PEER REVIEW HISTORY

ARTICLE DETAILS

TITLE (PROVISIONAL)	Cross-Sectional study of the association between healthcare professionals' empathy and burnout and the number of annual primary care visits per patient under their care in Spain
AUTHORS	Yuguero, Oriol; Melnick, Edward; Marsal, Josep Ramon; Esquerda, Montserrat; Soler-Gonzalez, Jorge

VERSION 1 – REVIEW

REVIEWER	Edinêis de Brito Guirardello University of Campinas, São Paulo - Brazil
REVIEW RETURNED	20-Dec-2017

GENERAL COMMENTS	In the abstract, the results and conclusions are not clear. In the section "Participants and study design", it seems to be a conflict in the schedule, so, please Clarify. Overall, the paper is not well written and it should be improved.

REVIEWER	Takashi NARUSE The University of Tokyo, Japan
REVIEW RETURNED	11-Jan-2018

GENERAL COMMENTS	Background 1) Please clarify the reason why clinical empathy is focused in issue of burnout. It is needed that systematic integration of previous studies about preventive factor of burnout. 2) Please clarify the reason why the relationship between empathy and number of visits was focused. If number of visit was considered as index pf care system quality, it looks reasonable to focus on association with burnout, but not about empathy. Method 3) In variable about number of diagnosis, "diabetes" and "hypertension" and "metabolic syndrome" were counted independently. But Mets might include symptom of diabetes and hypertension, so how did you define them? Please add explanation. 4) I confused that the definition of "the number of visits per patient" and "the number of diagnoses per visit" on each "nurses of physicians". Please explain how you calculated the number, and what they meant. 5) Why you did not implement multivariable analysis? Discussion 6) Please clarify what you added with study result. It should be

	explained more deeply and show implication for future research. If possible, I recommend you to discuss from a view point of relationship between your result and health care system in your country; the health care systems about how number of visits or diagnoses per profession divers among them, how working system or environment could be improved, and who can improve them. Minor revise 7) some citation styles do not meet guidelines.

REVIEWER	Aya Biderman Ben Gurion University of the Negev, Beer Sheva, Israel
REVIEW RETURNED	19-Jan-2018

GENERAL COMMENTS	This is an interesting study, and has to be published. My consideration regarding the presentation of their results: The authors should first present the demographics of the study population (before going into the detailed analysis) : Nurses and physicians' age groups, gender, area of work(rural or urban), number of hours/week , etc. so that we get the impression of the study population. Furthermore- the authors can do some more analyses of the data: for instance -correlations between the nurses' and physician's age and their empathy and burnout levels, etc. Also I think it would be very informative to check the correlations between nurses and physicians who work together as a teem: and their empathy and burnout- is it related?(I presume yes). Have all visits been counted? many patient visits are short - and often without "face to face" encounters- such as prescription renewal etc. Did they count these as well? Can you check the length of encounters or only the number? It would be very interesting to see if the length of consultation is related to the empathy/burnout of the professional! Another bias is the number of hours the nurse or physician is working: I haven't seen any comment regarding this effect on empathy/burnout or number of visits. Because the "low, medium and high" degrees of empathy and burnout are opposite (higher empathy is better, but higher burnout is worse) the tables are a bit confusing! perhaps change the order in the table ? The discussion: In a cross-sectional study one cannot speak about "cause and outcome" but you should try to address the opposite: That a higher load of patient visits is related to lower empathy and higher burnout? you can discuss the results in both directions! The references - I think that there were some new papers recently - for instance Burnout in Young Family Physicians: Variation Across States. Hansen A, Peterson LE, Fang B, Phillips RL Jr.. J Am Board Fam Med. 2018 Jan-Feb;31(1):7-8. doi: 10.3122/jabfm.2018.01.170269. PMID: 29330234 Free Article Similar articles Select item 29330232 6. Interventions Must Be Realistic to Be Useful and Completed in Family Medicine. Bowman MA, Seehusen DA, Victoria Neale A. J Am Board Fam Med. 2018 Jan-Feb;31(1):1-4. doi:

	10.3122/jabfm.2018.01.170422. PMID: 29330232 Free Article Please try to revise the article. If some of these remarks are not relevant, you should still address them in the "limitations section" of the study

VERSION 1 – AUTHOR RESPONSE

Reviewer(s)' Comments to Author:

Reviewer: 1
Reviewer Name: Edinêis de Brito Guirardello

Institution and Country: University of Campinas, São Paulo - Brazil

Please state any competing interests or state ‘None declared’: None

Please leave your comments for the authors below

In the abstract, the results and conclusions are not clear.
We have arranged the abstract and we hope is clearer right now.

