Author's response to reviews

Title: Prevalence of fibromyalgia in low socioeconomic status population

Authors:

Ana Assumpção (anassumpcao@usp.br)
Alane B Cavalcante (alanebc@gmail.com)
Cristina E Capela (criscapela@terra.com.br)
Juliana F Sauer (juliana.sauer@gmail.com)
Suellen D Chalot (ischalot@uol.com.br)
Carlos AB Pereira (cadebp@gmail.com)
Amélia P Marques (pasqual@usp.br)

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Author's response to reviews: see over
In response of reviewers’ concerns, we are providing a new version of the manuscript titled: “Prevalence of fibromyalgia in low socioeconomic status population”. Major points corrected and discussed were related to the screening sample of the study, the methodology of using dolorimeter, some limitations of the study and the high prevalence of widespread chronic pain. All comments are discussed point-by-point following this letter. All context changes were included at the manuscript with subtitled text. The text was copyedited by a professional copyediting service in order to avoid any misunderstanding so, the language might be little different from the original version.

We would like to thank the reviewers for the important concerns and we hope our manuscript could become available for publication at BMC Musculoskeletal Disorders.

Available for any questions, with best wishes

Ana Assumpção and co-authors
Referee 1: Stefan Bergamn

1) “Major Compulsory
My major concern is the prevalence estimate. Despite the use of Bayesian analysis I believe that there is a possibility for selection bias in several steps that has to be accounted for:

a) Are the 3109 subjects of middle age population registered in the health care system representative for the 207663 in the population of Embu? This is not thoroughly explained.”

The aim of this study was estimate the Fibromyalgia prevalence in adult population (35-60 years) registered in primary health care system of low socio-economic city. In this case, the population provided by the health care system is similar to the Embu population in general. Some data can support this thesis.

Embu city can be considered low socioeconomic status population in comparison with other population studies. The Gross Domestic Income (GDI) is less then four billion dollars and GDI per capita is three thousand dollars. The Human Development Index (HDI) is 0.772. In relation to education, 7.7% of adult population is illiterate, the years of study mean is 6.5 and 66.8% has less then 8 years of study, for adult population aged between 15 and 64 years old. Besides of this, the Unified Health System is the Brazilian governmental primary health care system and the most important one for majority of Embu population. According to Brazilian Census, this city has 22 Health establishments and 17 of them are governmental ones (16). Associated with low socioeconomic status, we can infer that Unified Health System is the main way for Embu population to access the Health Care System and some times, a form to obtain governmental help. Because of this, we believe that the health care system population is quite similar to the Embu population in general.

b) “Are the 75% with phone number representative or what kind of bias may be inflicted?”

The screening survey started selecting all subjects registered in the nine Unified Health System Units in 2003, aged 35-60 years old in 2004. In the pilot study we realized that it would be difficult to access these people face-to-face by address because the streets were not organized by number and were not identified by names at plates. Considering the screening survey by telephone as frequent methodology adopted by scientific community and the problem found at the pilot study, we decided to call for all 2269 subjects with telephone number for contact. This sample represents the majority of 3109 individuals registered (73%). In spite of this, the minority, 27% that did not have telephone number, could be represent a kind of bias that is pointed at the end of the manuscript.
c) “How were the 768 out of 2269 selected? Random? What about people not answering on the phone call or not wanting to participate?”

The 768 interviewed people were not randomly selected. We tried to contact all 2269 subjects in different periods of the day. As the 768 subjects were enough to the aim of the study (sample size calculation is illustrated above), we decided to not recall subjects and focus on the second evaluation. The refuse rate was insignificant (>1%) and the majority of lost calls was due to people unavailable at the moment of calling (30%).

Sample size was calculated using the followed equation (1):

\[ n' = \left( \frac{Z_{\alpha}}{\sqrt{d^2}} \right)^2 \cdot p \cdot q \]

Where: \( n' \) = minimum sample necessary for infinite population; \( Z_{\alpha} \) = Z value, in this case, for Confidence Interval = 95% and \( \alpha = 5\% \) it is equal 1.96; \( p \) = population proportion of fibromyalgia, in this case we adopted 5.5% based on Senna et al study (2) (similar socioeconomic status and age); \( q = 1 - p = 0.945 \); \( d\) = maximum difference between \( p \) and the \( p' \) = sample proportion of fibromyalgia, in this case, we assumed \( d=2\% \). The minimum sample necessary was 500 subjects. As the relation \( \frac{n'}{N} \) (where \( N \) is the population of Embu city, \( N = 207,663 \)) was less then 0.05 (\( 500/207663 = 0.0024 \)), the population was considered infinite and the minimum sample necessary was \( n' \). Adopting 20% of possible sample losses, the minimum necessary sample was 600 individuals.


d) “What selection bias was introduced when only a subgroup of 304 came for clinical examination?”

For the personal evaluation, all 768 subjects were invited to participate and 304 appeared. The evaluation were done in the Unified Health System Units they were registered and on Saturdays. So it would be near their house and in one week day that they are not supposed to work. However, the volunteers did not receive any financial support and we concluded that they were really interested on the survey or they were expecting a kind of physical therapy assistance. In fact, the sub sample of 304 subjects had higher pain complaints that the 768 one. Using the Bayesian Analyses, part of this problem was solved because the prevalence of fibromyalgia is calculated using data from 768 subjects.

These comments are also inserted in the manuscript, including in the limitations of the study.
2. “The subsample of 304 is introduced in the abstract without any explanation. Due to this is it not at all possible to value the prevalence figure.”

This is an important observation. The abstract was corrected.

