the mechanisms through which IPV is expected to affect these (will have to pull more broadly from the IPV literature, not just from India).

**Author response:**
We added a paragraph regarding the literature on the mental and physical health consequences of IPV, and the mechanisms through which IPV is expected to affect these to the background section. Please see page 3, paragraph 2.

**Reviewer comments:**
Methods
5. Paragraph 1: Please add a summary of the study design here. Cross-sectional, facility-based study?

**Author response:**
We added the information. Please see page 5, paragraph 2.

**Reviewer comments:**
6. Data collection: In this section, please include:
   a. Number of health centers where data collection occurred. Was this all community health centers run by the NGO in Gujarat (or in Rajkot district), or a sample? If a sample, how were the health centers selected?
   b. Please provide more information on the type of health services provided at the health centers. Do they focus on maternal and child health services, or do they provide general health care?
   c. Please add information on training that the staff members received. Were they trained on informed consent?
   d. Did the staff members explain the study to the clients during recruitment? Were women able to ask questions about the study before consenting to participation?
   e. Please add information on how literacy was assessed in the clinic. Given that this is likely to be a low literacy population, can you provide a sense of what proportion were excluded due to literacy?

**Author response:**
Thank you very much for your comments. We included all requested information. All community centers (18) were included for the data collection. It was not a sample. The health centers provide general health care and do not particularly focus on maternal and child care. The staff members
received training including informed consent prior to the data collection. The staff members explained the study to potential participants. The potential participants had an opportunity to ask questions before and during the survey. Illiteracy was assessed based on the clients’ self-report. 30-35% of the clients were excluded due to illiteracy. Please see pages 5-6.

**Reviewer comments:**
7. Measures – Health status: Please clarify the following:
   f. First sentence: It’s helpful that you list the types of health measures, but more detail would be helpful here. It isn’t clear why perceived health is different – since this is selfreported, aren’t all of the measures her perception of her physical or mental health? It would also be helpful to say more about what is meant by “social health”.
   **Author response:**
   We added “perceived” before health status to make it clear that the health measures were based on participants’ perceptions. We also explained “social health.”
   Please see page 7, last paragraph.

**Reviewer comments:**
8. Measures – Health status: Please clarify the following:
   g. It would also be helpful to mention whether or not the DUKE profile has ever been used in India or other countries in South Asia, and if any information is available on its validity and reliability in this setting.
   **Author response:**
   The DUKE profile has been used in India. We added this information with a reference. Please see page 8, last paragraph. However, no information is available regarding its validity and reliability in India. We mentioned this in the limitation section. Please see page 17.

**Reviewer comments:**
8. Measures – Somatic symptoms: As above, it would be helpful to mention whether the PHQ-15 has been used in India or other countries in South Asia, and any available information on its validity and reliability in this setting.
Author response:
The PHQ-15 has been used in India. We added this information with references. Please see page 9, paragraph 1. However, no information is available regarding its validity and reliability in India. We mentioned this in the limitation section. Please see page 17.

Reviewer comments:
9. Measures – Abuse experience:
j. Please add more information on how the “scores” were created. It would be interesting to incorporate your data on severity and frequency of violence experience into the score given that you have the data.
Author response:
We had data on frequency of violence experience only for childhood abuse. So there is no data on frequency of IPV. Also we did not have data on severity of IPV. We included this point in the limitation section. Please see page 17. On IPV experience, the data which we had basically whether a participant experienced each type of incident. We clarified this point in the method section. Please see page 10, paragraph 1.

Reviewer comments:
k. Please also specify whether you have data on frequency of violence and/or on timeframe of violence experience, i.e. in past year.
Author response:
For IPV experience, we did not have data on frequency of violence. The timeframe of IPV experience is lifetime. We added this information. Please see pages 9-10.

Reviewer comments:
10. Data Analysis:
l. First paragraph: Please add a bit more detail on how you are defining IPV – is this experience of any type of IPV (i.e. experiencing emotional violence only once or twice is classified as experiencing IPV)?
Author response:
Yes, it referred to any type of IPV. We added this information to the paragraph. Please see page 10, paragraph 2.

Reviewer comments:
m. Second paragraph: Please specify what type of regression. It looks like these were all multiple linear regression since I believe that all of your outcomes were continuous. Results
Author response:
Yes, we used multiple linear regression. We included this information in the paragraph. Please see page 10 paragraph 3.

Reviewer comments:
11. Paragraph 4, sentences 3-4: This is where you discuss the different types of IPV women experience. It would be more helpful to make the point that physical abuse alone is most common, but that many women experience multiple forms of violence (that 27.7% experience all three forms is very important).
Author response:
Thank you very much for your suggestion. We made the point in the paragraph. Please see page 12, paragraph 1.
Reviewer comments:
Discussion
12. There are several interesting findings that are not addressed in the Discussion section. Please add a discussion of:
n. Finding that socio-demographic characteristics not associated with IPV (this is contrary to the literature you’ve cited in the Background).
Author response:
We discussed the results in the discussion section. Please see page 16, paragraph 3.

Reviewer comments:
o. Finding that women experience multiple types of violence – 27.7% of women who experience IPV experience physical, sexual and emotional abuse. Can also discuss the range in severity here, emotional only to experience of all three types.
Author response:
We included this point in the discussion section. Please see page 14, last paragraph to page 15, paragraph 1.
But we are not sure if emotional abuse only is less severe than all types of IPV in terms of the impact on health because a study conducted by Yoshihama et al. (2009) concluded that there is no significant difference in physical and mental health outcomes between emotional IPV only and all three types of IPV. We cited this article in the discussion section. Please see page 15, paragraph 2.

Reviewer comments:
p. You have not included any discussion of your multivariate results. Please discuss the most important findings about the association between IPV and mental and physical health outcomes and why these findings matter.
Author response:
We moved the paragraph about the impact of IPV on health from the results of the current study up to the second paragraph of the discussion section and added more explanations. Please see page 14, paragraph 2.

Reviewer comments:
13. Paragraph 4: It seems a bit dubious to conclude that facility-based IPV interventions should be implemented based on the evidence presented in this paper. That most women do not seek help or seek help from informal sources suggests that community-level interventions would be a more natural fit. Given the success of grassroots movements in India in preventing violence against women and girls (most notably the Gulabi gang in UP), community-level interventions should be discussed as a way to address the issue of IPV.
Author response:
Community-based interventions are discussed. Please see page 15, paragraph 3 to page 16, paragraph 1.

Reviewer comments:
14. Paragraph 4: In addition to community-level interventions, please add a broader discussion of the types of facility-based IPV interventions that could be implemented. There is a large literature on facility-based violence screening in the U.S. (and likely in other settings), and this should be included in your discussion.
Author response:
We mentioned about IPV screening programs in the discussion section. Please see page 15, paragraph 3.
Reviewer comments:
15. Paragraph 5: The caste association with poor mental and physical health should also be explored in more depth. Really, you find that caste is associated with poor social health (not surprising), anxiety, pain and somatic symptoms. All of your participants are patients in a health center, and it could be that low caste women are more likely to come in with more serious ailments than higher caste women because they don’t feel welcome in the centers and wait longer to come in. This would explain both increased anxiety while waiting in the waiting room (because they do not feel comfortable/welcome) and increased pain and somatic symptoms.
Author response:
This is a good point, though the health centers treat all patients equally regardless of castes.

Reviewer comments:
16. Limitations:
q. Please add that some of your instruments have not been validated in the South Asian setting. If they have all been validated in South Asia, please add that information in the Methods section.
Author response:
Thank you very much for your suggestion. We added the information in the method section and the limitations. Please see page 17.

