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Association between healthcare professionals' empathy and burnout and the number of annual primary care visits per patient under their care in Spain

Visits, empathy and burnout.

Health Service Research

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Abstract

Objective

The aim of this study was to evaluate the association between physician and nurse self-reported empathy and burnout and the number of annual primary care visits per patient under their care.

Methods

Design: A cross-sectional survey study was conducted from January 2013 to June 2014

Site: The 22 Primary Care Centres of the Lleida Health Region in Spain.

Main Outcome Measures: The Jefferson Scale of Physician Empathy and Maslach Burnout Inventory were used to measure empathy and burnout, respectively. The number of visits and the number of diagnoses coded per visit were obtained through the Region's electronic health record.

Results

267 healthcare professionals (physicians and nurses, 52.6% participation of the total in the Region) with a total of 301,657 patients under their care. Healthcare professionals' degree of burnout and empathy were associated with the number of annual visits per patient under their care. Burned out nurses and physicians received fewer visits (4.5 vs 3.7) and (18.1 vs 18.9). Whereas, more empathic physicians received more visits per patient (19.4 vs 17.2, $p < 0.05$)) and documented more diagnoses per visit (10.2 vs 9.7, $p = 0{,}001$). Less burned out and less empathic nurses documented more diagnoses per visit (10.2 vs 10.0 and 8.2 vs 9.9, $p < 0.05$).

Conclusions

Empathy and burnout are associated with the number of annual primary care visits per patient healthcare professionals receive. These results should serve to promote empathic skills and establish organizational changes that promote practice efficiency and, in turn, reduce the degree of burnout of healthcare professionals.

Keywords: Empathy; Burnout; Primary Care; Management

Strengths and Limitations

One of the first studies showing the association between empathy, burnout and the number of visits in primary care

Sample size based on data of more of 300.000 patients

Use of self responded tests to evaluate empathy and burnout.

Background

The primary care landscape has undergone major changes in recent years.[i] Administrative burdens[ii], volume of visits, and insufficient resources in times of cutbacks [iii] are increasing work-related distress and burnout in healthcare professionals. Burnout is a syndrome characterized emotional exhaustion, decreased fulfilment, and the depersonalization.[iv] Burnout impacts healthcare professionals professional and personal lives leading to physicians reducing clinical work hours or clinical practice altogether[v], thus representing ethical challenges for those responsible for health institutions.[vi] Moreover, burnout has an important impact on quality of care.[vii],[viii] Continuing to deliver high quality primary care with high quality relationships with patients requires time.[6] Time constraints can lead to exhaustion and frustration, key elements of burnout.

Front line physicians with direct patient contact such as those practicing primary care, emergency medicine, and internal medicine have some of the highest rates of burnout.[ix], [x] In the United States in 2014, 55% of physicians reported symptoms of burnout[xi]--an absolute increase of 10% from just three years prior.[xii] These findings have prompted individual and system level solutions to combat burnout in healthcare professionals.[3,xiii]

Though some individuals may be more prone to burnout, this syndrome is job-related and situation-specific[xiv]. Reducing levels of burnout in health institutions is possible, thereby making it be an ethical responsibility for institutions to improve professional

wellness.[xv] Indeed skills that improve healthcare professionals' empathic capacity have been shown to be associated with lower levels of burnout.[xvixviixviii] The theory is that when healthcare professionals understand and communicate patients' situations better, we feel more fulfilled, and we help to humanize care delivery, both fundamental elements in the prevention of burnout.[xix] Since the degree of burnout or professional stress can affect the quality of communication with the patient, this study is particularly relevant given that healthcare professionals are being subjected to increasing clinical workloads and greater time constraints.[xx] Physician stress and burnout are two of the factors that most influence the duration of a primary care visit.[xxi]

Clinical empathy has been described as the ability to understand others' feelings and thoughts and to communicate such understanding.[xxii] Clinical empathy has been shown to be associated with improved communication, patient satisfaction, and therapeutic compliance.[xxiii],[xxiv] Empathic physicians decrease patient anxiety, potentially leading better clinical outcomes.[xxv],[xxvi]

The number of primary care visits per patient is used by the Organization for Economic Co-operation and Development (OECD) [xxvii] as one of the measures of health system quality. In 2014, the average number of annual primary care visits per patient in Spain was 7.6 per year per person, above the European average of 7.1 and far greater than the 2.9 annual visits in Sweden.

The aim of the present study is to evaluate the association between physician and nurse self-reported measures of empathy and burnout and the number of annual primary care visits per patient under their care.

Methods

Participants and Study Design

A cross-sectional survey study was conducted with volunteer participants. In the Lleida health region there are 22 primary care centres serving a population of about 366,000

people. All physicians and nurses in the region were contacted by e-mail and asked to complete an anonymous survey that assessed their degree of burnout and empathy. The study was conducted between January 2013 and June 2014. The survey was administered between May and July 2014.

Outcomes

Burnout and Empathy Evaluation

The degree of burnout was measured using the Spanish version of the Maslach burnout inventory (MBI), a 22-item scale validated in Spanish.[xxviii],[xxix] This scale measures the three dimensions of burnout: depersonalization, personal fulfilment, and emotional exhaustion.[xxx] Empathy was measured using the Spanish version of the Jefferson Scale of Physician Empathy (JSPE)[xxxi], a validated scale, recognized as the gold standard for measuring medical empathy, consisting of 20 items.[xxxii] Both scales are scored using a 7-point Likert scale, with higher scores indicating higher burnout and greater empathy.

Annual visits per patient

We analysed the number of visits made by patients to their primary care team (nurse and family physician) between January 2013 and June 2014 (the year in which we collected data from healthcare professionals). Results were divided by 1.4 to obtain the number of visits per calendar year. The number of visits, age and gender of each patient were obtained from the records of the E-CAP electronic health record that is used by all the primary care professionals of the Catalan Health Institute. It is important to note that the number of visits by each patient is different from the volume of visits that a healthcare professional was responsible for during that year. Given the varying roles and responsibilities of physicians and nurses within a single care team, we calculated separate values for this outcome for physicians and nurses.

Number of diagnoses coded per visit

We collected the number of diagnoses that the healthcare professional participants documented for each visit. The number and type of diagnoses were used to classify the severity and complexity of the visit. The diagnoses included in our analysis were

diabetes, heart failure, ischemic heart disease, stroke, dyslipidaemia, hypertension, anemia, joint fibrillation, chronic renal failure, apnea, anxiety, depression, metabolic syndrome.