3. “The use of a dolorimeter is interesting, but I would have liked to see a comparison with the manual approach, and at least a more thorough discussion on how this method could give a different result compared to the method suggested in the ACR criteria.”

Unfortunately, the manual approach was not done in this study so, we can not provide a comparison with the dolorimetry. Although ACR criteria recommended manual pressure for tender point classification, this method has produced questionable reliability (Harden et al. 2007, Tunks et al. 1995). For this reason, we decided to used pain threshold by dolorimeter to consider a tender point positive that can had partially improved this problem according to Harden et al.


4. The English language needs to be corrected. There are possibilities for misunderstanding of the text as it is now.

The text was copyedited by a professional copyediting service in order to avoid any misunderstanding. Only the context changes were subtitled in the text.

5. The limitations of the study with regard to prevalence estimate should be more discussed (see point 1 above).

We understand that there is a possibility for selection bias in some steps of the screening sample. These possibilities are discussed at item 1 and were inserted in the text of the manuscript. Besides of this, the limits of the study were rewritten regarding the possible bias in the sample selection. However, the screening survey was established considering methodological and economical feasibility and the socioeconomic status of volunteers.

We would like to point that some characteristics of low socioeconomic status population could be a limit the ideal methodology. We suggest that other studies with this kind of people should design a specific methodology considering difficulties regarding the social difficulties (for example: where people live, if they have telephone number, if public transport is available, if they work...), educational level (for example, difficulties in comprehension which demands large explanations, reading questionnaires and cross-cultural adaptation of the instruments) and economic problems (for example: money to public transport, lunch, necessity to work on weekends...).
“Minor Essential

1. The Beta distribution parameters could need to be more extensively explained for the usual reader to apprehend.”

The Bayesian Analysis is a complex statistical procedure that involves previous knowledge in the estimation of a probability. In this study, we considered the prevalence of widespread pain in the fibromyalgia prevalence calculation. The \textit{a priori} parameters for FM prevalence was defined based on known proportions of WP and FM in the 768 sample and the \textit{a posteriori} parameters was calculated based on the number of FM and WP subjects. We used the beta distribution that is a continuous probability distributions defined on the interval $[0, 1]$. For an usual reader we believe that this information would help to understand the advantages of the method. A detailed description of the Bayesian Analysis could be interesting but would need a special paper be totally explained.


Pereira CAB. Bayesian solutions to some classical problems of statistics [PhD]. Florida: Florida State University; 1980.

Pereira, CAB ; Stern, J ; Wechsler, S . Can a Significance Test Be Genuinely Bayesian?. Bayesian Analysis, v. 3, p. 79-100, 2008.
Referee 2: Robert Katz

We would like to thank the comments of our manuscript aiming the improvement of the study and consequently the comprehension of fibromyalgia syndrome.

Considering Fibromyalgia as an end point of chronic stress (1) and the several pain risk factors that low socioeconomic population are exposed to, our hypothesis was that the prevalence of fibromyalgia in Embu would be higher than other studies. We also believe that cultural, ethics and environmental factors could interfere in the symptoms and prevalence. In this sense, this study might be important to better understand the epidemiology of fibromyalgia in a continental country like Brazil and so, highlight the importance of planning the health care system and to properly assist this population. Other studies in low socioeconomic status population are necessary to define a specific methodology to access this population and to establish the real necessities in order to improve the quality of life of these people.

In this paper, we only sign the deficiency of the ACR criteria using the comparison of fibromyalgia symptoms among different the groups of pain. As we expected, we notice that the widespread chronic pain group was not so different from the fibromyalgia group. We believe that is essential to take a look to these people with chronic widespread pain and to better discuss the ACR classification criteria aiming the preventive or early treatments. This subject was presented in the ACR congress (2) it will be better discussed in other manuscript that we are writing.

As we had hypothesized, the low socioeconomic status population is exposed to several pain risk factors. These factors seem to interfere in the widespread chronic pain prevalence but not in the fibromyalgia prevalence. We found a higher prevalence of widespread chronic pain (24%, 95% CI = 21-27%) and we believe that this discrepancy may be due to the fact we enrolled a high-risk population for chronic pain. Both middle age (3) and female gender are known risk factors for chronic pain (4, 5, 6), determined by biological (7) and social factors (3). Increased weight is also a risk factor for pain, especially in women (3). Furthermore, low-income individuals are more likely to
work in manual functions, which may also facilitate injuries and pain. Wijnhoven et al. (8) related that non-paid work (e.g. household work) is per se a risk factor for pain (4, 7). Other studies report an inverse association between education and chronic pain (4, 7). Accordingly, our sample should be considered of high risk for widespread chronic pain.

The last assumption is supported by the fact that several studies showed an inverse relation between presence of musculoskeletal symptoms and socioeconomic status (9). However, of interest is that these factors did not determine a higher prevalence of FM in our study. Another factor explaining the high prevalence of widespread chronic pain was the screening interview being conducted over the telephone, forcing reliance on self-report. This kind of assessment may be a bias of the study and have to be considered in other epidemiologic studies.

The definition we used for widespread chronic pain was the same of ACR criteria: “axial + upper and lower segment + left and right-sided pain”. Those without widespread pain were classified as having regional pain (pain not fulfilling the widespread pain criteria) or no pain.

All information explained and all points discussed in this letter were included in the manuscript in subtitled text. The text was copyedited by a professional copyediting service in order to avoid any misunderstanding so, the language might be little different from the original version.


(2) Assumpção, A.; Sauer, J F ; Chalot, Sd ; Cavalcante, Ab; Marques, A. P. Fibromyalgia Classification: Concordance between ACR criteria and classification based on symptoms. In: 72 th Annual Scientific Meeting of American College of Rheumatology, 2008, San Francisco.