Reviewer comments:
i. In addition to the issue of only including literate women, please also add that as this study was conducted among a facility-based sample of women, they may be more likely to have lower mental and physical health scores than the general population (as they or their child are currently sick).
Author response:
We included this point in the limitation section. Please see page 17.

Reviewer comments:
ii. Women in your study may also be more likely to demonstrate help-seeking behaviors than women in the general population, so this may affect your findings on the prevalence of help-seeking for IPV.
Author response:
We included this point in the limitation section. Please see page 17.

Reviewer comments:
Conclusions
17. Please revise this section according to the comments in the Discussion section. You will want to mention a diversity of intervention options and may want to remove the conclusion on caste.
Author response:
We mentioned diversity of intervention options in the conclusion section and removed the conclusion on caste. Please see page 18, paragraph 1.

Reviewer comments:
Minor Essential Revisions
Background
1. Paragraph 2: Remove “(Jain, 2013)”
Author response:
We removed “(Jain, 2013)” from the paragraph.
Reviewer comments:
Methods
2. Participants: Please add the total number of study participants here.
Author response:
We added the total number of study participant in the method section. Please see page 6, paragraph 2.

Reviewer comments:
3. Measures – Health status: Please clarify the following:
a. First sentence: Do you mean that these measures are assessed over the past week?
Author response:
About half of the measures were assessed health status over the past week while other examined the current condition. We clarified this point. Please see page 7, paragraph 3.

Reviewer comments:
4. Measures – Depression:
a. First sentence: Please provide examples of the kinds of activities assessed.
Author response:
The PHQ-9 does not provide examples of the kinds of activities assessed, but simply say “things.” So we are unable to include examples of the kinds of the activities. Instead, we added two other examples of the items. Please see page 8, paragraph 2.

Reviewer comments:
b. Please clarify the last sentence in this paragraph. I am not sure whether you’re saying that you added the PHQ-9 because previous studies in India used this rather than the DUKE (and you wanted your study to be comparable), or whether you’re just saying that you wanted to use both assessments given that depression is an important outcome.
Author response:
We intended the latter “you wanted to use both assessments given that depression is an important outcome.” Please see page 8, paragraph 2.

Reviewer comments:
5. Measures – Somatic symptoms, first sentence: Remove “(Kroenke…,2002)”
Author response:
We removed “(Kroenke…,2002).”

Results/Tables
Reviewer comments:
6. Paragraph 3: The sentence that begins “The prevalence of childhood abuse was significantly higher” has a very long string of results in parentheses that are difficult to understand. Please rewrite so that each result is clear if you keep this information in the paper (i.e. Among women who have experienced IPV, 26.5% also experienced childhood physical abuse, compared to only 8.3% of women who have not experienced IPV.)
Author response:
Because we dropped childhood abuse from this paper, the sentence is no longer relevant. We deleted the sentence accordingly.

Reviewer comments:
7. Table 2: Please reorder the types of violence from least to most severe (e.g. could range from
emotional only to all three types of abuse).

Author response:
This is kind of hard because we did not access actual “severity” but just asked lifetime occurrence of IPV incidents. There is no way to know which is severer, physical abuse or sexual abuse. In addition, emotional abuse can be severe for some cases. Furthermore, we do not know whether all three types of IPV are always less severe than two of the types of IPV. We did our best to reorder the items.

Reviewer comments:
8. Table 4 and 5: Please move IPV to the top of these tables as it is your key independent variable of interest in the analyses.

Author response:
We moved IPV to the top of Table 4 and 5.

Reviewer comments:
9. Table 5:
  a. It would be helpful to label “DUKE depression” and “PHQ-9 depression” in the table so that it’s clear that these are both measuring depression. It would also be helpful to put these two columns next to each other.

Author response:
We put the labels and these depression measures next to each other.

Reviewer comments:
  b. Please also label the PHQ-15 column with something more descriptive, e.g. “PHQ-15 somatic symptoms”.

Author response:
We added “somatic symptoms” after “PHQ-15” on the label.

Reviewer comments:
Discretionary Revisions
1. Methods, paragraph 1: You may want to move the last part of this paragraph (starting with “The primary aim of the community organization...”) to the last paragraph in the Background section. It seems like the information on the organization would fit better before the sentence in Background paragraph 5 that begins “There are two main reasons...”.

Author response:
We moved the sentences to the Background paragraph 5. Please see page 4, paragraph 2.

Reviewer comments:
2. This is such an incredibly interesting dataset, and I think that you could make a more significant contribution to the literature by looking at more sensitive measures of IPV. All of the analyses dichotomize IPV into any experience of IPV, which could include one or two incidences of emotional abuse or could be daily physical and/or sexual victimization. Since we know that these different types of violence experience are likely to affect women’s physical and mental health very differently, it seems like a missed opportunity to simply dichotomize if you have rich data on type of violence and frequency available to you. You said in the limitations that you didn’t have a large enough sample size to look at different types of violence, but I still wonder if you could classify women into mile, moderate and severe categories using your data on type of violence and frequency. It would be very interesting to look at the association between the different levels of violence and physical and mental health outcomes as well as differences in help-seeking behaviors.
Author response:
Thank you for your suggestion. We included the prevalence of each IPV incident in Table 2 and explained the results in the text. As mentioned above, we do not have data on “severity” and frequency of IPV, but do have data on lifetime prevalence (experienced at least once sometime in life) of each type of IPV incident. For example, we do not know whether a woman who experienced “kicked” and “hit, slapped, or pushed” is in a severer category than a woman who experienced only “pushed, grabbed, or shoved” because we do not know the seriousness of each violent incident. In addition, we do not have data on frequency (how often IPV happened). We do not know if a woman who experienced emotional IPV only is in a less severer category than a woman who experienced physical IPV (e.g. what if a woman experienced emotional IPV every day for 20 years while another woman experienced physical IPV only once 20 years ago?) So we do not have any standards to classify women into mild, moderate and severe categories. We included this point in the limitation section. Please see page 17.

We are grateful for the helpful review of our manuscript. We hope our revisions will meet the needs of BMC Women’s Health and look forward to hearing from you regarding the manuscript.
Physical and mental health associated with intimate partner violence among women utilizing community health services in Gujarat, India

Akiko Kamimura  
Vikas Ganta  
Kyl Myers  
Tomi Thomas

Akiko Kamimura, PhD, MSW, MA  
Assistant Professor, Department of Sociology, University of Utah, Salt Lake City, Utah, USA.

Vikas Ganta, MA  
Project Officer, the Catholic Health Association of India, Secunderabad, Andhra Pradesh, India

Kyl Myers, MS  
Doctoral student, Department of Sociology, University of Utah, Salt Lake City, Utah, USA.

Tomi Thomas, PhD, MSW  
Director General, the Catholic Health Association of India, Secunderabad, Andhra Pradesh, India

Correspondence should be sent to Akiko Kamimura, PhD, MSW, MA, Department of Sociology, University of Utah, 380 S 1530 E, Salt Lake City, Utah 84112, USA (E-mail akiko.kamimura@utah.edu; telephone number +1-801-581-7858; fax number +1-801-585-3784).
Physical and mental health associated with intimate partner violence among women utilizing community health services in Gujarat, India

Abstract

Background: Intimate partner violence (IPV) is a significant public health threat which causes injury and acute and chronic physical and mental health problems. In India, a high percentage of women experience IPV. The purposes of this study include 1) to describe the lifetime prevalence of IPV, and 2) to examine the association between IPV and physical and mental health well-being, among women utilizing community health services for the economically disadvantaged in India.

Methods: Women utilizing community health services (N = 219) aged between 18 and 62 years completed a self-administered survey in Gujarat, India. Standardized instruments were used to measure perceived physical and mental health well-being. In addition, participants were asked about their lifetime experience with IPV, and socio-demographic questions. One hundred sixty seven (167) participants who had been married and indicated whether they had experienced IPV or not were included in the data analysis.