Participant Characteristics

The following sociodemographic data were collected for the practitioners: age, gender, professional category (physician or nurse) and practice setting (urban or rural).

Data Analysis

Standard descriptive summary statistics were used to characterize the MBI and the JSPE scores. The reliability of the instruments was tested using Cronbach's α. The Chi-square and Kolmogorov-Smirnov tests were used to evaluate the distribution of these scores. To analyse the association between the sociodemographic variables and the results of the JSPE, the MBI and the number of visits, the results were grouped into three categories (low, medium and high) using previously described value ranges and categories.[12] All results were to be presented with a 95% confidence interval. Results of association were compared using the Chi-square test. The results were disaggregated according to age, gender, professional category, and practice setting. For the data analysis, means, percentages and standard deviations were calculated using SPSS version 15.0 (IBM 2006)

Ethical and confidentiality considerations

The study was approved by the Clinical Research Ethics Committee of the Jordi Gol Institute for Primary Care Research (IDIAP). The data were kept confidential and anonymous in accordance with the Spanish Data Protection Law 15/1999.

All data were coded and accessible only to the primary care information system technicians who cross-referenced the data. All data were de-identified before being made available to the investigators.

Results

Of the total 267 healthcare professionals who participated in the study (response rate of 52.6% of practitioners in the region), 131 (49%) were nurses, 136 (51%) were physicians, 209 (78.3%) were women, and 155 (58.4%) work in rural areas. This sample was representative of the whole population of healthcare practitioners in the region according to the Ministry of Health of Catalunya. No significant differences were detected between burnout and gender or professional role. Medical professionals practicing in rural areas reported a lower degree of empathy ($p < 0.05$) but no significant differences in burnout. Cronbach's α, was 0.733 for the MBI and 0.748 for the JSPE, what shows an adequate reliability of the scales used.

Annual visits per patient

We analysed the annual number of visits per patient among 301,657 patients under the care of the participating 267 healthcare professionals. Nurses with higher burnout received fewer annual visits per patient. (4.5 visits vs 3.7 in the most burned out, p=0,001, Table 1). There was not a significant difference in the number of annual visits per patient based on nurses' degree of empathy. The most burned out physicians received fewer annual visits per patient (18.1 vs 18.9, p=0.002, Table 2). Physicians with lower empathy received a higher number of visits by their patients (19.4 vs 17.2, p=0.001).

Number of diagnoses coded per visit

Less burned out nurses (8.4 vs 9.9, $p < 0.05$) and less empathic nurses (10 vs 10.2, $p < 0.05$) documented more diagnoses per visit. Whereas physicians with medium range empathy documented the most diagnoses (10.2 vs 9.7, p=0.001). In addition, physicians with the highest degree of burnout were the ones that documented the most diagnoses per visit (10.2 vs 10, $p < 0.05$).

Discussion

In this cross-sectional survey study, we found a significant association between primary care healthcare professionals' burnout and empathy and the annual number of visits per patient under their care. This large, highly representative sample is the

first (to our knowledge) to analyze this association and is strengthened by the inclusion of both physicians and nurses. Few existing similar studies make it difficult to compare our results to the existing literature.

The healthcare professionals' degree of burnout and level of empathy were associated with the annual number of visits per patient under their care. The most empathic and least burned out physicians received fewer visits. We hypothesize that this relationship could be due to the fact that these physicians can better solve their patients' problems with fewer visits. We were unable to compare these results with other similar ones, since to date the literature[10] has only related the severity of consultation with the duration of the consultation, not with the number of encounters between physician and patient.

However among nurses, the associations we found were different. Nurses with less burnout received a greater number of consultations. We should consider that tasks performed by nurses were generally associated with cures, health promotion, and case management[xxxiii]. We hypothesize that the nature of nurses' roles and responsibilities within the care team could influence this relationship, i.e., patients may perceive that they can consult the nurse more in a single visit without finding resistance. If so, less burned out nurses may not have mind receiving more visits by the same patient, to follow up and monitor the evolution of the patient's problems[xxxiv,xxxv]. Also in the field of nursing, we suspect this greater autonomy of visits and case management may be related to greater professional satisfaction[xxxvi]. Likewise, the professional situation also has an association in the documentation of the patients' diagnoses.

In reference to the number of diagnoses coded per visit, we believe that the results we have obtained reflect an association with the professional situation. As for empathy, both less empathic nursing staff and physicians document more diagnoses per visit. We hypothesize that professionals with better communication (and empathy) skills spend more time with the patient and less time documenting diagnoses. It should be noted that the recording of diagnoses in the computer program is important for two main reasons. On one hand, these diagnoses can serve as a rapid reference for other

healthcare professionals caring for the same patient. On the other hand, the patient's clinical complexity is determined by the coded diagnoses, so qualifying for certain clinical programs (i.e inclusion in domiciliary health programs or palliative care) may depend on correct coding. For these reasons, we believe that healthcare professionals with medium levels of empathy are the ones that focus on the care of patient in the interview but also understand the importance of the health records.

However it is striking that in the case of physicians, the most burned out physicians are the ones who record the most. This finding has been described previously, i.e.,[xxxvii] that burnout healthcare professionals are more likely to dehumanize their patients and, focus more on the *iPatient* than the actual human being in front of them. Similarly in Spain, documentation of more diagnoses increases financial incentives linked to quality indicators[8].

We acknowledge several limitations to our study including the use of self-reported outcomes which although validated and widely used could lead to a reporting bias. Furthermore, the 52% of response rate could cause a selection bias. In our region, a large number of healthcare professionals work in rural areas, where access to family physicians and nurses (given the great geographical dispersion) [xxxviii] may be more difficult than in urban areas. In addition, the majority group of healthcare professionals are those who are over 50 years of age.

In conclusion, we believe that future research should focus on which communication skills and work situations can improve the quality of care. Promotion of such skills could lead to an improvement not only in the clinical quality of care but also in the working environment. Burnout levels have been linked with work effort. One of the most important implications of our study is to quantify the effect of healthcare professional burnout on patient care. [xxxix] Health policymakers should be aware of the different measures that can reduce professional burnout (promote professional engagement, team building, flexible work schedule,..).[xl] Perhaps our findings should encourage introspection on alignment of financial incentives based on communication and empathy rather than traditional quality indicators like the number of diagnoses

entered in the electronic health record. We believe that the results of our study may prove interesting for health organization leaders to encourage programs that promote empathic skills and to establish strategies that reduce the degree of burnout of healthcare professionals to improve the quality of patient care.