In the section "Participants and study design", it seems to be a conflict in the schedule, so, please Clarify. Overall, the paper is not well written and it should be improved.

We have adjusted, there was a writing error with the period of study. We have arranged that section. The study was done between January 2013 and July 2014. We hope that with all the commentaries from the reviewers we will improve the paper.

Reviewer: 2
Reviewer Name: Takashi NARUSE
Institution and Country: The University of Tokyo, Japan
Please state any competing interests or state ‘None declared’: None declared
Please leave your comments for the authors below Background

1) Please clarify the reason why clinical empathy is focused in issue of burnout. It is needed that systematic integration of previous studies about preventive factor of burnout.

We have evaluated in different studies, how high levels of burnout are linked with little empathy on the part of professionals. The low empathic capacity, makes communication with patients difficult, and in many cases leads to depersonalization and in many cases to emotional exhaustion. Two aspects those are fundamental in burnout. In fact, improving the communication skills of health professionals has been described as a resource to reduce burnout. All references are included in the background section. You can find this explanation in page 4 paragraph 4.

References:

- Yuguero O, Marsal JR, Buti M, Esquerda M, Soler-González J. Descriptive study of association between quality of care and empathy and burnout in primary care. BMC Med Ethics. 2017 Sep 26;18(1):54
- Yuguero O, Marsal JR, Esquerda M, Soler-González J. Association between low empathy and high burnout among primary care physicians and nurses in Lleida, Spain. Eur J Gen Pract. 2016 Oct 10:1-7
- Melnick ER, Powsner SM. Empathy in the Time of Burnout. Mayo Clin Proc. 2016; 91(12):1678-1679
- Yuguero O, Forné C, Esquerda M, Pifarré J, Abadías MJ, Viñas J. Empathy and burnout of emergency professionals of a health region: A cross-sectional study. Medicine (Baltimore). 2017 Sep;96(37):e8030

2) Please clarify the reason why the relationship between empathy and number of visits was focused. If number of visit was considered as index pf care system quality, it looks reasonable to focus on association with burnout, but not about empathy.

Yes, we have considered the number of visits as a quality indicator. And to evaluate what can affect this indicator we have raised different hypotheses. In the first place, we wanted to prove the effect of professionals with greater burnout. But we also thought it would be interesting to see if those professionals with greater empathy received the same number of visits as professionals with less empathy.
That's why we decided to include it. The results show that the most empathic professionals receive fewer visits. Our team believes that empathic professionals solve patients' problems better, and do not need to receive as many visits. And that is related to the cost and quality of care. We have included that reflection in page 5, paragraph 2.

Method
3) In variable about number of diagnosis, “diabetes” and “hypertension” and “metabolic syndrome” were counted independently. But Mets might include symptom of diabetes and hypertension, so how did you define them? Please add explanation.

We defined the diagnostics (i.e. diabetes, heart failure, ischemic heart disease, etc) from the electronic records of the medical history (e-CAP). All the diagnostics were recorded from the practitioners using de ICD10 dictionary. It was defined by each diagnostic a binary variable indicating the presence or not and the sum of all of them. We have included the explanation in page 6, paragraph 4.

4) I confused that the definition of “the number of visits per patient” and “the number of diagnoses per visit” on each “nurses of physicians”. Please explain how you calculated the number, and what they meant.