Results: Participants with a lifetime history of IPV were more likely to have reported poorer physical and mental health compared to those without a lifetime history of IPV. More than half of the participants with an IPV history experienced multiple types of IPV (physical, sexual and/or emotional IPV). While being in the highest caste was a significant positive factor associated with better health, caste and other socio-demographic factors were not associated with IPV.

Conclusions: Women in India face risk of IPV. Yet those experiencing IPV do not seek help or rely on informal help sources. Community health organizations may take a role of IPV prevention and intervention. Diversity of intervention options would be important to encourage more women with IPV experience to seek help.

Key words

Intimate partner violence, physical and mental health, women’s health, community health services, India
Introduction

Intimate partner violence (IPV) is a significant public health threat which causes injury and acute and chronic physical and mental health problems [1-3]. IPV comprises of physical, sexual and psychological violence committed by a current or former intimate partner including a spouse or a dating partner [4]. According to a World Health Organization (WHO) survey of ten countries, the lifetime prevalence of physical IPV varies from 15% to 71% [5].

Previous studies examined physical and mental health consequences of IPV. Physical health problems resulting from IPV include physical symptoms (e.g. irritable bowel disease or fibromyalgia) [1-3,6-9]. Depression and post-traumatic stress disorders are common mental health consequences of IPV [3,10]. IPV is also one of the major risk factors of suicide attempts [11]. Because women do not always seek health care immediately following an IPV incident [12], it is often difficult to identify which type of IPV affects what specific health problems especially if a woman experiences multiple types of IPV. But in general, injuries are the major health outcomes associated with immediate healthcare utilization [12,13]. Among women who had experienced IPV, those who had more social support reported better physical and mental health than those who had less social support [14].

In India, more than one third of women experience physical or sexual violence some time in their lifetime [15]. The lifetime prevalence of IPV was 37.9% based on the 2005-2006 India National Family Health Survey 3 [16]. The prevalence of IPV was approximately 30% to 40% at orthopedic trauma hospitals [17]. The percentage of women who had experienced IPV is high among outpatient psychiatric patients, over 55%, and the majority of the women who had experienced IPV reported depression [18].
Risk factors of IPV in India include low household income, low education levels, low caste, husband’s alcohol drinking [19], wives’ lower economic status than husband’s, and women’s unemployment [20]. Previous studies in India reported health problems associated with IPV among women including poor mental health including mental disorders depressive disorder, attempted suicide [21-24], terminated pregnancy [25], gynecological complaints, low Body Mass Index, and sexually transmitted infections [26].

The purposes of this study are to describe the lifetime prevalence of IPV, and to examine the association between IPV and health and well-being among women utilizing community health services for the economically disadvantaged in India. This study focuses on spousal abuse as IPV because marriage is related to social and cultural pressures that control the position of women in family and society in India [27]. The primary aim of the community organization where this study was performed is to promote community health. The organization was founded about 70 years ago and has more than 3,000 member institutions throughout India. The services provided at the organization and member institutions include prevention and treatment of communicable and non-communicable diseases, advocacy to promote “health as a right for all”, disaster management, and disability rehabilitation. There are two main reasons that this study targeted women utilizing community health services for the economically disadvantaged in particular. First, while women utilizing such community health services lack access to regular healthcare and may be at risk of poor health and IPV, little information is available about their abuse experience and health. Second, the knowledge about what community health organizations may offer to prevent or intervene IPV to ensure women’s health and safety in India is lacking. This study contributes to expanding the literature on health and abuse experience and to
providing knowledge for developing intervention programs and research projects to improve health and safety of women.

**Methods**

**Study design and participants**

The current project was a cross-sectional facility based study and based on the collaboration between a nonprofit community health organization in India and a research team of an academic institution in the US. The staff of the community organization and the research team worked together to develop the survey instrument, study protocol, participant recruitment strategies, and interpreting study results. The data collection was performed in Rajkot city in Gujarat, India. The state of Gujarat is located on the north-west coast of India. Rajkot city is in the center of the state with a population of approximately 1.3 million.

This study was approved by the institutional review board (IRB) of the US academic institution. The community organization provided a letter to permit data collection to the IRB. To ensure participants’ anonymity, identifiable personal information (e.g. name, phone number, address) was not collected. All survey materials including a consent cover letter, a flyer and a survey instrument, were available to participants in Gujarati (a main language in the state of Gujarat). A native Gujarati speaker, who is fluent in English, translated English materials into Gujarati. Another native Gujarati speaker, who is fluent in English, conducted the back-translation for the survey instrument. The study team then checked the accuracy of the translation. When the back-translation had a different meaning from the original English version, the Gujarati and the back-translation were re-done. This process was repeated three times. A third bilingual speaker checked translation accuracy in the case of differing translations.
The data were collected at 18 community health centers that are primarily for the economically disadvantaged (in 14 slums of Rajkot city and four villages within Rajkot district) in Gujarat, India for 47 days in the fall of 2013. The community health centers included all community health centers of the community organization in Rajkot, Gujarat. The community health centers ask clients to pay only a minimum fee. Although the community health centers provide general health care and serve women and men, the majority of people who utilize services at the centers are women.

Study samples were convenience samples and were women who were aged 18 years or older, spoke and read Gujarati, and were seeking services at a community health center. Literacy of a potential participant was assessed based on a self-report. The staff who took main responsibility of the data collection reported that approximately 65-70% of the health centers’ patients were literate during the time of the data collection. The potential participants were visiting the community health centers primarily for seasonal illness. Out of the 219 participants who completed the survey, 169 participants had ever been married (currently married, widowed, or divorced). Among ever-married participants, 83 women had ever experienced IPV while 84 women had never experienced IPV. Two of the ever-married participants did not indicate whether they had been abused by their spouse or not. After excluding the two participants, 167 participants were included in analysis.

**Data collection**

The 11 staff members of the community health centers collected data, on average three hours per day. The staff members received training on the data collection procedure and informed consent at the community organization in Gujarat. Recruitment occurred at a
community health center by distributing flyers explaining the survey to clients in the waiting room. If a potential participant expressed interest in participating in the study, she received a consent cover letter and a self-administered paper survey. The staff members were available to answer questions from participants before consenting to participation and during the survey participation.

Measures

Demographic characteristics
Demographic questions included age, educational level, current employment status and sector (government or private), marital status, household income per month in Indian Rupees, number of people living in the household, religion, caste, number of children, type of house (a Pakka house which is solid made of concrete, stone, brick or cement, or a Kuccha house made of mud or hay stack or tin roof), and living area (urban or rural).

Perceived health status
Perceived health status was measured using the Duke Health Profile (DUKE). The DUKE consists of 17 items and includes health measures (physical, mental, social, general, perceived health, and self-esteem), and dysfunction measures (anxiety, depression, pain, and disability) [28]. About half of the measures assessed health status over the past week while the remaining examined the current condition. Social health refers to participation in social activities and relationships with family or other people [29]. The DUKE uses a 3-point Likert scale except for the last question asking the days of “Stay in your home, a nursing home, or hospital because of sickness, injury, or other health problem” using None/1-4 days/5-7 days. Scoring (the score
range 0-100) was based on the user manual [29]. Higher scores indicate better health status for the health measures and worse status for dysfunction measures. There is no specific cut-offs for health and dysfunction and the scores are considered continuous. The validity and reliability of the DUKE has been tested [29]. The DUKE has been translated into more than 17 languages and has been widely used in and outside of the US [29] including in India [30].