Declarations/ Acknowledgements:

1. Contributor ship statement: OY designed the study and wrote the main part of the paper. EM collaborate in the design of the paper and in its revision. JM did the statistical analysis. ME collaborate in the data collection and in the introduction research. JS reviewed the manuscript and collaborate in the revision of all the process.
2. Competing interests: The authors declare no conflict of interest.
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4. Data sharing statement: All the data is included in the article.

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Table 1

Characteristics of patients according to Empathy and Burnout of Nursing staff

EMPATHY	Low (n=52,173) mean (SD)	Medium (n= 51,298) mean (SD)	High (n= 49,354) mean (SD)	Total (n=152,825) mean (SD)	p
Women Patients	25,851(49.5%)	25,290 (49.3%)	24,452 (49.5%)	75,593 (49.5%	0.977
Age	48.1 (19.1)	48.4 (19.2)	48.5 (19.4)	48.3 (19.2)	0.014
Visits 2014	4.5 (6.9)	4.4 (6.6)	4.4 (6.6)	4.5 (6.7)	0.065
Visits 2012	18.9 (23.7)	18.6 (23.2)	18.6 (23)	18.7 (23.3)	0.075
Number of diagnoses	10.2 (8.5)	9.7 (8.3)	10 (8.3)	10 (8.4)	0.001
BURNOUT	**Low (n=968,888) mean (SD)**	**Medium (n=54,441) mean (SD)**	**High (n=1,496) mean (SD)**	**Total (n=152,825) mean (SD)**	**p**
Women patients	47638 (49.2%)	27167 (49.9%)	788 (52.7%)	75593 (49.5%)	0.001
Age	48.7 (19.5)	47.6 (18.8)	48.6 (18.8)	48.3 (19.2)	0.001
Visits 2014	4.5 (6.8)	4.3 (6.4)	3.7 (5.3)	4.5 (6.7)	0.001
Visits 2012	19.1 (24)	18.1 (22.1)	16.1 (19.7)	18.7 (23.3)	0.001
Number of diagnoses	9.9 (8.4)	10.2 (8.4)	8.4 (6.7)	10 (8.4)	0.001

Table 2

Characteristics of patients based on Empathy and Burnout of physicians.

EMPATHY	Low (n=42,138) mean (SD)	Medium (n= 45,070) mean (SD)	High (n= 61,624) mean (SD)	Total (n=148,832) mean (SD)	p
Women patients	20,793 (49.3 %)	22,246 (49.4%)	30,765 (49.9%)	73,804 (49.6%)	0.052
Age	48.9 (19.3)	48.9 (19.4)	47.9 (19)	48.5 (19.2)	0.001
Visits 2014	4.6 (6.7)	4.5 (6.7)	4.1 (6.3)	4.4 (6.5)	0.001
Visits 2012	19.4 (23.5)	18.9 (23.8)	17.2 (21.7)	18.3 (22.9)	0.001
Number of diagnoses	9.7 (7.8)	10.2 (8.6)	9.7 (8.3)	9.8 (8.3)	0.001
BURNOUT	**Low (n=81,430) mean (SD)**	**Medium (n=57,742) mean (SD)**	**High (n=9,660) mean (SD)**	**Total (n=148,832) mean (SD)**	**p**
Women patients	40,330 (49.5%)	28,798 (49.9%)	4,676 (48.4%)	73,804 (49.6%)	0.589
Age	48.5 (19.1)	48.6 (19.3)	47.9 (18.7)	48.5 (19.2)	0.003
Visits 2014	4.4 (6.5)	4.4 (6.5)	4.5 (6.6)	4.4 (6.5)	0.069
Visits 2012	18.1 (22.8)	18.4 (23.1)	18.9 (22.9)	18.3 (22.9)	0.002
Number of diagnoses	10 (8.5)	9.6 (7.9)	10.2 (8.8)	9.8 (8.3)	0.001

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STROBE Statement—Checklist of items that should be included in reports of ***cross-sectional studies***

	Item No	Recommendation
Title and abstract	1	(*a*) Indicate the study's design with a commonly used term in the title or the abstract **DONE PAGE 2**
		(*b*) Provide in the abstract an informative and balanced summary of what was done and what was found **DONE PAGE 2**
Introduction		
Background/rationale	2	Explain the scientific background and rationale for the investigation being reported **DONE PAGE 3- 4**
Objectives	3	State specific objectives, including any prespecified hypotheses **DONE PAGE 4**
Methods		
Study design	4	Present key elements of study design early in the paper **DONE PAGE 4**
Setting	5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection **DONE PAGE 5**
Participants	6	(*a*) Give the eligibility criteria, and the sources and methods of selection of participants **DONE PAGE 4-5**
Variables	7	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable **DONE PAGE 5**
Data sources/ measurement	8*	For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group **DONE PAG 5-6**
Bias	9	Describe any efforts to address potential sources of bias **DONE PAGE 9**
Study size	10	Explain how the study size was arrived at **DONE PAGE 5**
Quantitative variables	11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why **DONE PAGE 5**
Statistical methods **(PAGE 5-6)**	12	(*a*) Describe all statistical methods, including those used to control for confounding
		(*b*) Describe any methods used to examine subgroups and interactions
		(*c*) Explain how missing data were addressed
		(*d*) If applicable, describe analytical methods taking account of sampling strategy
		(*e*) Describe any sensitivity analyses
Results		
Participants	13*	(a) Report numbers of individuals at each stage of study—eg numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analysed **DONE PAGE 7**
		(b) Give reasons for non-participation at each stage NOT NECESSARY
		(c) Consider use of a flow diagram NOT NECESSARY
Descriptive data	14*	(a) Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders **DONE PAGE 7**
		(b) Indicate number of participants with missing data for each variable of interest
Outcome data	15*	Report numbers of outcome events or summary measures **DONE PAGE 7**
Main results	16	(*a*) Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (eg, 95% confidence interval). Make clear which confounders were adjusted for and why they were included **DONE PAGE 7**
		(*b*) Report category boundaries when continuous variables were categorized **DONE PAGE 7**
		(*c*) If relevant, consider translating estimates of relative risk into absolute risk for a

		meaningful time period
Other analyses	17	Report other analyses done—eg analyses of subgroups and interactions, and sensitivity analyses **NOT APPLICABLE**
Discussion		
Key results	18	Summarise key results with reference to study objectives **DONE PAGE 8**
Limitations	19	Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias **DONE PAGE 9**
Interpretation	20	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence **DONE PAGE 8**
Generalisability	21	Discuss the generalisability (external validity) of the study results **DONE PAGE 9**
Other information		
Funding	22	Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based **DONE PAGE 10**

*Give information separately for exposed and unexposed groups.

