Author's response to reviews

Title: Gender differences in the association of social support and social network with self-rated health status among older adults: a population-based study

Authors:

Silvana C Caetano (sil.caetano@gmail.com)
Cosme MFP Silva (cfpassos@ensp.fiocruz.br)
Mario V Vettore (mariovettore@gmail.com)

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Author's response to reviews: see over
Dear Ms. Emily Crow,

We should be grateful if you would consider the revised version of our article entitled “Gender differences in the association of perceived social support and social network with self-rated health status among older adults: a population-based study” for publication in the BMC Geriatrics.

This is original research that is not presently under consideration for publication elsewhere. It is free of conflict of interest and was conducted applying the highest ethical principles on human subjects.

We thank for the editor comments and we have responded to all items.

Yours sincerely,

Dr. Cosme Marcelo Furtado Passos da Silva
The Editors comments are as follows:

1. Background
The first paragraph: The following sentences need citations. "However, no consensus has been reached with respect to... in older adults," and "The influence of occupation, education, ... in the literature." The latter one also needs to expansion. More literature on social determinants of health is needed.

Answer: The first paragraph was re-written. Citations were inserted to support all sentences in the first paragraph of the Background section. The 3rd sentence was removed.

# Background, Social determinants of health in older adults, paragraph 1, lines 3-10
Removed: “However, no consensus has been reached with respect to the relationship between socioeconomic indicators and health outcomes in older adults. The influence of occupation, education, and income on successful aging was not consistently supported in the literature.”

Added: “Studies did not detect a consistent relationship between socioeconomic indicators and health outcomes in older adults [1-5]. For instance, worse self-rated health (SRH) was unrelated to social deprivation, occupational status, income inequality and family income in older adults in some studies [3-5]. On the other hand, elderly people with low individual and family income and/or poor educational attainment showed higher likelihood of poor SRH and multimorbidity in others [4-5]. Further investigation is needed to identify other possible social determinants besides material circumstances and could include elements of social integration [6].”

# References
Added:

2. Section of "Self-rated health measure"
(1)The first paragraph: citations are needed for the first sentence.
(2) Sentence "The indirect effect of perceived ......" needs citation.

Answer: (1) The first sentence was edited and citations were inserted.
(2) The sentence "The indirect effect of perceived ......" was edited and citations were inserted.
Removed: “Previous epidemiological studies used SRH to evaluate health status in older adults, as SRH is considered a valid, reliable, and robust measure of health status as well as a predictor of mortality in this population.”
Added: “SRH is considered to be a valid, reliable, and robust measure of health status as well as a predictor of mortality among older people [35,36].”

Removed: “The indirect effect of perceived social support and social network on SRH is expected to be mediated by use of health services, functional status, somatic health problems and health-related behaviours.”
Added: “Perceived social support and social network have direct and indirect effects on SRH [38,39].”

Added:

3. Results Section. In describing Table 3: "women without perceived social support" may need to be rephrased. What is the proportion of women without perceived social support? There is no such information in Tables 1 and 2. I suggest using low or limited social support.
Also, social support is measured by two variables in Tables 1 and 2, whereas it is measured by only one variable in Tables 3 and 4. Please double check this.
Answer: The description of Table 3 was re-written. The terms “without social support”, “lack of social support” and “lack of social networks” were replaced by “low social support/networks”.
The proportion of women with low perceived social support can be obtained from Table 1. ‘Live with someone’ and ‘One or more people to count’, the variables used to measure perceived social support, were reported by 71.7% and 83.8% of women, respectively. Thus, the proportion of women with low perceived social support was 28.3% and 16.2%, according to the two perceived social support variables.

Removed: “while lack of perceived social support”
Added: “Low perceived social support”
Results, paragraph 3

Removed: “Table 3 shows the results of multivariate logistic nested models investigating the association of perceived social support and social networks with poor SRH in women. In Model 1, women without perceived social support (people to count on) (OR 1.85; 95% CI = 1.46–2.33) and those who had no visitors in the last 30 days (lack of social networks) (OR 1.40; 95% CI = 1.01–1.94) had a greater probability of poor SRH than those in the respective reference groups. Lack of perceived social support was associated with poor SRH after incremental adjustment for socioeconomic variables (Model 2) and health-related behaviours (Model 3). The probability of poor SRH continued to be associated with low perceived social support after further adjustments for use of health care services, functional status, somatic health problems, and age. In the final model (Model 6), women without perceived social support continued to have higher probability of poor SRH (OR = 1.65; 95% CI = 1.16–2.36). Other characteristics associated with poor SRH in women were low income, lack of current employment, low independence in daily activities, greater number of somatic health problems, and depression (Table 3).”

Added: “Logistic nested models investigated the association of perceived social support and social networks with poor SRH in women (Table 3). In Model 1, low perceived social support (people to count on) (OR 1.85; 95% CI = 1.46–2.33) and no visitors in the last 30 days (low social networks) (OR 1.40; 95% CI = 1.01–1.94) predicted poor SRH in women. Low perceived social support was associated with poor SRH after incremental adjustment for age (Model 2), socioeconomic variables (Model 3) and health-related behaviours (Model 4). Poor SRH was associated with low perceived social support after further adjustments for use of health care services, functional status and somatic health problems. In the final model (Model 6), women with low perceived social support continued to have higher probability of poor SRH (OR = 1.64; 95% CI = 1.16–2.34). Other characteristics associated with poor SRH in women were low age, low income, lack of current employment, low independence in daily activities, greater number of somatic health problems, and depression.”