**Depression**

The Patient Health Questionnaire (PHQ)-9 measures levels of depression and asks how often a participant has been bothered by nine kinds of problems in the past two weeks such as *little interest or pleasure in doing things, feeling tired or having little energy,* and *poor appetite or overeating* using a 4-point Likert scale (0 = not at all and 3 = nearly every day). The PHQ-9 scores are total scores of the nine items (total score range 0-27). Depression severity is defined as: minimal, 0-4; mild, 5-9; moderate, 10-14; moderately severe, 15-19; severe, 20-27[31]. The PHQ-9 scores were used for describing the overall level of self-reported depression. The responses were not verified by a clinician. The PHQ-9 is a valid and reliable tool and has been widely used internationally including in India [32-34]. While the DUKE has a depression measure, an additional depression measure from the PHQ-9 was added because depression is an important outcome. Previous studies showed the significant association between IPV and depression [23] and high prevalence of depression in slum communities related to IPV [35] in India.

**Somatic symptoms**
The Patient Health Questionnaire (PHQ)-15 is a valid, 15-item measure of somatic symptoms (Kroenke, Spitzer, & Williams, 2002). The PHQ-15 asks respondents to report somatic symptoms that they have experienced in the past four weeks using a 3-point Likert scale (0 = Not bothered at all, 1 = Bothered a little, 2 = Bothered a lot; with total score ranging from 0-30). Examples of somatic complaints represented by the items include stomach pain, back pain, and headaches. The PHQ-15 scores are the total scores from the 15 items and are defined as: no somatic disorder 1-4; mild somatization disorder 5-9; moderate somatization disorder 10-14; severe somatization disorder 15+. The PHQ-15 is a valid and reliable measure of somatic symptoms and has been used in various countries [36-39] including in India [40,41]. But the information of the validity and reliability of the PHQ-15 in India or Gujarati is not available.

**IPV experience**

IPV experience was measured using questions extracted from a research project on IPV and help-seeking among Asian Indian, Pakistani and Filipino immigrant women in the US with permission from the primary author of the questionnaire [42]. The study team used the questions because those questions are comprehensive, have been used for Asian Indian women, and fit the social context of Indian society. The participants who had been married but were not currently married answered based on her ex- or late- husband. The first question asked the nature of marriage (e.g. love marriage, arranged marriage, forced marriage). Then, the participants were asked if their husband or in-laws physically abused (e.g. pushed, grabbed, hit, slapped, kicked, used knife), sexually abused (e.g. forced or attempted to force sex), or emotionally abused them (e.g. denied access to money, made unwanted phone calls, separated or took away children) at least once sometime in their life. Participants answered whether they did or did not experience
each kind of incident. The scoring was based on lifetime prevalence for each type of abuse (physical abuse, sexual abuse, or emotional abuse) (1=experienced in lifetime, 0=never experienced). Finally, the participants were asked to whom they sought help for abuse from husband (e.g. did not seek help, parents, health care facilities; 1=yes or 0=no) for each item.

**Data analysis**

Data were analyzed using SPSS (version 19). Descriptive statistics were used to describe the distribution of the outcome and independent variables. Descriptive data were presented as means with standard deviations (SDs) for continuous variables, and frequencies and percentages for categorical variables. The ever-married participants were classified into two groups: participants who had ever experienced any type of IPV; and those who had never experienced IPV. These two groups were compared using Pearson Chi-square for categorical variables and independent samples t-test for continuous variables. Logistic regression was performed to examine the association between socio-demographic characteristics (i.e., age, education, work status, length of marriage, number of children, monthly income per person, caste, type of house, living area) and the lifetime experience of IPV.

Multiple linear regression analysis was conducted to test the association between health and dysfunction, and IPV and socio-demographic characteristics among ever-married participants. Never-married participants were excluded from the regression analysis because they had never had a risk of spousal IPV. Each health or dysfunction measure was examined using separate models. Regression coefficients (standard errors) were used to obtain a 95% confidence interval.
Results

Table 1 describes the socio-demographic characteristics of the 167 participants. The average age of the participants was 35.2 years (SD = 9.2). More than one third of the participants (n=59, 35.3%) had secondary education (eighth grade) or higher level of education. Approximately 60% of the participants (n=104) were employed (not including domestic work or seasonal farm work). The majority of the participants (n=160, 95.8%) were currently married. The average length of marriage was 13.7 years (SD=8.6). The average monthly income per person (monthly household income divided by the number of people living in the household) was 2,930.0 Indian Rupees (SD=4,007.7) or 46.9 US Dollars (1 Indian Rupee = 0.016 US Dollar, December 2013; Average monthly income per person in Gujarat in 2011-2012 was 1,430.1 in rural areas and 2,472.5 in urban areas in Indian Rupee) [43]. The average number of people in the same household was 5.1 (SD=1.6). More than ninety percent of the participants (n=153) reported their religious belief was Hindu. One fourth of the participants (n=42, 25.1%) reported their caste was general (highest). More than half of the participants (n=92, 55.1%) lived with in-laws (husband’s parents). The average number of children was 1.9 (SD=1.1). While approximately 70% of the participants (n=115, 68.9%) lived in a Pakka house, solidly made of concrete, stone, brick or cement, others (n=45, 26.9%) lived in a Kuccha house made of mud or hay with a tin roof. One third of the participants (n=58, 34.7%) lived in an urban area. Arranged marriage was common among the participants (n=142, 85%). There was no significant demographic difference between ever-married participants with IPV experience and those without IPV experience.

Table 2 summarizes IPV experience and help-seeking for spousal IPV among participants who had experienced IPV. Logistic regression was performed to examine the impact of socio-
demographic characteristics on the lifetime experience of IPV (not shown on the table). None of the socio-economic factors were associated with IPV. Nearly 40% of the participants with IPV (n=31, 37.3%) experienced physical IPV only. Although physical abuse only was most common, many women experienced multiple forms of violence. Nearly 30% of the ever married women with IPV (n=23, 27.7%) experienced all three forms of IPV. Other types of abuse included physical and emotional IPV (n=12, 14.5%), physical and sexual IPV (n=8, 9.6%), emotional IPV only (n=8, 9.6%), and sexual and emotional IPV (n=1, 1.2%). The most common physical IPV incident was “pushed, grabbed, or shoved” (n=50, 29.9%) followed by “kicked” (n=36, 21.6%). Husbands attempting or having actually forced the participant to have sex against her will was common sexual IPV (attempted n=28, 16.8%; actually forced n=24, 14.4%). “Damaged property” was the most common emotional IPV (n=32, 19.2%) followed by “separated or took away children against your wishes” and “isolated, restricted, or controlled; did not give you enough food, clothing, medical care, etc.” (n=29, 17.4% for each item). Approximately 45% of the participants with IPV experience (n=37) did not seek any help for IPV. Seeking help from informal sources (e.g. parents 47%, siblings 18.1%, friends or neighbors 14.5%) was more common than that from formal help sources (e.g. social service organization 12%, health care facilities 8.4%, police or law enforcement 8.4%).

Table 3 presents physical and mental health comparisons between ever-married participants with IPV experience and those without IPV experience. Ever-married participants with IPV experience reported poorer physical health (p<0.05), mental health (p<0.01), and social health (p<0.05), and lower self-esteem (p<0.01) compared to ever-married participants without IPV experience. In addition, ever-married participants with IPV experience reported higher levels of anxiety (p<0.01), higher levels of depression (DUKE-depression and PHQ-9, p<0.01)
and more somatic symptoms (p<0.05) than those without IPV experience. While ever-married participants with IPV experience reported mild depression (PHQ-9 score=5.7, SD=7.6) and mild somatization disorder (PHQ-15 score=6.5, SD=8.8), those without IPV experience reported minimal depression (PHQ-9 score =2.5, SD=3.7) and no somatic symptoms (PHQ-15 score=3.8, SD=5.2).