Note: An Explanation and Elaboration article discusses each checklist item and gives methodological background and published examples of transparent reporting. The STROBE checklist is best used in conjunction with this article (freely available on the Web sites of PLoS Medicine at http://www.plosmedicine.org/, Annals of Internal Medicine at http://www.annals.org/, and Epidemiology at http://www.epidem.com/). Information on the STROBE Initiative is available at www.strobe-statement.org.

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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

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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

Visits, empathy and burnout.

Health Service Research

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Abstract

Objective

The aim of this study was to evaluate the association between physician and nurse self-reported empathy and burnout and the number of annual primary care visits per patient under their care.

Methods

Design: A cross-sectional survey study was conducted from January 2013 to July 2014

Site: The 22 Primary Care Centres of the Lleida Health Region in Spain.

Main Outcome Measures: The Jefferson Scale of Physician Empathy and Maslach Burnout Inventory were used to measure empathy and burnout, respectively. The number of visits and the number of diagnoses coded per visit were obtained through the Region's electronic health record.

Results

267 healthcare professionals (physicians and nurses, 52.6% participation of the total in the Region) with a total of 301,657 patients under their care. Healthcare professionals' degree of burnout and empathy were associated with the number of annual visits per patient under their care. Burned out nurses and physicians received fewer visits (4.5 vs 3.7 in nurses) and (18.1 vs 18.9 in physicians). Whereas, more empathic physicians received more visits per patient (19.4 vs 17.2, p <0.05)) and documented more diagnoses per visit (10.2 vs 9.7, p =0,001). Less burned out and less empathic nurses documented more diagnoses per visit (10.2 vs 10.0 and 8.2 vs 9.9, p <0.05).

Conclusions

Empathy and burnout show a significant association with the number of annual primary care visits per patient healthcare professionals receive. These results should serve to promote empathic skills and establish organizational changes that promote practice efficiency and, in turn, reduce the degree of burnout of healthcare professionals.

Keywords: Empathy; Burnout; Primary Care; Management

Strengths and Limitations

- Sample size based on data of more of 300.000 patients.
- Use of validate tools to evaluate empathy and burnout.
- The design of study, don't allow us to establish cause and outcome.
- The 52% of response rate could cause a selection bias.
-

Background

The primary care landscape has undergone major changes in recent years.[1] Administrative burdens[2], volume of visits, and insufficient resources in times of cutbacks[3] are increasing work-related distress and burnout in healthcare professionals. Burnout is a syndrome characterized emotional exhaustion, decreased fulfilment, and the depersonalization.[4] Burnout impacts healthcare professionals professional and personal lives leading to physicians reducing clinical work hours or clinical practice altogether[5], thus representing ethical challenges for those responsible for health institutions.[6] Moreover, burnout has an important impact on quality of care.[7,8] Continuing to deliver high quality primary care with high quality relationships with patients requires time.[6] Time constraints can lead to exhaustion and frustration, key elements of burnout.

Front line physicians with direct patient contact such as those practicing primary care, emergency medicine, and internal medicine have some of the highest rates of burnout.[9,10] In the United States in 2014, 55% of physicians reported symptoms of burnout[11]--an absolute increase of 10% from just three years prior.[12] These findings have prompted individual and system level solutions to combat burnout in healthcare professionals.[3,13,14] Specially among young professionals[15].

Though some individuals may be more prone to burnout, this syndrome is job-related and situation-specific[16]. Reducing levels of burnout in health institutions is possible, thereby making it be an ethical responsibility for institutions to improve professional wellness.[17] Indeed skills that improve healthcare professionals' empathic capacity have been shown to be associated with lower levels of burnout[18,19,20] .The theory is that when healthcare professionals understand and communicate patients' situations better, we feel more fulfilled, and we help to humanize care delivery, both fundamental elements in the prevention of burnout.[21] Since the degree of burnout or professional stress can affect the quality of communication with the patient, this study is particularly relevant given that healthcare professionals are being subjected to increasing clinical workloads and greater time constraints.[22] Physician stress and burnout are two of the factors that most influence the duration of a primary care visit.[23]

Clinical empathy has been described as the ability to understand others' feelings and thoughts and to communicate such understanding.[24] Clinical empathy has been shown to be associated with improved communication, patient satisfaction, and therapeutic compliance.[25],[26] Empathic physicians decrease patient anxiety, potentially leading better clinical outcomes.[27],[28]

We have evaluated in different studies[8], how high levels of burnout are linked with little empathy on the part of professionals[18]. The low empathic capacity, makes communication with patients difficult, and in many cases leads to depersonalization and in many cases to emotional exhaustion[20]. 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[21].

The number of primary care visits per patient is used by the Organization for Economic Co-operation and Development (OECD) [29] as one of the measures of health system quality. In 2014, the average number of annual primary care visits per patient in Spain was 7.6 per year per person, above the European average of 7.1 and far greater than the 2.9 annual visits in Sweden.

We wanted to prove the effect of professionals with greater burnout in the number of visits they receive. 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.

Our team believe 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.

The aim of the present study is to evaluate the association between physician and nurse self-reported measures of empathy and burnout and the number of annual primary care visits per patient under their care.

Methods

Participants and Study Design

A cross-sectional survey study was conducted with volunteer participants. In the Lleida health region there are 22 primary care centres serving a population of about 366,000 people. All physicians and nurses in the region were contacted by e-mail and asked to complete an anonymous survey that assessed their degree of burnout and empathy. The study was conducted between January 2013 and July 2014. The survey was administered between May and July 2014.

Outcomes

Burnout and Empathy Evaluation

The degree of burnout was measured using the Spanish version of the Maslach burnout inventory (MBI), a 22-item scale validated in Spanish.[30,31] This scale measures the three dimensions of burnout: depersonalization, personal fulfilment, and emotional exhaustion.[32] Empathy was measured using the Spanish version of the Jefferson Scale of Physician Empathy (JSPE)[33], a validated scale, recognized as the gold standard for measuring medical empathy, consisting of 20 items.[34] Both scales are scored using a 7-point Likert scale, with higher scores indicating higher burnout and greater empathy.

Annual visits per patient

We analysed the number of visits made by patients to their primary care team (nurse and family physician) between January 2013 and July 2014 (the year in which we collected data from healthcare professionals). . The number of visits is the number of contacts with de medical system either at nurses or physicians. Results were divided by 1.4 to obtain the number of visits per calendar year. The number of visits, age and gender of each patient were obtained from the records of the E-CAP electronic health record that is used by all the primary care professionals of the Catalan Health Institute. 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. It is important to note that the number of visits by each patient is different from the volume of visits that a healthcare professional was responsible for during that year. Given the varying roles and responsibilities of physicians and nurses within a single care team, we calculated separate values for this outcome for physicians and nurses.