The reason why there are two variables of perceived social support in Tables 1 and 2 and only one (‘One or more people to count on’) appears in Tables 3 and 4 is because the other variable used to measure perceived social support (‘With whom do you live?’) did not reach the p-value of 0.20 in the bivariate analysis in both genders (Females, p-value = 0.304 and Males, p-value = 0.254; See Table 2). This was a pre-established criterion to select the independent variables for multivariate logistic regression (See Methods, Statistical analysis, paragraph 2, lines 4-6). We clarified this aspect in the Methods section.

Methods, Statistical analysis, paragraph 2, lines 6-8

Added: “The variable ‘With whom do you live?’, used to measure perceived social support, was excluded from the multivariate analysis because of this criterion.”

Discussion: Please strengthen it further. I suggest that the authors read the paper by Gu et al. (2008) who provided a good explanation for associations between psychosocial factors and social network and social support.

Answer: The discussion was modified according to Editor’s suggestion. Further explanations for the association between psychosocial factors and social network and social support were inserted.
**Discussion, paragraph 4, lines 2-15**

**Removed:** “The physiological basis for the effects of poor social connectedness on the health of older adults pertains to the influence of social isolation on mechanisms related to stress [21].”

**Added:** “Social, behavioural, psychosocial and physiological pathways are implicated in the effects of poor social connectedness on the health of older adults [38,39]. The structure of social networks may influence disease through social support and behavioural mechanisms. Behaviours are related to social influence, levels of social engagement and participation, contact with infectious disease and access to material goods and resources [38,39]. Such behavioural and psychosocial mechanisms may operate simultaneously and affect downstream factors via biologic and physiologic pathways. In addition, psychosocial pathways can operate through cognitive and emotional states such as self-efficacy, social integration and self-esteem. Finally, poor social connectedness may directly affect health if social isolation is related to stress [25]. In older adults, social support help in coping with the stress of chronic illness or stressful life events to maintain immune function and neuroendocrine and cardiovascular activity [7,25,34,55].”

**References**

**Added:**


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5. There should be a direct link between social support/social network and SRH in the proposed framework. With regard to the framework, two paper (i.e., Idler, Hudson, and Leventhal, 1999; Jylhä, 2009) are worth reading.

**Answer:** The direct link between social support/social network and SRH was inserted in the proposed framework and Figure 1.

**Background, Conceptual model of the relationship between social connectedness and SRH, paragraph 1**

**Removed:** “The relationships between perceived social support, social network size, other independent variables, and SRH are shown in Figure 1. The indirect effect of perceived social support and social network on SRH is expected to be mediated by use of health services, functional status, somatic health problems and health-related behaviours. Low social support and reduced social network result in decreased use of health services, poor functional capacity, more somatic health problems and unhealthy behaviours. We expect use of health services, functional status, somatic health problems and health-related behaviours act as moderators on the relationship of social support and social network with SRH, which means the strength of the relationship between social connectedness and SRH is dependent on these characteristics. It is also expected that demographic factors such as age and sex, will act as mediators between social support and social network and SRH since demographic factors affect social relationships, and demographic factors affect SRH. In addition, low socioeconomic factors are associated with low use of health services and poor social relationships.”

**Added:** “The relationships between perceived social support, social network size, other independent variables, and SRH are summarized in Figure 1. Perceived social support and social network have direct and indirect effects on SRH [38,39]. Demographic factors such as age and sex may mediated by social support and social network and SRH since demographic factors affect social relationships and
SRH. Perceived social support and social network may also be mediated by use of health services, functional status, somatic health problems and health-related behaviours [39,40]. Low social support and reduced social network result in decreased use of health services, poor functional capacity, more somatic health problems and unhealthy behaviours. We expect use of health services, functional status, somatic health problems and health-related behaviours moderate the effect of social support and social network on SRH, which means the strength of the relationship between social connectedness and SRH is dependent on these characteristics. In addition, low socioeconomic factors are associated with low use of health services and poor social relationships.”

# References

**Added:**

6. Tables 3 and 4, Age should be always included in all models.

**Answer:** The variable Age was included in all models. Different sections of the paper were changed to meet this suggestion. The sequence of variables in Tables 2, 3 and 4 was reordered.

# Abstract, lines 14-17

**Removed:** “Independent variables were organised into six blocks: (1) perceived social support and social networks, (2) socioeconomic characteristics, (3) health-related behaviours, (4) health services, (5) functional status measures and somatic health problems, and (6) age group.”

**Added:** “Independent variables were organised into six blocks: (1) perceived social support and social network, (2) age group, (3) socioeconomic characteristics, (4) health-related behaviours, (5) use of health care services, (6) functional status measures and somatic health problems.”

# Abstract, line 19

**Removed:** “(OR = 1.57; 95% CI = 1.11–2.22)”

**Added:** “(OR = 1.63; 95% CI = 1.16–2.30)”

# Abstract, lines 21-23

**Removed:** “(OR = 1.65; 95% CI = 1.16–2.36). Poor SRH continued to be associated with low income, employment status (not working), poor functional capacity, and depression in both men and women. Number of somatic health problems was also associated with poor SRH in women while age continued to be associated with poor SRH in men.”