Table 4 summarizes predictors of physical and mental health (physical health, mental health, social health, and self-esteem from the DUKE) among ever-married participants. Perceived health was not included because there was no significant variation among the participants. Spousal IPV was associated with poorer physical health (p<0.01), mental health (p<0.01), and social health (p<0.05), and lower levels of self-esteem (p<0.01). Being in the highest caste (general) was associated with better social health (p<0.05).

Table 5 describes predictors of dysfunction (anxiety, depression and pain from the DUKE), depression (from the PHQ-9) and somatic symptoms (from the PHQ-15) among ever-married participants. Disability from the DUKE was not included because there was no significant variation among the participants: few of whom reported disability. Spousal IPV was associated with higher levels of anxiety (p<0.01), depression (PHQ-9, p<0.01), and pain (p<0.01), and more somatic symptoms (p<0.05). Being in the highest caste was associated with lower levels of anxiety (p<0.01) and fewer somatic symptoms (p<0.05). Higher educational level was associated with higher levels of depression (p<0.05) from the DUKE depression measure. There was no such effect from the PHQ-9 depression measure, however.

Discussion
This study described the lifetime prevalence of IPV, and examined the association between IPV and physical and mental health well-being among women utilizing community health services for the economically disadvantaged in India. There were three main findings in this study. First, participants who had experienced IPV reported poorer physical and mental health compared to those who had not. Second, many women experienced multiple types of IPV. Third, while being in the highest caste was a significant factor associated with better health, caste and other socio-demographic factors were not associated with IPV.

Participants who had experienced IPV reported poorer physical and mental health than those without IPV. The results are consistent with previous studies [1-3,10] and suggest providing IPV prevention and intervention would be important to improve women’s health. Nevertheless, the majority of the participants with IPV experience did not seek any help or relied on informal help sources. The results on help seeking behaviors were constant with a previous study in India: only one third of women sought help for the last IPV incident and the majority of them sought help from informal sources mainly from parents [44]. Only 8.4% of participants with IPV experience in the current study sought help for IPV from healthcare facilities. Barriers to seeking help need to be identified and eliminated to ensure health and safety of women experiencing IPV.

While physical abuse only was the most common IPV experience, more than half of the participants with an IPV history experienced all types of or two types of IPV. There is a study from New Zealand which examined overlap of types of IPV [45]. The results of the New Zealand study indicated that the most common abuse was psychological abuse only. Similarly, a study from Japan shows that emotional IPV was more commonly experienced than physical and sexual IPV among women with an IPV history [12]. However, the results of the current study
suggest that physical IPV (physical IPV only or physical IPV plus sexual and/or emotional IPV) is the most common type of IPV in India.

The impact of each type of IPV or multiple types of IPV on health has been examined but the results of previous studies are not consistent. The results of the study in South Africa indicated that emotional abuse only had less impact on depressive symptoms and psychological distress compared to physical and/or sexual abuse and emotional abuse [46]. Another study conducted in Japan suggest that there was no significant difference in physical and mental health outcomes between emotional abuse only and all types of IPV [47]. The impact of emotional IPV on health is especially under-studied [47]. Future research would warrant how the relatively high percentage of physical IPV and emotional abuse in India would affect health of women who had experienced IPV differently from other countries.

It may be challenging for abused women to seek help particularly for IPV because of fears to disclose abuse or lack of awareness of available formal resources [44]. The women in the current study were seeking community health services for seasonal illness. If community health centers provide prevention and intervention for IPV along with their regular health services, it may be easier for abused women to seek help from health care facilities for IPV. IPV screening at a facility would be another potential intervention, though a number of challenges have been reported to implement an IPV screening program, such as lack of time and organizational support [48] and also the limitations of IPV screening programs (e.g. low identification rate of IPV, insufficient evidence of the effectiveness of IPV screening to improve women’s health) [49]. In addition to facility-based interventions, community-level interventions would be necessary as community norms are significantly associated with spousal physical IPV in India [50]. A community based IPV prevention program using campaign activities which have been
implemented in the Gujarat community in the US [51] may be one of the models for community health centers in Gujarat to include IPV prevention and intervention in their regular services. Further research and practice are necessary to develop IPV prevention and intervention programs which fit community health centers in India.

Besides IPV, the most influential factor on health was caste. Participants in the highest caste (general) reported better health than those in the lower caste. Previous studies show that caste was associated with the utilization of and access to maternal and reproductive health care [52,53], childhood immunization [54], the receipt of state financial support [55], and household health expenditure [56]. In any case, caste is not something that individuals can change. Any health-related barriers that people in lower castes face should be eliminated to ensure rights to healthcare for everyone.

Contrary to previous studies [19,20], there was no significant difference in socio-demographic characteristics such as caste, low household income, low education levels, and women’s work status between participants with IPV experience and those without IPV experience. There are two possible explanations of the results. First, it is possible that there were few variations in socio-demographic characteristics among participants because all of the participants were seeking health care at a community health center for the underserved. Second, husbands’ socio-demographic characteristics (e.g. husband’s educational level, occupation, use of alcohol) often influencing IPV occurrence [57,58] were not included in the current study. Future studies should examine how socio-demographic characteristics of a husband and a wife would affect IPV and women’s health in India.

Limitations
This study has some limitations. Because this study used a self-administrated survey, there were no illiterate participants. Women who do not have education have a higher prevalence of IPV compared to those with education [59]. Future research should include illiterate women using an interviewer-administrated survey. As this study was conducted among a facility-based sample of women, the participants of this study may be more likely to have lower mental and physical health scores than the general population. Although all scales used in this study are validated and reliable, the validity and reliability of these scales in India or in Gujarat is not necessarily available. This study was cross-sectional and could not examine causal relationships among the variables. The number of participants was too small to examine how types of IPV were associated with different physical or mental health issues. We did not have data on severity and frequency of IPV experience. Thus we were unable to classify the participants based on the severity of IPV which might have affected health differently. The participants of this study were seeking help at a community health center and therefore women in this study may also be more likely to demonstrate help-seeking behaviors than the general population. This might have affected the findings on the prevalence of help-seeking for IPV. Finally, the information about the characteristics of the participants’ husbands was not collected. Such information may be important because the characteristics of abusers are often related to IPV. For example, the educational level of male partners, not just that of women, affects the occurrence of IPV in India [60].

Conclusions
The findings of this study contribute to a better understanding of IPV experience and perceived physical and mental health among women utilizing community health services in India. Women in India are at risk of IPV. Women with IPV experience are more likely to report poorer physical and mental health. Yet women experiencing IPV do not seek help or they rely on informal help sources. Community health organizations may take a role in IPV prevention and intervention because it would be easier for abused women to visit a community health center for general health issues and to receive additional services related to IPV if necessary rather than visiting a center particularly for IPV. Finally, diversity of intervention options would be important to encourage more women with IPV experience to seek help.

Competing interests
The authors declare that they have no competing interests.

Author’s contributions
AK contributed to the conception and design and the collection and analysis of data, and prepared the first draft of the paper. VG and TT made significant contribution to the conception and design and the data collection, and were involved in drafting the manuscript and revising the manuscript critically for important intellectual content. KM participated in the interpretation of the statistical analysis and was involved in drafting the manuscript and revising the manuscript critically for important intellectual content. All authors read and approved the final manuscript.

Author’s information
AK is an Assistant Professor of Sociology at the University of Utah. She received PhD in Health Services Organizations and Policy and the Master of Social Work from the University of Michigan. Her current research is suited within two specific areas: global health research related to violence against women; and community-based research concerning healthcare for the underserved. VG is a Project Officer for the Catholic Health Association of India and is responsible for hospital consultation and children’s health programs. He also has experience in data management and analysis. KM is a doctoral student in the Department of Sociology at the University of Utah. She has worked at a Rape Crisis Center and a Domestic Violence shelter. TT is a Director General for the Catholic Health Association of India, which is one of the world’s largest non-governmental organizations in the health sector. He holds PhD in Social Work from the University of Utah and the Master of Social Work from the University of Mumbai.