Number of diagnoses coded per visit

We collected the number of diagnoses that the healthcare professional participants documented for each visit. The number and type of diagnoses were used to classify the severity and complexity of the visit. The diagnoses included in our analysis were 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 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

Participant Characteristics

The following sociodemographic data were collected for the practitioners: age, gender, professional category (physician or nurse) and practice setting (urban or rural).

Data Analysis

Standard descriptive summary statistics were used to characterize the MBI and the JSPE scores. The reliability of the instruments was tested using Cronbach's α. The Chi-square and Kolmogorov-Smirnov tests were used to evaluate the distribution of these scores. To analyse the association between the sociodemographic variables and the results of the JSPE, the MBI and the number of visits, the results were grouped into three categories (low, medium and high) using previously described value ranges and categories.[12] All results were to be presented with a 95% confidence interval. Results of association were compared using the Chi-square test. The results were disaggregated according to age, gender, professional category, and practice setting. For the data analysis, means, percentages and standard deviations were calculated using SPSS version 15.0 (IBM 2006)

Ethical and confidentiality considerations

The study was approved by the Clinical Research Ethics Committee of the Jordi Gol Institute for Primary Care Research (IDIAP). The data were kept confidential and anonymous in accordance with the Spanish Data Protection Law 15/1999.

All data were coded and accessible only to the primary care information system technicians who cross-referenced the data. All data were de-identified before being made available to the investigators.

Patient and Public Involvement

No patients and public were involved in the study.

Results

Of the total 267 healthcare professionals who participated in the study (response rate of 52.6% of practitioners in the region), 131 (49%) were nurses, 136 (51%) were physicians, 209 (78.3%) were women, and 156 (58.4%) work in rural areas. This sample was representative of the whole population of healthcare practitioners in the region according to the Ministry of Health of Catalunya. We have included in Table 1 data about sociodemographic variables. No significant differences were detected between

burnout and gender or professional role. Medical professionals practicing in rural areas reported a lower degree of empathy (p <0.05) but no significant differences in burnout. High empathy was associated with low burnout in both nurses and physicians (p<0,05) Cronbach's α, was 0.733 for the MBI and 0.748 for the JSPE, what shows an adequate reliability of the scales used.

Annual visits per patient

We analysed the annual number of visits per patient among 301,657 patients under the care of the participating 267 healthcare professionals. Nurses with higher burnout received fewer annual visits per patient. (4.5 visits vs 3.7 in the most burned out, p=0,001, Table 2). There was not a significant difference in the number of annual visits per patient based on nurses' degree of empathy. The most burned out physicians received fewer annual visits per patient (18.1 vs 18.9, p=0.002, Table 3). Physicians with lower empathy received a higher number of visits by their patients (19.4 vs 17.2, p=0.001).

Number of diagnoses coded per visit

Less burned out nurses (8.4 vs 9.9, p <0.05) and less empathic nurses (10 vs 10.2, p <0.05) documented more diagnoses per visit. Whereas physicians with medium range empathy documented the most diagnoses (10.2 vs 9.7, p=0.001). In addition, physicians with the highest degree of burnout were the ones that documented the most diagnoses per visit (10.2 vs 10, p <0.05).

Discussion

In this cross-sectional survey study, we found a significant association between primary care healthcare professionals' burnout and empathy and the annual number of visits per patient under their care. This large, highly representative sample is the first (to our knowledge) to analyze this association and is strengthened by the inclusion of both physicians and nurses. Few existing similar studies make it difficult to compare our results to the existing literature.

The healthcare professionals' degree of burnout and level of empathy were associated with the annual number of visits per patient under their care. The most empathic and least burned out physicians received fewer visits. We hypothesize that this relationship could be due to the fact that these physicians can better solve their patients' problems with fewer visits. We were unable to compare these results with other similar ones, since to date the literature[10] has only related the severity of consultation with the duration of the consultation, not with the number of encounters between physician and patient.

However among nurses, the associations we found were different. Nurses with less burnout received a greater number of consultations. We should consider that tasks performed by nurses were generally associated with cures, health promotion, and case management[35]. We hypothesize that the nature of nurses' roles and responsibilities within the care team could influence this relationship, i.e., patients may perceive that they can consult the nurse more in a single visit without finding resistance. If so, less burned out nurses may not have mind receiving more visits by the same patient, to follow up and monitor the evolution of the patient's problems[36],[37]. Also in the field of nursing, we suspect this greater autonomy of visits and case management may be related to greater professional satisfaction[38]. Likewise, the professional situation also has an association in the documentation of the patients' diagnoses.

In reference to the number of diagnoses coded per visit, we believe that the results we have obtained reflect an association with the professional situation. As for empathy, both less empathic nursing staff and physicians document more diagnoses per visit. We hypothesize that professionals with better communication (and empathy) skills spend more time with the patient and less time documenting diagnoses. It should be noted that the recording of diagnoses in the computer program is important for two main reasons. On one hand, these diagnoses can serve as a rapid reference for other healthcare professionals caring for the same patient. On the other hand, the patient's clinical complexity is determined by the coded diagnoses, so qualifying for certain clinical programs (i.e inclusion in domiciliary health programs or palliative care) may depend on correct coding. For these reasons, we believe that healthcare professionals

with medium levels of empathy are the ones that focus on the care of patient in the interview but also understand the importance of the health records.

However, it is striking that in the case of physicians, the most burned out physicians are the ones who record the most. This finding has been described previously, i.e.,[39] that burnout healthcare professionals are more likely to dehumanize their patients and, focus more on the *iPatient* than the actual human being in front of them. Similarly in Spain, documentation of more diagnoses increases financial incentives linked to quality indicators[8].

We acknowledge several limitations to our study including the use of self-reported outcomes which although validated and widely used could lead to a reporting bias. Furthermore, the 52% of response rate could cause a selection bias. In our region, a large number of healthcare professionals work in rural areas, where access to family physicians and nurses (given the great geographical dispersion) [40] may be more difficult than in urban areas. There is also another bias, the number of hours the nurse or physician is working. This information could be important to evaluate this effect on empathy/burnout or number of visits. In addition, the majority group of healthcare professionals are those who are over 50 years of age. The design of study, don't allow us to establish cause and outcome. We have chosen that interpretation but we have to assume that interpretations in other directions could be done

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.