**Added:** “(OR = 1.64; 95% CI = 1.16–2.34). Poor SRH was associated with low age, low income, not working, poor functional capacity, and depression in both men and women. More somatic health problems were associated with poor SRH in women.”
Methods, Statistical analysis, paragraph 3, lines 8-11

Removed: “Independent variables were organised into six blocks: (1) perceived social support and social network, (2) socioeconomic characteristics, (3) health-related behaviours, (4) use of health care services, (5) functional status measures and somatic health problems, and (6) age group.”

Added: “Independent variables were organised into six blocks: (1) perceived social support and social network, (2) age group, (3) socioeconomic characteristics, (4) health-related behaviours, (5) use of health care services, (6) functional status measures and somatic health problems.”

Methods, Statistical analysis, paragraph 3, lines 14-15

Removed: “The variable used to assess education (years of schooling) was maintained in all models because it can be considered an important predictor of SRH.”

Added: “Age group and education (years of schooling) were maintained in all models as important predictors of SRH.”

Results, paragraphs 3 and 4

Removed: “Table 3 shows the results of multivariate logistic nested models investigating the association of perceived social support and social networks with poor SRH in women. In Model 1, women without perceived social support (people to count on) (OR 1.85; 95% CI = 1.46–2.33) and those who had no visitors in the last 30 days (lack of social networks) (OR 1.40; 95% CI = 1.01–1.94) had a greater probability of poor SRH than those in the respective reference groups. Lack of perceived social support was associated with poor SRH after incremental adjustment for socioeconomic variables (Model 2) and health-related behaviours (Model 3). The probability of poor SRH continued to be associated with low perceived social support after further adjustments for use of health care services, functional status, somatic health problems, and age. In the final model (Model 6), women without perceived social support continued to have higher probability of poor SRH (OR = 1.65; 95% CI = 1.16–2.36). Other characteristics associated with poor SRH in women were low income, lack of current employment, low independence in daily activities, greater number of somatic health problems, and depression (Table 3).

Table 4 lists the results of the multivariate logistic nested models testing the relationship between perceived social support and social network size and poor SRH in men. Men with low perceived social support (OR 1.54; 95% CI = 1.05–2.25) and small social networks (no participation in group activities) (OR 1.50; 95% CI = 1.14–1.97) were more likely to report poor SRH (Model 1). Lack of participation in group activities (low social network) continued to be associated with poor SRH after adjusting for covariates, as shown in subsequent models (Model 2 to Model 6). In the fully adjusted model (Model 6), men without participation in group activities were 1.57 times more likely to report poor SRH than those reporting participation in group activities (95% CI = 1.11–2.22). Furthermore, the odds of poor SRH were significantly higher for men with low income, lack of current employment, low independence in daily activities, and depression. Older men aged between 70 and 79 years showed lower odds of poor SRH than those between 60 and 69 years of age (Table 4).

Added: “Logistic nested models investigated the association of perceived social support and social networks with poor SRH in women (Table 3). In Model 1, low perceived social support (people to count on) (OR 1.85; 95% CI = 1.46–2.33) and no visitors in the last 30 days (low social networks) (OR 1.40; 95% CI = 1.01–1.94) predicted poor SRH in women. Low perceived social support was associated with poor SRH after incremental adjustment for age (Model 2), socioeconomic variables...
Poor SRH was associated with low perceived social support after further adjustments for use of health care services, functional status and somatic health problems. In the final model (Model 6), women with low perceived social support continued to have higher probability of poor SRH (OR = 1.64; 95% CI = 1.16–2.34). Other characteristics associated with poor SRH in women were low age, low income, lack of current employment, low independence in daily activities, greater number of somatic health problems, and depression.

Table 4 summaries the same analyses in men. Men with low perceived social support (OR 1.56; 95% CI = 1.07–2.28) and small social networks (no participation in group activities) (OR 1.54; 95% CI = 1.17–2.02) were more likely to report poor SRH (Model 1). Lack of participation in group activities (low social network) continued to be associated with poor SRH after adjusting for covariates (Model 2 to Model 6). In the fully adjusted model (Model 6), men who did not participate in group activities were 1.63 times more likely to report poor SRH than those who participated (95% CI = 1.16–2.30). Poor SRH was also associated with low age, low income, lack of current employment, low independence in daily activities, and depression.

7. Paper needs a native English speaker to proofread it. There are some incorrect usages of English.

**Answer:** The English of the paper was fully edited and revised by Professor Peter Robinson from the University of Sheffield, UK.