Acknowledgement

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### Table 1: Participant socio-demographic characteristics

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Total (N=167)</th>
<th>Ever-married with IPV (n=83)</th>
<th>Ever-married without IPV (n=84)</th>
<th>p-value*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean age, years</td>
<td>35.2 (9.2)</td>
<td>34.8 (8.3)</td>
<td>35.9 (10.1)</td>
<td>N.S.</td>
</tr>
<tr>
<td>Education</td>
<td></td>
<td></td>
<td></td>
<td>N.S.*</td>
</tr>
<tr>
<td>Less than primary (5th grade)</td>
<td>28 (16.8)</td>
<td>12 (14.5)</td>
<td>16 (19.0)</td>
<td></td>
</tr>
<tr>
<td>Completed primary (5th grade)</td>
<td>22 (13.2)</td>
<td>11 (13.3)</td>
<td>11 (13.1)</td>
<td></td>
</tr>
<tr>
<td>Less than upper primary (7th grade)</td>
<td>6 (3.6)</td>
<td>4 (4.8)</td>
<td>2 (2.4)</td>
<td></td>
</tr>
<tr>
<td>Completed upper primary (7th grade)</td>
<td>44 (3.6)</td>
<td>24 (28.9)</td>
<td>20 (23.8)</td>
<td></td>
</tr>
<tr>
<td>Secondary (8-10th grade)</td>
<td>40 (24.0)</td>
<td>17 (20.5)</td>
<td>23 (27.4)</td>
<td></td>
</tr>
<tr>
<td>Higher secondary (11-12th grade)</td>
<td>15 (9.0)</td>
<td>8 (9.6)</td>
<td>7 (8.3)</td>
<td></td>
</tr>
<tr>
<td>College education</td>
<td>2 (1.2)</td>
<td>2 (2.4)</td>
<td>1 (1.2)</td>
<td></td>
</tr>
<tr>
<td>Graduate education</td>
<td>2 (1.2)</td>
<td>2 (2.4)</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Currently employed</td>
<td>104 (62.3)</td>
<td>54 (65.1)</td>
<td>50 (59.5)</td>
<td>N.S.</td>
</tr>
<tr>
<td>Employment sector</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Government</td>
<td>8 (4.8)</td>
<td>4 (4.8)</td>
<td>4 (4.8)</td>
<td></td>
</tr>
<tr>
<td>Private</td>
<td>35 (21.0)</td>
<td>19 (22.9)</td>
<td>16 (19.0)</td>
<td></td>
</tr>
<tr>
<td>Marital status</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Married</td>
<td>160 (95.8)</td>
<td>81 (97.6)</td>
<td>79 (94.0)</td>
<td></td>
</tr>
<tr>
<td>Widowed</td>
<td>6 (3.6)</td>
<td>1 (1.2)</td>
<td>5 (6.5)</td>
<td></td>
</tr>
<tr>
<td>Divorced</td>
<td>1 (0.6)</td>
<td>1 (1.2)</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Length of marriage</td>
<td>13.7 (8.6)</td>
<td>13.6 (7.3)</td>
<td>13.8 (9.8)</td>
<td>N.S.</td>
</tr>
<tr>
<td>Income per person/month in Rupee</td>
<td>2930.0 (4007.7)</td>
<td>3043.7 (4080.1)</td>
<td>2800.0 (3948.7)</td>
<td>N.S.</td>
</tr>
<tr>
<td>Number of people living in the household</td>
<td>5.1 (1.6)</td>
<td>5.1 (1.7)</td>
<td>5.1 (1.4)</td>
<td>N.S.</td>
</tr>
<tr>
<td>Religious belief</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hindu</td>
<td>153 (91.6)</td>
<td>73 (88.0)</td>
<td>80 (95.2)</td>
<td></td>
</tr>
<tr>
<td>Muslim</td>
<td>10 (6.0)</td>
<td>7 (8.4)</td>
<td>3 (3.6)</td>
<td></td>
</tr>
<tr>
<td>Christian</td>
<td>2 (1.2)</td>
<td>2 (2.4)</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Caste</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>General (highest)</td>
<td>42 (25.1)</td>
<td>19 (22.9)</td>
<td>23 (27.4)</td>
<td>N.S.</td>
</tr>
<tr>
<td>Other Backward Castes</td>
<td>51 (30.5)</td>
<td>28 (33.7)</td>
<td>23 (27.4)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Ever IPV Experience</td>
<td>IPV Experience</td>
<td>N.S.</td>
<td></td>
</tr>
<tr>
<td>--------------------------------</td>
<td>---------------------</td>
<td>----------------</td>
<td>------</td>
<td></td>
</tr>
<tr>
<td>Schedule Caste/Schedule Tribe (lowest)</td>
<td>62 (37.1)</td>
<td>30 (36.1)</td>
<td>32 (38.1)</td>
<td></td>
</tr>
<tr>
<td>Living with in-laws (husband’s parents)</td>
<td>92 (55.1)</td>
<td>44 (53.0)</td>
<td>46 (54.8)</td>
<td>N.S.</td>
</tr>
<tr>
<td>Number of children</td>
<td>1.9 (1.1)</td>
<td>1.9 (1.3)</td>
<td>1.8 (1.0)</td>
<td>N.S.</td>
</tr>
<tr>
<td>Type of house</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pakka (concrete, stone, brick, cement)</td>
<td>115 (68.9)</td>
<td>57 (68.7)</td>
<td>58 (69.0)</td>
<td>N.S.</td>
</tr>
<tr>
<td>Kuccha (mud or hay stack or tin roof)</td>
<td>45 (26.9)</td>
<td>22 (26.5)</td>
<td>23 (27.4)</td>
<td></td>
</tr>
<tr>
<td>Living area</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Urban</td>
<td>58 (34.7)</td>
<td>33 (39.8)</td>
<td>25 (29.8)</td>
<td>N.S.</td>
</tr>
<tr>
<td>Rural</td>
<td>106 (63.5)</td>
<td>49 (59.0)</td>
<td>57 (67.9)</td>
<td></td>
</tr>
<tr>
<td>Type of marriage (if a participant had been married)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Love marriage</td>
<td>6 (3.6)</td>
<td>4 (4.8)</td>
<td>2 (2.4)</td>
<td></td>
</tr>
<tr>
<td>Arranged by parents and other relatives</td>
<td>142 (85.0)</td>
<td>64 (77.1)</td>
<td>78 (92.9)</td>
<td></td>
</tr>
<tr>
<td>Forced by parents and other relatives</td>
<td>13 (7.8)</td>
<td>12 (14.5)</td>
<td>1 (1.2)</td>
<td></td>
</tr>
<tr>
<td>Through internet</td>
<td>2 (1.2)</td>
<td>1 (1.2)</td>
<td>1 (1.2)</td>
<td></td>
</tr>
</tbody>
</table>

*Note. No. (%) or Mean (SD)*

*Compared based on whether the participant completed secondary education or higher.