In conclusion, we believe that future research should focus on which communication skills and work situations can improve the quality of care. Promotion of such skills could lead to an improvement not only in the clinical quality of care but also in the working environment. Burnout levels have been linked with work effort. One of the most important implications of our study is to quantify the effect of healthcare professional burnout on patient care. [41] Health policymakers should be aware of the different measures that can reduce professional burnout (promote professional engagement, team building, flexible work schedule,..). Perhaps our findings should encourage introspection on alignment of financial incentives based on communication and empathy rather than traditional quality indicators like the number of diagnoses entered in the electronic health record. We believe that the results of our study may prove interesting for health organization leaders to encourage programs that promote empathic skills and to establish strategies that reduce the degree of burnout of healthcare professionals to improve the quality of patient care.

Declarations/ Acknowledgements:

1. Contributor ship statement: OY designed the study and wrote the main part of the paper. EM collaborate in the design of the paper and in its revision. JM did the statistical analysis. ME collaborate in the data collection and in the introduction research. JS reviewed the manuscript and collaborate in the revision of all the process.
2. Competing interests: The authors declare no conflict of interest.
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4. Data sharing statement: All the data is included in the article.

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Table 1

Sociodemographic variables depending on place of work

	Urban (n=111)		Rural (n=156)		Total (n=267)		
	N	n (%)	N	n (%)	N	n (%)	P
Age	111		156		267		0,915
31 - 40		26 (23,4%)		34 (21,8%)		60 (22,5%)	
41 - 50		40 (36%)		55 (35,3%)		95 (35,6%)	
>50		45 (40,5%)		67 (42,9%)		112 (41,9%)	
Professional Role	111		156		267		0,405
Nurse		50 (45%)		81 (51,9%)		131 (49,1%)	
Physician		61 (55%)		75 (48,1%)		136 (50,9%)	
Gender	111		156		267		0,349
Men		21 (18,9%)		37 (23,7%)		58 (21,7%)	
Women		90 (81,1%)		119 (76,3%)		209 (78,3%)	
Empathy (JSPE)	**111**		**156**		**267**		**0,018**
Low		27 (24,3%)		62 (39,7%)		89 (33,3%)	
Medium		38 (34,2%)		50 (32,1%)		88 (33%)	
High		46 (41,4%)		44 (28,2%)		90 (33,7%)	
Burnout	111		156		267		0,774
Low		63 (56,8%)		94 (60,3%)		157 (58,8%)	
Medium		43 (38,7%)		57 (36,5%)		100 (37,5%)	
High		5 (4,5%)		5 (3,2%)		10 (3,7%)	

Table 2

Characteristics of patients according to Empathy and Burnout of Nursing staff

EMPATHY	Low (n=52,173) mean (SD)	Medium (n= 51,298) mean (SD)	High (n= 49,354) mean (SD)	Total (n=152,825) mean (SD)	p
Women Patients	25,851(49.5%)	25,290 (49.3%)	24,452 (49.5%)	75,593 (49.5%	0.977
Age	48.1 (19.1)	48.4 (19.2)	48.5 (19.4)	48.3 (19.2)	0.014
Visits 2014	4.5 (6.9)	4.4 (6.6)	4.4 (6.6)	4.5 (6.7)	0.065
Visits 2012	18.9 (23.7)	18.6 (23.2)	18.6 (23)	18.7 (23.3)	0.075
Number of diagnoses	10.2 (8.5)	9.7 (8.3)	10 (8.3)	10 (8.4)	0.001
BURNOUT	**High (n=1,496) mean (SD)**	**Medium (n=54,441) mean (SD)**	**Low (n=968,888) mean (SD)**	**Total (n=152,825) mean (SD)**	**p**
Women patients	788 (52.7%)	27167 (49.9%)	47638 (49.2%)	75593 (49.5%)	0.001
Age	48.6 (18.8)	47.6 (18.8)	48.7 (19.5)	48.3 (19.2)	0.001
Visits 2014	3.7 (5.3)	4.3 (6.4)	4.5 (6.8)	4.5 (6.7)	0.001
Visits 2012	16.1 (19.7)	18.1 (22.1)	19.1 (24)	18.7 (23.3)	0.001
Number of diagnoses	8.4 (6.7)	10.2 (8.4)	9.9 (8.4)	10 (8.4)	0.001

Table 3

Characteristics of patients based on Empathy and Burnout of physicians.

EMPATHY	Low (n=42,138) mean (SD)	Medium (n= 45,070) mean (SD)	High (n= 61,624) mean (SD)	Total (n=148,832) mean (SD)	p
Women patients	20,793 (49.3 %)	22,246 (49.4%)	30,765 (49.9%)	73,804 (49.6%)	0.052
Age	48.9 (19.3)	48.9 (19.4)	47.9 (19)	48.5 (19.2)	0.001
Visits 2014	4.6 (6.7)	4.5 (6.7)	4.1 (6.3)	4.4 (6.5)	0.001
Visits 2012	19.4 (23.5)	18.9 (23.8)	17.2 (21.7)	18.3 (22.9)	0.001
Number of diagnoses	9.7 (7.8)	10.2 (8.6)	9.7 (8.3)	9.8 (8.3)	0.001
BURNOUT	**High (n=9,660) mean (SD)**	**Medium (n=57,742) mean (SD)**	**Low (n=81,430) mean (SD)**	**Total (n=148,832) mean (SD)**	**p**
Women patients	4,676 (48.4%)	28,798 (49.9%)	40,330 (49.5%)	73,804 (49.6%)	0.589
Age	47.9 (18.7)	48.6 (19.3)	48.5 (19.1)	48.5 (19.2)	0.003
Visits 2014	4.5 (6.6)	4.4 (6.5)	4.4 (6.5)	4.4 (6.5)	0.069
Visits 2012	18.9 (22.9)	18.4 (23.1)	18.1 (22.8)	18.3 (22.9)	0.002
Number of diagnoses	10.2 (8.8)	9.6 (7.9)	10 (8.5)	9.8 (8.3)	0.001

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STROBE Statement—Checklist of items that should be included in reports of ***cross-sectional studies***