Both variables (i.e "number of visits per patient" and "number of diagnostics") were computed directly using the electronic records of the medical history. The Catalan Health Institute records save the medical history for all the patients insured. The number of visits is the number of contacts with de medical system either at nurses or physicians. On other hand, the number of diagnostics is the number of the following diagnostics recorded: diabetes, heart failure, ischemic heart disease, stroke, dyslipidaemia, hypertension, anemia, joint fibrillation, chronic renal failure, apnea, anxiety, depression, metabolic syndrome. So for an hypothetic patient with no diagnostics the number of diagnostics would be zero. We have included that explanation in the methods section in page 6.

5) Why you did not implement multivariable analysis?

Neither multivariable analysis was done. Probably in following studies we can conduct multivariable analysis. But we chose that type of study to compare it with previous studies.

Discussion
6) Please clarify what you added with study result. It should be explained more deeply and show implication for future research. If possible, I recommend you to discuss from a view point of relationship between your result and health care system in your country; the health care systems about how number of visits or diagnoses per profession divers among them, how working system or environment could be improved, and who can improve them.

The work relating empathy with burnout in our health region is a pioneer in our country and has managed to verify a reality that has been widely described in other countries and is the association that exists between the degree of empathy and burnout of professionals and the number of visits they make.

We also consider an interesting line to continue investigating would be the realization of a qualitative study in order to detect the differences between doctors and nurses, and to analyze the relationship between teamwork and its influence with burnout.
Based on the results, we believe that health institutions should continue to promote communication skills and other work relationship initiatives that reduce burnout among healthcare professionals. This would surely help to improve assistance and affect the quality indicators. An interesting line would be the realization of a qualitative study with the objective of detecting differences between doctors and nurses, and to be able to develop, in this way, the concept of the grouping of empathy.
We have add this information at the end of page 10

Minor revise
7) some citation styles do not meet guidelines.

We have arranged citation as you can see in the references section.

Reviewer: 3
Reviewer Name: Aya Biderman

Institution and Country: Ben Gurion University of the Negev, Beer Sheva, Israel

Please state any competing interests or state ‘None declared’: None declaired

Please leave your comments for the authors below

This is an interesting study, and has to be published. Many thanks for your consideration

My consideration regarding the presentation of their results: The authors should first present the demographics of the study population (before going into the detailed analysis) : Nurses and physicians' age groups, gender, area of work(rural or urban), number of hours/week , etc. so that we get the impression of the study population.

Thank you for your comment. We have included table 1 with some demographics of the sample.

Furthermore- the authors can do some more analyses of the data: for instance -correlations between the nurses' and physician's age and their empathy and burnout levels, etc.

We have included the information between the correlation between empathy and burnout levels. This is an important issue and our team has done some research on it. No significant differences were detected between burnout and gender or professional role. You can find in page 8, first paragraph.

Also I think it would be very informative to check the correlations between nurses and physicians who work together as a teem: and their empathy and burnout- is it related?(I presume yes).

We agree with the reviewer and we assume that its related. However, the identification of each professional was encrypted or the same each professional was anonymized. Then it is impossible identify each member of the ‘professional team'.

Have all visits been counted? many patient visits are short - and often without "face to face" encounters- such as prescription renewal etc. Did they count these as well? Can you check the length of encounters or only the number? It would be very interesting to see if the length of consultation is related to the empathy/burnout of the professional!

We also agree with the reviewer. Without doubts there are many different types of visits, durations, health providers and intensity of the visits. In our care health system the number of visits is automatically recorded so it is mandatory record the visit in the time table of the professional to receive the visit. We have added this information in the Methods section to clarify in page 6 paragraph 2.

Another bias is the number of hours the nurse or physician is working: I haven't seen any comment regarding this effect on empathy/burnout or number of visits.

This information was not registered and we can not obtain that information right now. It could be interesting in further studies. We have added this as a limitation in page 10, 3th paragraph.

Because the "low, medium and high" degrees of empathy and burnout are opposite (higher empathy is better, but higher burnout is worse) the tables are a bit confusing! perhaps change the order in the table ?

Yes that’s true and we have changed it! We hope is more clear. You can see the changes in tables 2 and 3.