**# Abstract, lines 2-4**

**Removed:** “In addition, social interaction could be reduced among this age group due to their limited mobility, which stems from chronic conditions. Therefore, aging is frequently accompanied by a reduction in”

**Added:** “Social interaction could also be reduced in this age group due by limited mobility caused by chronic conditions. Therefore, aging is frequently accompanied by reduced”

**# Abstract, lines 9-10**

**Removed:** “was carried out. The final sample consisted of”

**Added:** “recruited”
Abstract, line 12
Removed: “were conducted to collect”
Added: “collected”

Removed: “social networks”
Added: “social networks”

Abstract, line 18-23
Removed: “Older men without participation in group activities were more likely to report poor SRH compared to those reporting participation in group activities, (OR = 1.57; 95% CI = 1.11–2.22), while lack of perceived social support increased the probability of poor SRH in older women (OR = 1.65; 95% CI = 1.16–2.36). Poor SRH continued to be associated with low income, employment status (not working), poor functional capacity, and depression in both men and women. Number of somatic health problems was also associated with poor SRH in women while age continued to be associated with poor SRH in men.”
Added: “Older men who did not participate in group activities were more likely to report poor SRH compared to those who did, (OR = 1.63; 95% CI = 1.16–2.30). Low perceived social support predicted the probability of poor SRH in women (OR = 1.64; 95% CI = 1.16–2.34). Poor SRH was associated with low age, low income, not working, poor functional capacity, and depression in both men and women. More somatic health problems were associated with poor SRH in women.”

Abstract, line 24-25
Removed: “SRH is not uniform across genders.”
Added: “SRH varies between genders.”

Background, Social determinants of health in older adults
Removed: “Healthy aging is not a random phenomenon; socioeconomic characteristics could play an important role in health and life expectancy among older people. Early studies exploring social determinants of health in the elderly focused on the association between different measures of social position such as education, occupational class, and health status [1]. However, no consensus has been reached with respect to the relationship between socioeconomic indicators and health outcomes in older adults. The influence of occupation, education, and income on successful aging was not consistently supported in the literature. Further investigation is needed to identify other possible social determinants besides material circumstances to include elements of social integration [2].

Added: “Healthy aging is not a random phenomenon; socioeconomic characteristics may play an important role in health and life expectancy among older people. Studies did not detect a consistent relationship between socioeconomic indicators and health outcomes in older adults [1-5]. For instance, worse self-rated health (SRH) was unrelated to social deprivation, occupational status, income inequality and family income in older adults in some studies [3-5]. On the other hand, elderly people with low individual and family income and/or poor educational attainment showed higher likelihood of poor SRH and multimorbidity [4-5]. Further investigation is needed to identify other possible social determinants besides material circumstances and could include elements of social integration [6].”
broadly defined in terms of existence and availability of interpersonal relationships and supportive persons while the latter is defined as the web of social relationships including friends, family, neighbours other connections originating from the social environment in which people live.”

Added: “broadly defined as the availability of interpersonal relationships and supportive persons while the latter involves the web of social relationships including friends, family, neighbours and other connections in the social environment.”

“people perceive is available to them if needed. This has been”

Added: “people feel is available if needed and has been”

“There are different types of social support, such as emotional support (expressions of positive affect, understanding, and feelings of confidence), informational support (availability of people to obtain advice or guidance), tangible/material support (provision of material aid), positive social interaction (availability of other persons to have fun or relax), and affectionate support (physical expressions of love and affection) [5]. The different types of social support are”

Added: “Social support may be emotional (expressions of positive affect, understanding, and feelings of confidence), informational (availability of people to obtain advice or guidance), tangible/material (provision of material aid), positive social interaction (availability of other persons to have fun or relax), or affectionate (physical expressions of love and affection) [9]. The different types are”

“to private transport, reduced contact with friends and family members, and living alone [7]. Reduction in social resources has been shown to affect”

Added: “to transport, reduced contact with friends and family, and living alone [11]. Reduced social resources affect”

“in older adults”

“The association between a lack of social interaction”

Added: “Associations between low social interaction”

“showed that despite evidence of”

Added: “found”
Background, Social determinants of health in older adults, paragraph 2, lines 14-15
Removed: “the link between social capital variables and SRH is not restricted to high-income countries.”
Added: “but the link between social capital and SRH occurred across low and high-income countries.”

Background, Gender, social connectedness, and health, paragraph 1
Removed: “Gender differences have been found in social support and social network patterns across the aging process [25,26]. The pattern of social connectedness is known to vary more by gender than by any other demographic characteristic [27]. In general, women have larger and more varied social networks than men. Women typically report having more friends and receiving more social support from members of their network than men do [25,26]. In addition, men tend to maintain intimate relationships with only a few people, while women identify more people as being important to them or as people they care about [28].”
Added: “Gender differences have been found in social support and social networks across the aging process [29,30]. Social connectedness varies more by gender than any other demographic characteristic [31]. In general, women have larger and more varied social networks with more friends and more social support than men [29,30]. Men tend to maintain intimate relationships with only a few people, while women identify more people as being important to them or as people they care about [32].”

Background, Gender, social connectedness, and health, paragraph 2, line 3
Removed: “would also be”
Added: “are”

Background, Gender, social connectedness, and health, paragraph 2, line 4
Removed: “alone”

Background, Gender, social connectedness, and health, paragraph 2, lines 4-10
Removed: “the association between participation in community activities and physical activity level was observed in only elderly women but not in elderly men [14]. In most studies, gender has been considered a confounding variable and measures have been taken to control for the effect of gender in testing the association between social relationship and health in multivariate analyses; consequently, the role of gender in this association has not been adequately clarified. Such gender differences in social interaction and interpersonal connections suggest that the influence of different types of social support and social networks on health may also differ by gender [16,29].”
Added: “an association between participation in community activities and physical activity was observed in elderly women but not in men [18]. In most studies, gender has been considered as a confounder and measures have been taken to control for its effect in the association between social relationship and health. Consequently, the role of gender has not been clarified. Such gender differences in social interaction and interpersonal connections may implicate gender as a determinant of health in the elderly [20,33].”
**Background, Self-rated health measure**

**Removed:** “Previous epidemiological studies used SRH to evaluate health status in older adults, as SRH is considered a valid, reliable, and robust measure of health status as well as a predictor of mortality in this population. The advantage of using SRH in research is its ease in assessment via a questionnaire [31].”