*p-value denotes significant Chi-Square tests between categorical variables, and independent samples t-tests for continuous variables, comparing between ever-married participants with IPV experience and those without IPV experience.
<table>
<thead>
<tr>
<th>Spousal IPV</th>
<th>Ever-married with IPV (n=83)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Emotional abuse only</td>
<td>8 (9.6)</td>
</tr>
<tr>
<td>Physical abuse only</td>
<td>31 (37.3)</td>
</tr>
<tr>
<td>Physical &amp; emotional abuse</td>
<td>12 (14.5)</td>
</tr>
<tr>
<td>Sexual &amp; emotional abuse</td>
<td>1 (1.2)</td>
</tr>
<tr>
<td>Physical &amp; sexual abuse</td>
<td>8 (9.6)</td>
</tr>
<tr>
<td>Physical, sexual &amp; emotional abuse</td>
<td>23 (27.7)</td>
</tr>
<tr>
<td>Physical IPV incidents (multiple answers)</td>
<td></td>
</tr>
<tr>
<td>Pushed, grabbed, or shoved</td>
<td>50 (29.9)</td>
</tr>
<tr>
<td>Kicked</td>
<td>36 (21.6)</td>
</tr>
<tr>
<td>Hit, slapped, or punched</td>
<td>32 (19.2)</td>
</tr>
<tr>
<td>Strangled or choked</td>
<td>12 (7.2)</td>
</tr>
<tr>
<td>Used knife, gun or other object (bat, bleach/acid)</td>
<td>9 (5.4)</td>
</tr>
<tr>
<td>Sexual IPV incidents (multiple answers)</td>
<td></td>
</tr>
<tr>
<td>Attempted to force you to have sex against your will</td>
<td>28 (16.8)</td>
</tr>
<tr>
<td>Forced you to have sex against your will</td>
<td>24 (14.4)</td>
</tr>
<tr>
<td>Forced you to have sex with others</td>
<td>13 (7.8)</td>
</tr>
<tr>
<td>Emotional IPV (multiple answers)</td>
<td></td>
</tr>
<tr>
<td>Damaged property</td>
<td>32 (19.2)</td>
</tr>
<tr>
<td>Separated or took away children against your wishes</td>
<td>29 (17.4)</td>
</tr>
<tr>
<td>Isolated, restricted, or controlled you; did not give you enough food, clothing, medical care, etc.</td>
<td>29 (17.4)</td>
</tr>
<tr>
<td>Denied access to money, jewelry, or other personal possessions</td>
<td>27 (16.2)</td>
</tr>
<tr>
<td>Followed, spied on, stood outside home/work, or had someone else do that</td>
<td>21 (12.6)</td>
</tr>
<tr>
<td>Made unwanted phone calls, text-messages, left unwanted letters, emails, gifts or items, or had someone else do that</td>
<td>14 (8.4)</td>
</tr>
<tr>
<td>Help-seeking for IPV (multiple answers)</td>
<td></td>
</tr>
<tr>
<td>Did not seek help</td>
<td>37 (44.6)</td>
</tr>
<tr>
<td>Parents</td>
<td>39 (47.0)</td>
</tr>
<tr>
<td>Siblings</td>
<td>15 (18.1)</td>
</tr>
<tr>
<td>Child</td>
<td>7 (8.4)</td>
</tr>
<tr>
<td>Other family</td>
<td>10 (12.0)</td>
</tr>
<tr>
<td>In-laws</td>
<td>5 (6.0)</td>
</tr>
<tr>
<td>Friends or neighbors</td>
<td>12 (14.5)</td>
</tr>
<tr>
<td>Health care facilities</td>
<td>7 (8.4)</td>
</tr>
<tr>
<td>Social service organizations</td>
<td>10 (12.0)</td>
</tr>
<tr>
<td>Police/ law enforcement</td>
<td>7 (8.4)</td>
</tr>
<tr>
<td>Other</td>
<td>2 (2.4)</td>
</tr>
</tbody>
</table>

Frequency (%)
Table 3 Physical and mental health

<table>
<thead>
<tr>
<th></th>
<th>Total (N=167)</th>
<th>Ever-married with IPV (n=83)</th>
<th>Ever-married without IPV (n=84)</th>
<th>p-value*</th>
</tr>
</thead>
<tbody>
<tr>
<td>DUKE-healtha</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Physical health</td>
<td>72.4 (29.2)</td>
<td>67.7 (31.3)</td>
<td>77.0 (26.4)</td>
<td>&lt;0.05</td>
</tr>
<tr>
<td>Mental health</td>
<td>63.9 (18.2)</td>
<td>59.3 (16.7)</td>
<td>68.3 (18.6)</td>
<td>&lt;0.01</td>
</tr>
<tr>
<td>Social health</td>
<td>49.7 (20.8)</td>
<td>45.6 (20.6)</td>
<td>53.8 (20.3)</td>
<td>&lt;0.05</td>
</tr>
<tr>
<td>Perceived health</td>
<td>79.9 (34.0)</td>
<td>79.0 (34.3)</td>
<td>80.7 (33.9)</td>
<td>N.S.</td>
</tr>
<tr>
<td>Self-esteem</td>
<td>63.5 (16.6)</td>
<td>59.3 (14.0)</td>
<td>67.2 (17.9)</td>
<td>&lt;0.01</td>
</tr>
<tr>
<td>DUKE-dysfunctionb</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Anxiety</td>
<td>36.0 (18.7)</td>
<td>41.4 (17.2)</td>
<td>30.9 (18.7)</td>
<td>&lt;0.01</td>
</tr>
<tr>
<td>Depression</td>
<td>38.6 (20.8)</td>
<td>43.9 (17.2)</td>
<td>33.7 (22.7)</td>
<td>&lt;0.01</td>
</tr>
<tr>
<td>Pain</td>
<td>29.8 (36.1)</td>
<td>33.7 (37.5)</td>
<td>25.9 (34.4)</td>
<td>N.S.</td>
</tr>
<tr>
<td>Disability</td>
<td>3.9 (16.6)</td>
<td>5.5 (19.3)</td>
<td>2.4 (13.3)</td>
<td>N.S.</td>
</tr>
<tr>
<td>PHQ-9 (depression)c</td>
<td>4.1 (6.2)</td>
<td>5.7 (7.6)</td>
<td>2.5 (3.7)</td>
<td>&lt;0.01</td>
</tr>
<tr>
<td>PHQ-15 (somatic symptoms)d</td>
<td>5.1 (7.3)</td>
<td>6.5 (8.8)</td>
<td>3.8 (5.2)</td>
<td>&lt;0.05</td>
</tr>
</tbody>
</table>

Mean (SD)

- a Higher score indicates better health status.
- b Higher score indicates worse health status.
- c Higher score indicates a higher level of depression.
- d Higher score indicates more somatic symptoms.
- * Independent samples t-tests comparing between ever-married participants with IPV and those without IPV.
Table 4 Predictors of physical and mental health among ever-married participants