The discussion: In a cross-sectional study one cannot speak about "cause and outcome" but you should try to address the opposite: That a higher load of patient visits is related to lower empathy and higher burnout? you can discuss the results in both directions!

In the discussion we speak of association, not of cause-effect relationship since one of the limitations of cross-sectional studies is precisely that. This is what we have reflected in the limitations in page 10, 3th paragraph. We have chosen that interpretation address but we have to assume that interpretations in other directions could be done.

The references - I think that there were some new papers recently - for instance Burnout in Young Family Physicians: Variation Across States.
Hansen A, Peterson LE, Fang B, Phillips RL Jr..

J Am Board Fam Med. 2018 Jan-Feb;31(1):7-8. doi: 10.3122/jabfm.2018.01.170269.

Interventions Must Be Realistic to Be Useful and Completed in Family Medicine.
Bowman MA, Seehusen DA, Victoria Neale A.
J Am Board Fam Med. 2018 Jan-Feb;31(1):1-4. doi: 10.3122/jabfm.2018.01.170422.
PMID: 29330232 Free Article

Many thanks! They are really interesting and have been included in the background as reference 14 and 15

VERSION 2 – REVIEW

REVIEWER	Aya Biderman Ben Gurion University of the Negev, Beer Sheva, Israel
REVIEW RETURNED	07-Apr-2018

GENERAL COMMENTS	The paper is important in its main issue . A few remarks: The English translation needs another English speaker to address , sometimes there are expressions and words written incorrectly. I think that the authors could use a more advanced statistical method - and try to do a multi variable regression model that would define the factors related to more burned out physicians/nurses? Another thought regarding this paper- would it be more clear to include only the physicians' data, and write a separate analysis of the nurses' outcome?

VERSION 2 – AUTHOR RESPONSE

Dear editor and dear reviewer,

Thank you very much for your email and for your consideration. We enclose a new version of the article where we have added all the minor changes requested by the reviewer number 3 and those that we detail in a separate document in a letter of reply, as well as we have included in the new version of the manuscript well Indicated in bold to identify them more easily.

The paper is important in its main issue . A few remarks: The English translation needs another English speaker to address , sometimes there are expressions and words written incorrectly.

Thank you very much for the reviewer for his reflections and contributions. As the authors are not experts in English, we have once again sent the manuscript to a professional copy-editor, which, as the reviewer points out, has improved some expressions and also some words. We appreciate the opportunity to improve the text to make it more understandable

.

I think that the authors could use a more advanced statistical method - and try to do a multi variable regression model that would define the factors related to more burned out physicians/nurses?

Indeed the reviewer is right. However, we could not do a multivariate analysis because the objective of the study was not to determine which factors were associated independently both to the degree of burnout and the level of empathy. The objective was to know what factors of the administrative data are associated with the degree of empathy and burnout. That is why the database is composed of these variables and we can not do this exhaustive analysis. That is why we have added it as a limitation of our study, as you can read on page 11.

> **[…]Finally, we think it would be positive to develop a multivariate analysis, to evaluate different factors affecting empathy and burnout. However, our data base was not done with that objective and it would be a good option for further research.**

Another thought regarding this paper- would it be more clear to include only the physicians' data, and write a separate analysis of the nurses' outcome?

We would like to thank the reviewer for the thought of separating this analysis because, certainly, as can be seen in the tables, the behavior has a certain different component. That is why we have created tables 2 and 3 with separate data from doctors and nurses.
In fact, it would be interesting as a future line to continue working on the subject in specific groups by adding a qualitative methodology that would allow us to know more in depth not only the state of the question but the ways to detect it in time and apply solutions. However, given the Spanish model of primary care relationship between doctors and nurses, who share the same patients and therefore where there is a model of care interaction very close, we believe it is better to know what happens both collectively, since we believe it is easier to see the differences.

We insist that the suggestion is very good and that if you want more information about the results we have, or some other modification of the manuscript we will be happy to do so.

VERSION 3 – REVIEW

REVIEWER	Aya Biderman Ben-Gurion University of the Negev, Israel
REVIEW RETURNED	02-Jun-2018

GENERAL COMMENTS	Good luck!