**Added:** “SRH is considered to be a valid, reliable, and robust measure of health status as well as a predictor of mortality among older people [35,36]. One advantage of using SRH in research is its ease in assessment via a questionnaire [37].”

**Background, Conceptual model of the relationship between social connectedness and SRH**

**Removed:** “The relationships between perceived social support, social network size, other independent variables, and SRH are shown in Figure 1. The indirect effect of perceived social support and social network on SRH is expected to be mediated by use of health services, functional status, somatic health problems and health-related behaviours. Low social support and reduced social network result in decreased use of health services, poor functional capacity, more somatic health problems and unhealthy behaviours. We expect use of health services, functional status, somatic health problems and health-related behaviours act as moderators on the relationship of social support and social network with SRH, which means the strength of the relationship between social connectedness and SRH is dependent on these characteristics. It is also expected that demographic factors such as age and sex, will act as mediators between social support and social network and SRH since demographic factors affect social relationships, and demographic factors affect SRH. In addition, low socioeconomic factors are associated with low use of health services and poor social relationships.

The relevant changes in the population demographics and epidemiological profile of most countries occurred in recent decades as a consequence of accelerated population aging. Consequently, the impact of different aspects of perceived social support and social network on health, along with gender differences in the same, needs to be understood better. In an attempt to shed light on this topic, the present study investigates whether gender differences exist in the effect of perceived social support and social network size on SRH in older adults.”

**Added:** “The relationships between perceived social support, social network size, other independent variables, and SRH are summarized in Figure 1. Perceived social support and social network have direct and indirect effects on SRH [38,39]. Demographic factors such as age and sex may mediated by social support and social network and SRH since demographic factors affect social relationships and SRH. Perceived social support and social network may also be mediated by use of health services, functional status, somatic health problems and health-related behaviours [39,40]. Low social support and reduced social network result in decreased use of health services, poor functional capacity, more somatic health problems and unhealthy behaviours. We expect use of health services, functional status, somatic health problems and health-related behaviours moderate the effect of social support and social network on SRH, which means the strength of the relationship between social connectedness and SRH is dependent on these characteristics. In addition, low socioeconomic factors are associated with low use of health services and poor social relationships.

Population aging is evident in the demographic and epidemiological profiles of most countries in recent decades. Consequently, the impact of perceived social support, social network and gender requires elucidation. Therefore, the present
study investigates whether gender differences exist in the effect of perceived social support and social network size on SRH in older adults.”

# Methods, Sample design and data collection, paragraph 1, line 3
Removed: “the city of” and “System’s”

# Methods, Sample design and data collection, paragraph 1, line 4
Removed: “This campaign is a national program that offers”
Added: “This national program offers”

# Methods, Sample design and data collection, paragraph 1, line 5
Removed: “care”

# Methods, Sample design and data collection, paragraph 2, lines 1-2
Removed: “locations on 5 alternate days during the campaign held between”

# Methods, Sample design and data collection
Paragraph 5 was dislocated to paragraph 3.

# Methods, Sample design and data collection, paragraph 4, lines 5-9
Removed: “considering the proportional probability to the population size of the corresponding PUS. These 60 vaccination posts, secondary units of selection, were randomly selected to ensure disaggregation of posts considered for recruitment and representativeness of PUS. In the second stage, a systematic sample of older adults, tertiary units of selection, was selected from the people visiting each vaccination post and approached for interview. In this stage, the number of individuals recruited across each post was proportional to the frequency of vaccination given in the year prior to the study.”
Added: “considering the population of the corresponding PUS. In the second stage, a systematic sample of older adults was selected from the people visiting each vaccination post and approached for interview. The number of individuals recruited across each post was proportional to the frequency of vaccination given in the previous year.”

# Methods, Sample design and data collection, paragraph 4, line 11
Removed: “4,003 interviews were conducted.”
Added: “4,003 people were recruited.”

# Methods, Sample design and data collection, paragraph 5, lines 1-3
Removed: “Interviews were conducted by 137 examiners and 37 supervisors. Examiners were college students in health-related programmes who had received previous training for this study. Fieldwork supervisors”
Added: “Interviews were conducted by 137 trained examiners and 37 supervisors. Examiners were college students attending health-related programmes who had received previous training for this study. Supervisors”

# Methods, Variables
Removed: “Individual interviews utilised a 70-item questionnaire to assess participants’ perceived social support, social network, SRH, and other covariates.”
Added: “A 70-item structured interview schedule questionnaire assessed participants’ perceived social support, social network, SRH, and other covariates.”
# Methods, Self-rated health, line 1
Removed: “, the main outcome variable,”