	Item No	Recommendation
Title and abstract	1	(*a*) Indicate the study's design with a commonly used term in the title or the abstract **DONE PAGE 2**
		(*b*) Provide in the abstract an informative and balanced summary of what was done and what was found **DONE PAGE 2**
Introduction		
Background/rationale	2	Explain the scientific background and rationale for the investigation being reported **DONE PAGE 3- 4**
Objectives	3	State specific objectives, including any prespecified hypotheses **DONE PAGE 4**
Methods		
Study design	4	Present key elements of study design early in the paper **DONE PAGE 4**
Setting	5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection **DONE PAGE 5**
Participants	6	(*a*) Give the eligibility criteria, and the sources and methods of selection of participants **DONE PAGE 4-5**
Variables	7	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable **DONE PAGE 5**
Data sources/ measurement	8*	For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group **DONE PAG 5-6**
Bias	9	Describe any efforts to address potential sources of bias **DONE PAGE 9**
Study size	10	Explain how the study size was arrived at **DONE PAGE 5**
Quantitative variables	11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why **DONE PAGE 5**
Statistical methods **(PAGE 5-6)**	12	(*a*) Describe all statistical methods, including those used to control for confounding
		(*b*) Describe any methods used to examine subgroups and interactions
		(*c*) Explain how missing data were addressed
		(*d*) If applicable, describe analytical methods taking account of sampling strategy
		(*e*) Describe any sensitivity analyses
Results		
Participants	13*	(a) Report numbers of individuals at each stage of study—eg numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analysed **DONE PAGE 7**
		(b) Give reasons for non-participation at each stage NOT NECESSARY
		(c) Consider use of a flow diagram NOT NECESSARY
Descriptive data	14*	(a) Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders **DONE PAGE 7**
		(b) Indicate number of participants with missing data for each variable of interest
Outcome data	15*	Report numbers of outcome events or summary measures **DONE PAGE 7**
Main results	16	(*a*) Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (eg, 95% confidence interval). Make clear which confounders were adjusted for and why they were included **DONE PAGE 7**
		(*b*) Report category boundaries when continuous variables were categorized **DONE PAGE 7**
		(*c*) If relevant, consider translating estimates of relative risk into absolute risk for a

		meaningful time period
Other analyses	17	Report other analyses done—eg analyses of subgroups and interactions, and sensitivity analyses **NOT APPLICABLE**
Discussion		
Key results	18	Summarise key results with reference to study objectives **DONE PAGE 8**
Limitations	19	Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias **DONE PAGE 9**
Interpretation	20	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence **DONE PAGE 8**
Generalisability	21	Discuss the generalisability (external validity) of the study results **DONE PAGE 9**
Other information		
Funding	22	Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based **DONE PAGE 10**

*Give information separately for exposed and unexposed groups.

Note: An Explanation and Elaboration article discusses each checklist item and gives methodological background and published examples of transparent reporting. The STROBE checklist is best used in conjunction with this article (freely available on the Web sites of PLoS Medicine at http://www.plosmedicine.org/, Annals of Internal Medicine at http://www.annals.org/, and Epidemiology at http://www.epidem.com/). Information on the STROBE Initiative is available at www.strobe-statement.org.

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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

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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

Visits, empathy and burnout.

Health Service Research

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Abstract

Objective

The aim of this study was to evaluate the association between physician and nurse self-reported empathy and burnout and the number of annual primary care visits per patient under their care.

Methods

Design: A cross-sectional survey study was conducted from January 2013 to July 2014

Site: The 22 Primary Care Centres of the Lleida Health Region in Spain.

Main Outcome Measures: The Jefferson Scale of Physician Empathy and the Maslach Burnout Inventory were used to measure empathy and burnout, respectively. The number of visits and the number of diagnoses coded per visit were obtained through the Region's electronic health record.

Results

Two hundred and sixty-seven healthcare professionals (physicians and nurses, 52.6% participation of the total in the region) with 301,657 patients under their care. Healthcare professionals' degree of burnout and empathy was associated with the number of annual visits per patient under their care. Burned out nurses and physicians received fewer visits (4.5 vs 3.7 in nurses and 18.1 vs 18.9 in physicians), whereas more empathic physicians received more visits per patient (19.4 vs 17.2, $p < 0.05$) and documented more diagnoses per visit (10.2 vs 9.7, $p = 0.001$). Less burned out and less empathic nurses documented more diagnoses per visit (10.2 vs 10.0 and 8.2 vs 9.9, $p < 0.05$).

Conclusions

The number of annual primary care visits per patient that healthcare professionals receive is closely associated with healthcare professionals' empathy and burnout. These results should serve to promote empathic skills and establish organizational changes that promote efficiency in the practice and, in turn, reduce the degree of burnout of healthcare professionals.

Keywords: Empathy; Burnout; Primary Care; Management

Strengths and Limitations

- Sample size based on data of more of 300,000 patients.
- Use of validated tools to evaluate empathy and burnout.
- The study design does not allow us to establish cause and outcome.
- The 52% response rate could cause selection bias.

Background

The primary care landscape has undergone major changes in recent years[1]. Administrative burdens[2], volume of visits, and insufficient resources in times of cutbacks[3] are increasing work-related distress and burnout among healthcare professionals. Burnout is a syndrome characterized by emotional exhaustion, decreased fulfilment, and depersonalization[4]. Burnout affects healthcare professionals' professional and personal lives leading to physicians reducing their clinical working hours or practice altogether[5], thus representing ethical challenges for those responsible for health institutions[6]. Moreover, burnout has an major impact on the quality of healthcare[7],[8]. Continuing to deliver high quality primary care with high quality patient relationships requires time[6]. Time constraints can lead to exhaustion and frustration, which are key elements of burnout.

Front line physicians with direct patient contact such as those practising primary care, emergency medicine, and internal medicine have some of the highest rates of burnout[9], [10]. In the United States in 2014, 55% of physicians reported symptoms of burnout[11], i.e., an absolute increase of 10% on just three years prior[12]. These findings have prompted individual- and system-level solutions to combat burnout among healthcare professionals[3,13,14], especially among young professionals[15].

Though some individuals may be more prone to burnout, this syndrome is job-related and situation-specific[16]. Reducing levels of burnout in health institutions is possible, thereby making it be an ethical responsibility for institutions to improve professional wellbeing[17]. Indeed skills that improve healthcare professionals' empathic capacity have been shown to be associated with lower levels of burnout[18,19,20]. The theory is that when healthcare professionals understand and communicate patients' situations better, we feel more fulfilled, and we help to humanize care delivery, both of which are fundamental elements in the prevention of burnout[21]. Since the degree of burnout or professional stress can affect the quality of communication with the patient, this study is particularly relevant given that healthcare professionals are being subjected to increasing clinical workloads and greater time constraints[22]. Physician stress and

burnout are two of the factors that most influence the duration of a primary care visit[23].