<table>
<thead>
<tr>
<th>Dependent variables</th>
<th>Physical health (^a)</th>
<th>p-value</th>
<th>Mental health (^a)</th>
<th>p-value</th>
<th>Social health (^a)</th>
<th>p-value</th>
<th>Self-esteem (^a)</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(\beta)</td>
<td>(\beta)</td>
<td>(\beta)</td>
<td>(\beta)</td>
<td>(\beta)</td>
<td>(\beta)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Independent variables</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IPV</td>
<td>-15.20</td>
<td>&lt;0.01</td>
<td>-12.82</td>
<td>&lt;0.01</td>
<td>-9.35</td>
<td>&lt;0.05</td>
<td>-10.97</td>
<td>&lt;0.01</td>
</tr>
<tr>
<td>Age</td>
<td>-0.20</td>
<td>N.S.</td>
<td>0.27</td>
<td>N.S.</td>
<td>0.60</td>
<td>N.S.</td>
<td>0.30</td>
<td>N.S.</td>
</tr>
<tr>
<td>Education – secondary or higher</td>
<td>3.53</td>
<td>N.S.</td>
<td>-6.00</td>
<td>N.S.</td>
<td>0.25</td>
<td>N.S.</td>
<td>0.70</td>
<td>N.S.</td>
</tr>
<tr>
<td>Employed</td>
<td>2.70</td>
<td>N.S.</td>
<td>0.19</td>
<td>N.S.</td>
<td>3.55</td>
<td>N.S.</td>
<td>3.38</td>
<td>N.S.</td>
</tr>
<tr>
<td>Length of marriage</td>
<td>-0.23</td>
<td>N.S.</td>
<td>-0.27</td>
<td>N.S.</td>
<td>-0.10</td>
<td>N.S.</td>
<td>0.23</td>
<td>N.S.</td>
</tr>
<tr>
<td>Number of children</td>
<td>1.03</td>
<td>N.S.</td>
<td>-1.33</td>
<td>N.S.</td>
<td>-3.00</td>
<td>N.S.</td>
<td>-2.52</td>
<td>N.S.</td>
</tr>
<tr>
<td>Income per person</td>
<td>0.001</td>
<td>N.S.</td>
<td>0.000</td>
<td>N.S.</td>
<td>-0.001</td>
<td>N.S.</td>
<td>0.000</td>
<td>N.S.</td>
</tr>
<tr>
<td>Caste – general (highest)</td>
<td>11.0</td>
<td>N.S.</td>
<td>4.94</td>
<td>N.S.</td>
<td>10.52</td>
<td>&lt;0.05</td>
<td>7.14</td>
<td>N.S.</td>
</tr>
<tr>
<td>Living in Pakka house</td>
<td>0.15</td>
<td>N.S.</td>
<td>3.22</td>
<td>N.S.</td>
<td>-2.38</td>
<td>N.S.</td>
<td>4.50</td>
<td>N.S.</td>
</tr>
<tr>
<td>Living in urban area</td>
<td>9.33</td>
<td>N.S.</td>
<td>2.09</td>
<td>N.S.</td>
<td>7.04</td>
<td>N.S.</td>
<td>5.65</td>
<td>N.S.</td>
</tr>
<tr>
<td>(R^2)</td>
<td>0.15</td>
<td>0.16</td>
<td>0.17</td>
<td></td>
<td>0.20</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(F)</td>
<td>2.02</td>
<td>2.01</td>
<td>2.17</td>
<td></td>
<td>2.59</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(P)-value</td>
<td>&lt;0.05</td>
<td>&lt;0.05</td>
<td>&lt;0.05</td>
<td></td>
<td>&lt;0.05</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

\(^a\) Higher score indicates better health.

p-values denote significance from multivariate regression analyses.

N=167 (Ever-married participants excluding 2 participants who did not indicate whether they ever experienced IPV or not)
### Table 5 Predictors of dysfunction, depression and somatic symptoms among ever-married participants

<table>
<thead>
<tr>
<th>Dependent variables</th>
<th>Anxiety&lt;sup&gt;a&lt;/sup&gt;</th>
<th>p-value</th>
<th>Pain&lt;sup&gt;a&lt;/sup&gt;</th>
<th>p-value</th>
<th>DUKE Depression&lt;sup&gt;a&lt;/sup&gt;</th>
<th>p-value</th>
<th>PHQ-9 Depression&lt;sup&gt;b&lt;/sup&gt;</th>
<th>p-value</th>
<th>PHQ-15 Somatic symptoms&lt;sup&gt;c&lt;/sup&gt;</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Independent variables</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IPV</td>
<td>16.79</td>
<td>&lt;0.01</td>
<td>12.78</td>
<td>&lt;0.05</td>
<td>16.19</td>
<td>&lt;0.01</td>
<td>4.00</td>
<td>&lt;0.01</td>
<td>3.46</td>
<td>&lt;0.05</td>
</tr>
<tr>
<td>Age</td>
<td>-0.52</td>
<td>N.S.</td>
<td>0.67</td>
<td>N.S.</td>
<td>-0.47</td>
<td>N.S.</td>
<td>0.15</td>
<td>N.S.</td>
<td>0.08</td>
<td>N.S.</td>
</tr>
<tr>
<td>Education – secondary or higher</td>
<td>4.24</td>
<td>N.S.</td>
<td>-8.12</td>
<td>N.S.</td>
<td>9.20</td>
<td>&lt;0.05</td>
<td>-0.58</td>
<td>N.S.</td>
<td>0.37</td>
<td>N.S.</td>
</tr>
<tr>
<td>Employed</td>
<td>-0.83</td>
<td>N.S.</td>
<td>-4.58</td>
<td>N.S.</td>
<td>0.003</td>
<td>N.S.</td>
<td>-1.78</td>
<td>N.S.</td>
<td>-1.77</td>
<td>N.S.</td>
</tr>
<tr>
<td>Length of marriage</td>
<td>0.62</td>
<td>N.S.</td>
<td>-0.24</td>
<td>N.S.</td>
<td>0.74</td>
<td>N.S.</td>
<td>-0.10</td>
<td>N.S.</td>
<td>0.08</td>
<td>N.S.</td>
</tr>
<tr>
<td>Number of children</td>
<td>0.21</td>
<td>N.S.</td>
<td>-1.04</td>
<td>N.S.</td>
<td>0.56</td>
<td>N.S.</td>
<td>0.16</td>
<td>N.S.</td>
<td>-0.50</td>
<td>N.S.</td>
</tr>
<tr>
<td>Income per person</td>
<td>0.000</td>
<td>N.S.</td>
<td>-0.001</td>
<td>N.S.</td>
<td>0.000</td>
<td>N.S.</td>
<td>0.000</td>
<td>N.S.</td>
<td>0.000</td>
<td>N.S.</td>
</tr>
<tr>
<td>Caste – general (highest)</td>
<td>-1.00</td>
<td>&lt;0.05</td>
<td>-16.10</td>
<td>&lt;0.05</td>
<td>-1.72</td>
<td>N.S.</td>
<td>-2.55</td>
<td>N.S.</td>
<td>-3.53</td>
<td>&lt;0.05</td>
</tr>
<tr>
<td>Living in Pakka house</td>
<td>-5.63</td>
<td>N.S.</td>
<td>8.80</td>
<td>N.S.</td>
<td>-3.81</td>
<td>N.S.</td>
<td>-1.21</td>
<td>N.S.</td>
<td>0.59</td>
<td>N.S.</td>
</tr>
<tr>
<td>Living in urban area</td>
<td>-4.76</td>
<td>N.S.</td>
<td>-9.84</td>
<td>N.S.</td>
<td>-3.54</td>
<td>N.S.</td>
<td>-1.18</td>
<td>N.S.</td>
<td>-2.05</td>
<td>N.S.</td>
</tr>
<tr>
<td>( R^2 )</td>
<td>0.27</td>
<td></td>
<td>0.19</td>
<td></td>
<td>0.20</td>
<td></td>
<td>0.17</td>
<td></td>
<td>0.14</td>
<td></td>
</tr>
<tr>
<td>( F )</td>
<td>3.93</td>
<td></td>
<td>2.99</td>
<td></td>
<td>2.70</td>
<td></td>
<td>2.59</td>
<td></td>
<td>2.03</td>
<td></td>
</tr>
<tr>
<td>( P )-value</td>
<td>&lt;0.01</td>
<td></td>
<td>&lt;0.01</td>
<td></td>
<td>&lt;0.01</td>
<td></td>
<td>&lt;0.01</td>
<td></td>
<td>&lt;0.05</td>
<td></td>
</tr>
</tbody>
</table>

N=167 (Ever married participants excluding 2 participants who did not indicate whether they ever experienced IPV or not)

<sup>a</sup> Higher score indicates higher levels of dysfunction.

<sup>b</sup> Higher score indicates a higher level of depression.

<sup>c</sup> Higher score indicates more somatic symptoms.

p-values denote significance from multivariate regression analyses.