# Methods, Perceived social support and social networks, paragraph 1, line 1
Removed: “The perceived social support measure focused”
Added: “Perceived social support focused”

# Methods, Perceived social support and social networks, paragraph 2, lines 9-11
Removed: “The items evaluating participants’ perceived social support and social network were adapted from previous studies on Brazilian populations”
Added: “The items evaluating perceived social support and social network were adapted from previous studies in Brazil”

# Methods, Covariates, Demographic and socioeconomic variables, line 1
Removed: “measured”

# Methods, Covariates, Demographic and socioeconomic variables, line 3
Removed: “retirement”

# Methods, Covariates, Demographic and socioeconomic variables, line 7
Removed: “the”

# Methods, Covariates, Demographic and socioeconomic variables, line 8
Removed: “to each other”

# Methods, Covariates, Health-related behaviours, line 8
Removed: “refer”
Added: “referred”

# Methods, Use of health services
Removed: “Universality, comprehensive care and equity are the core principles of the national health care system in Brazil (SUS). However, profound inequalities in access to health care persist and elderly people with health insurance are more likely to receive care [38]. Therefore, use of health services was assessed whether the participant had health insurance (Yes/No) and type of health services received when being treated for disease (Public/Private).”
Added: “Whilst universality, comprehensive care and equity are the core principles of the national health care system in Brazil (SUS), profound inequalities in access persist and elderly people with health insurance are more likely to receive care [47]. Use of health services was assessed whether the participant had health insurance (Yes/No) and type of health services used when receiving treatment (Public/Private).”
**Methods, Functional status, lines 1-9**

**Removed:** “Participants’ functional status was assessed by their capacity to perform each task in scales assessing basic and instrumental activities of daily living (ADL and IADL). ADL refers to the individual’s performance in areas such as bathing, dressing, using the toilet, transferring, continence, and eating. On the other hand, IADL gauges performance in areas including unassisted meal preparation, housekeeping, laundering, medication management, and use of the telephone. Other non-domestic activities considered in IADL are unassisted shopping for food, clothing, and medicine, and attending medical appointments and social and religious events without help. All the ADL and IADL items were coded as ‘0’ if the participant could perform the specific task independently, or as ‘1’ if they required any supervision or assistance while performing the same [39].”

**Added:** “Participants’ functional status was assessed by their capacity to perform tasks in scales assessing basic and instrumental activities of daily living (ADL and IADL). ADL refers to ability to bathe, dress, use the toilet, transferring, continence, and eating. IADL gauges performance in unassisted meal preparation, housekeeping, laundering, medication management, and use of the telephone. Non-domestic activities considered in IADL are unassisted shopping for food, clothing, and medicine, and attending medical appointments and social and religious events without help. All the ADL and IADL items were scored for each activity the participant could perform independently [48].”

**Methods, Somatic health problems, lines 4-5**

**Removed:** “Participants were grouped into four categories on the basis of the total number of health problems reported”

**Added:** “Participants were categorised by the number of health problems reported”

**Methods, Statistical analysis, paragraph 1, line 1**

**Removed:** “For the purpose of analysis, the outcome variable SRH was”

**Added:** “The outcome variable was dichotomised”

**Methods, Statistical analysis, paragraph 3, line 1**

**Removed:** “was performed to test the”

**Added:** “tested the”

**Methods, Statistical analysis, paragraph 3, line 5**

**Removed:** “presented in Figure 1.”

**Added:** “(Figure 1)”

**Methods, Statistical analysis, paragraph 3, line 6**

**Removed:** “when the study aims to test the effect”

**Added:** “when testing the effect”

**Methods, Statistical analysis, paragraph 3, line 14**

**Removed:** “economic model consisting of relatively”

**Added:** “model with relatively”
# Results, paragraph 1, lines 1-4
Removed: “Of the 4,003 individuals who agreed to participate, 354 were excluded, as they did not meet the inclusion criteria defined earlier. The final sample comprised 3,649 older adults, 22.9% of whom had poor SRH. Most participants were female (65.2%) and almost 50% of the sample was between 60 and 69 years old. The characteristics of the sample and any differences found between men and women are presented in Table 1.”
Added: “Of the 4,003 individuals who agreed to participate, 354 did not meet the inclusion criteria defined, thus the final sample comprised 3,649 older adults, 22.9% of whom had poor SRH. Most were female (65.2%) and almost half were between 60 and 69 years old (Table 1).”

# Results, paragraph 1, line 9
Removed: “status as current or former smokers than women did”
Added: “tobacco use”

# Results, paragraph 1, line 9
Removed: “of the participants”

# Results, paragraph 1, line 13
Removed: “did”

# Results, paragraph 1, line 14
Removed: “, a measure of social network status, than men did”

# Results, paragraph 2, lines 2-11
Removed: “The percentage of participants who reported having one or more persons to count on was significantly higher in the good SRH group for both genders. The relationship between social network variables and SRH was different in men and women. Participation in group activities was more common in the good SRH group among older men, whereas low frequency of visits was associated with poor SRH among women. There were significant differences in years of education, income, employment status, pattern of physical activities, health care services, functional status, and somatic health problems between SRH groups across both genders. Individuals with poor SRH had the worst socioeconomic conditions, worse health-related behaviours, and more somatic health problems than did those with good SRH.”
Added: “More participants reported having persons to count on in the good SRH group for both genders. The relationship between social network variables and SRH differed between men and women. Participation in group activities was more common in the good SRH group among men, whereas low frequency of visits was associated with poor SRH among women. Years of education, income, employment status, pattern of physical activities, health care services, functional status, and somatic health problems were similar across SRH groups in both genders. Individuals with poor SRH had worse socioeconomic conditions, worse health-related behaviours, and more somatic health problems than did those with good SRH.”
In the present study, low perceived social support as well as a small social network was associated with poor SRH in adults aged 60 and above. Our findings suggest that social connectedness differs between elderly men and women and its effect on SRH varies significantly.

Removal: “In the present study, low perceived social support and a small social network was associated with poor SRH in older adults. Social connectedness differed between elderly men and women and its effect on SRH varied significantly.”

Removal: “There is strong evidence to support the notion that being socially connected is a determinant of health. The earliest data linking social support to mortality came from a large prospective community studies in adults [10,37]. For example, greater mortality was associated with limited social network as assessed by the number of contacts with friends and relatives, and church and other group membership [37]. A recent meta-analytic review showed that people with strong social relationships had a 50% increased likelihood of survival [10]. The most common health outcomes investigated in research on social support and health were mental disorders [7,9,42–44] and chronic diseases [9,39]. Social support has been found to be related to cardiovascular disease, including coronary heart disease, stroke, and myocardial infarction [3,45].”

Removal: “In older adults, social support may be helpful in coping with the stress of a chronic illness and stressful life events that affect immune function and increase neuroendocrine and cardiovascular activity.”

Removal: “In older adults, social support help in coping with the stress of chronic illness or stressful life events to maintain immune function and neuroendocrine and cardiovascular activity”

Removal: “This might suggests that”
**Discussion, paragraphs 5-7**

**Removed:** “Having a small social network increased the likelihood for a poor SRH in our study as well as in others [16,17,23,24]. Such association is supported by the fact that social network size is intrinsically associated with social integration and psychological well-being. Different types of formal and informal social networks have been associated with poor SRH in terms of membership in a religious group, associations, volunteering for an organisation and voluntary worker [16,20,23]. They can provide beneficial health effects, as they foster trust, self-esteem, and cooperation [46]. The quality and extent of ties and social norms originating in social groups can also influence health through health-related behaviours such as physical activity, binge drinking, functional capacity, cost-related medication non-adherence, and access to and use of medical care [12–15,29,47]. However, it seems the positive effect of social networks on health is more relevant for men than women since similar gender difference was found in other studies where social network size was associated with SRH in men but not in women [16,24]. To our knowledge, however, ours is the first study to provide evidence of the differing influence of perceived social support and social network size on SRH between elderly men and women in a single study.

Few studies have analysed the possible influence of poor social connectedness on health status specifically between genders. In general, women tend to have a larger number of close relationships than men, although men usually have larger social networks [43]. Therefore, it might be expected that different types of social support and social networks operate in different ways for men and women, and that their impact on health differs between genders. Another potential explanation is the difference in the role of social interactions in lifestyle and health-related behaviours between older men and older women. In a recent study, older women participating in community activities had greater probability of being physically active. However, this association was not found in older men [14].

In this study, while older men reported spending less time alone and having more people to count on (higher perceived social support), the proportion of older women participating in group activities was higher. Such gender differences in perceived social support and social network suggest that older women have larger social networks, which are usually built during adult life. However, the large social network of older women did not correspond to an increase in perceived social support, as might be expected. At the same time, although older men showed lower social interaction in terms of participation in group activities, which suggests they are more isolated socially than older women are, older men perceived their close social relationships as more supportive.”

**Added:** “Having a small social network predicted the likelihood for a poor SRH in this and other studies [20,21,27,28]. Social network size is intrinsically associated with social integration and psychological well-being. Different formal and informal social networks have been associated with poor SRH such as membership of religious groups, associations, volunteering for an organisation and voluntary working [20,24,27]. Such networks can benefit health, as they foster trust, self-esteem, and cooperation [55]. Social groups can also influence health through health-related behaviours such as physical activity, binge drinking, functional capacity, cost-related medication non-adherence, and access to and use of medical care [16–19,33,56]. However, the positive effect of social networks on health appears to be more relevant for men than women since similar gender difference was found in other studies where social network size was associated with SRH only in men [20,28]. To our knowledge, however, ours is the first study to demonstrate a gender difference of perceived social support and social network on SRH in a single study of older people.
Few studies have analysed the influence of poor social connectedness on health specifically between genders. In general, women tend to have more close relationships than men, although men usually have larger social networks [52]. Therefore, the different types of social support and networks may operate in different ways and with different impacts on health between genders. Another potential explanation is the difference in the role of social interactions in lifestyle and health-related behaviours between genders. In a recent study, older women who participated in community activities were more likely to be physically active. However, this association was not found in older men [18].

In our study, older men spent less time alone and had more people to count on (higher perceived social support), but more women participated in group activities. Such gender differences suggest that older women have larger social networks, which are usually built during adult life. However, these large social networks did not correspond to a more perceived social support. At the same time, older men had less social interaction via participation in group activities. Yet, they perceived their close social relationships as more supportive.

**# Discussion, paragraph 8, lines 1-2**

**Removed:** “Older women with low perceived social support were more likely to consider their health to be poor. It seems that close social ties and perceived social support may be relevant determinants of SRH in older women.”

**Added:** “Close social ties and perceived social support may determine SRH in older women.”

**# Discussion, paragraph 8, line 3**

**Removed:** “affects”

**Added:** “affected”

**# Discussion, paragraphs 9-12**

**Removed:** “Early studies employing analysis stratified by gender assessed the relationship of social support and social ties with mental health and risk markers for chronic diseases [42–44]. Different types of social support acted differently as risk factors of psychological distress in male and female adults. Emotional support from one’s closest relations was associated with good mental health only in men. However, negative aspects of close relationships predicted poor mental health in both men and women [42]. Emotional support (support from up to four close people) was found to have a beneficial effect on mental health only in women. The influence of social support (within and outside the workplace) and social network on subsequent occurrence of psychological distress was similar for men and women [43]. In another study, allostatic load was assessed in elderly participants in terms of risk markers for chronic diseases, such as blood pressure, waist/hip ratio, urinary cortisol, and blood plasma levels of glycosylated haemoglobin and cholesterol. Social relationships and allostatic load for older men and women were analysed separately, and it was found that the greater the number of social ties, the lower the odds of significant allostatic load in both genders. However, high emotional support was inversely associated with allostatic load only in men [44].

In the present study, the results on the association of perceived social support and social network with SRH among older adults were presented using logistic regression instead ordinal regression though SRH was assessed using a 5-point ordinal
The former statistical procedure was chosen because few women and few men considered their health as “poor” (women: 2.4%; men: 0.9%) and “very poor” (women and men: 0.8%). The frequency of the outcome “poor SRH” rose up to 24.6% and 19.9% in women and men, respectively, when the categories ‘very poor’, ‘poor’ and ‘regular’ were grouped. In addition, SRH has been frequently assessed as a binary outcome in previous studies on social interactions and SRH [16,23,24]. Notwithstanding, logistic and ordinal regression models provided similar findings. Low perceived social support was associated with poor SRH in women using logistic regression (adjusted OR = 1.65; 95%CI: 1.16 - 2.36) and ordinal regression (adjusted OR = 1.47; 95%CI: 1.16 – 1.86). In addition, low social network involvement increased the likelihood of poor SRH in men when logistic (adjusted OR = 1.57 95%CI: 1.11 – 2.22) and ordinal regression (adjusted OR = 1.30 95%CI: 1.21 – 2.24) were used.

The strengths of the present study were its robust and representative sample and the theoretical model used to test the associations of perceived social support and social network size with SRH. In addition, the nature of the independent variables was taken into account during statistical analysis through nested modeling procedure.

However, our study has some limitations. Its sample included only elderly who participated in the influenza vaccination campaign and those who were competent to complete the interview. Thus, the findings can be considered representative of older adults living independently or with lower levels of dependency as well as those without mental disorders. However, the results cannot be generalised to all elderly adults. In addition, although the items used to assess social support and social network size were derived from theoretical constructs, they were not previously validated for the studied population. The cross-sectional design is another limitation since econometric techniques were not used and causal relationships between perceived social support, social network size, and SRH cannot be inferred.

Added: “Early studies employing analysis stratified by gender assessed the relationship of social support and social ties with mental health and risk markers for chronic diseases [51–53]. Different types of social support acted differently as risk factors for psychological distress in men and women. Emotional support from close relations was associated with good mental health only in men. However, negative aspects of close relationships predicted poor mental health in both men and women [51]. Emotional support (from up to four close people) benefited mental health only in women. The effect of social support and network on subsequent psychological distress was similar in both genders [52]. In another study, more social ties varied inversely with allostatic load as measured by clinical and serological risk factors for chronic disease in both genders. However, high emotional support was inversely associated with allostatic load only in men [53].

In the present study, SRH was dichotomised because few participants considered their health as “poor” or “very poor” (women: 3.2%; men: 1.7%). SRH has frequently been assessed as a binary outcome in previous studies [20,27,28]. Similar findings arose if ordinal regression was used with ordinal categories. Low perceived social support was associated with poor SRH in women using ordinal regression (adjusted OR = 1.47; 95% CI: 1.16 – 1.86). Low social network increased the likelihood of poor SRH in men when ordinal regression (adjusted OR = 1.30 95%CI: 1.21 – 2.24) was used.

The strengths of the present study were its robust sample and the theoretical model used to test the associations. In addition, the nature of the variables was accounted for in the nested modeling procedure.

However, our study has some limitations. We included only participants in the vaccination campaign who could complete the interview. Thus, the findings reflect older adults living independently or with low levels of dependency but may not be generalisable to all elderly adults. In addition, although the items used to
assess social support and social network size were derived from theoretical constructs, they were not previously validated for the studied population. The cross-sectional design also restricts inferences about causal relationships.”

# Conclusion, line 1
Removed: “is not uniform”
Added: “differed”

Institutional affiliation of the last author

Dr Mario Vianna Vettore

Remove: Institute of Studies in Public Health, Federal University of Rio de Janeiro, Brazil

Add: Unit of Dental Public Health, School of Clinical Dentistry, University of Sheffield, Sheffield, UK.