Clinical empathy has been described as the ability to understand others' feelings and thoughts and to communicate such understanding[24]. Clinical empathy has been shown to be associated with improved communication, patient satisfaction, and therapeutic compliance[25],[26]. Empathic physicians reduce patient anxiety, potentially leading to better clinical outcomes[27],[28].

We have evaluated in different studies[8] how high levels of burnout are linked with little empathy on the part of professionals[18]. Low empathic capacity hinders communication with patients and in many cases leads to depersonalization and emotional exhaustion[20.] These two aspects are fundamental in burnout. In fact, improving health professionals' communication skills has been described as a resource to reduce burnout[21].

The number of primary care visits per patient is used by the Organization for Economic Co-operation and Development (OECD) [29] as one of the measures of health system quality. In 2014, the average number of annual primary care visits per patient in Spain was 7.6 per year per person, above the European average of 7.1 and far higher than the 2.9 annual visits in Sweden.

We wished to prove the effect of professionals with greater burnout on the number of visits they receive. 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.

Our team believes that empathic professionals solve patients' problems better, and do not need to receive as many visits. And this is related to the cost and quality of healthcare.

The aim of the present study is to evaluate the association between physician and

nurse self-reported measures of empathy and burnout and the number of annual primary care visits per patient under their care.

Methods

Participants and Study Design

A cross-sectional survey study was conducted with volunteer participants. In the Lleida health region there are 22 primary care centres serving a population of about 366,000. All physicians and nurses in the region were contacted by e-mail and asked to complete an anonymous survey that assessed their degree of burnout and empathy. The study was conducted between January 2013 and July 2014. The survey was administered between May and July 2014.

Outcomes

Burnout and Empathy Evaluation

The degree of burnout was measured using the Spanish version of the Maslach burnout inventory (MBI), a 22-item scale validated in Spanish[30,31]. This scale measures the three dimensions of burnout: depersonalization, personal fulfilment, and emotional exhaustion[32]. Empathy was measured using the Spanish version of the Jefferson Scale of Physician Empathy (JSPE)[33], a validated scale, recognized as the gold standard for measuring medical empathy, consisting of 20 items[34]. Both scales are scored using a 7-point Likert scale, with higher scores indicating higher burnout and greater empathy.

Annual visits per patient

We analysed the number of visits made by patients to their primary care team (nurse and family physician) between January 2013 and July 2014 (the year in which we collected data from healthcare professionals). The number of visits is the number of contacts with the medical system either with nurses or physicians. The results were divided by 1.4 to obtain the number of visits per calendar year. The number of visits, age and gender of each patient were obtained from the records of the E-CAP electronic health records that are used by all primary care professionals of the Catalan

Health Institute. In our healthcare system the number of visits is automatically recorded as it is mandatory to record the visit in the time table of the professional receiving the visit. It is important to note that the number of visits by each patient is different from the volume of visits for which a healthcare professional was responsible during that year. Given the varying roles and responsibilities of physicians and nurses within a single care team, we calculated separate values for this outcome for physicians and nurses.

Number of diagnoses coded per visit

We collected the number of diagnoses that the participant healthcare professionals documented for each visit. The number and type of diagnoses were used to classify the severity and complexity of the visit. The diagnoses included in our analysis were diabetes, heart failure, ischemic heart disease, stroke, dyslipidaemia, hypertension, anaemia, joint fibrillation, chronic renal failure, apnoea, anxiety, depression, metabolic syndrome. So for a hypothetical patient with no diagnoses the number of diagnoses would be zero.

We defined the diagnoses (i.e. diabetes, heart failure, ischemic heart disease, etc.) from the electronic records of the medical history (e-CAP). All the diagnoses were recorded from the practitioners using the ICD10 dictionary. For each diagnose a binary variable was defined indicating presence or not and the sum of all of them.

Participant Characteristics

The following sociodemographic data were collected for the practitioners: age, gender, professional category (physician or nurse) and practice setting (urban or rural).

Data Analysis

Standard descriptive summary statistics were used to characterize the MBI and the JSPE scores. The reliability of the instruments was tested using Cronbach's α. The Chi-square and Kolmogorov-Smirnov tests were used to evaluate the distribution of these scores. To analyse the association between the sociodemographic variables and the results of the JSPE, the MBI and the number of visits, the results were grouped

into three categories (low, medium and high) using previously described value ranges and categories[12]. All results were to be presented with a 95% confidence interval. Results of association were compared using the Chi-square test. The results were disaggregated according to age, gender, professional category, and practice setting. For data analysis, means, percentages and standard deviations were calculated using SPSS version 15.0 (IBM 2006) software.

Ethical and confidentiality considerations

The study was approved by the Clinical Research Ethics Committee of the Jordi Gol Institute for Primary Care Research (IDIAP). The data were kept confidential and anonymous in accordance with the Spanish Data Protection Law 15/1999.

All data were coded and accessible only to the primary care information system technicians who cross-referenced the data. All data were de-identified before being made available to the investigators.

Patient and Public Involvement

No patients or public were involved in the study.

Results

Of the 267 healthcare professionals who participated in the study (response rate of 52.6% of all practitioners in the region), 131 (49%) were nurses, 136 (51%) were physicians, 209 (78.3%) were women, and 156 (58.4%) work in rural areas. This sample was representative of the whole population of healthcare practitioners in the region according to the Ministry of Health of Catalonia. We have included data on sociodemographic variables in Table 1. No significant differences were detected between burnout and gender or professional role. Medical professionals practising in rural areas reported a lower degree of empathy ($p<0.05$) but no significant differences in burnout. High empathy was associated with low burnout in both nurses and physicians ($p<0.05$), Cronbach's α was 0.733 for the MBI and 0.748 for the JSPE, which shows adequate reliability of the scales used.

Annual visits per patient

We analysed the annual number of visits per patient from the 301,657 patients under the care of the 267 participating healthcare professionals. Nurses with higher burnout received fewer annual visits per patient (4.5 visits vs 3.7 in the most burned out, p=0.001, Table 2). There was no significant difference in the number of annual visits per patient based on nurses' degree of empathy. The most burned out physicians received fewer annual visits per patient (18.1 vs 18.9, p=0.002, Table 3). Physicians with less empathy received a higher number of visits by their patients (19.4 vs 17.2, p=0.001).

Number of diagnoses coded per visit

Less burned out nurses (8.4 vs 9.9, p <0.05) and less empathic nurses (10 vs 10.2, p<0.05) documented more diagnoses per visit, whereas physicians with medium range empathy documented the most diagnoses (10.2 vs 9.7, p=0.001). In addition, physicians with the highest degree of burnout were the ones that documented the most diagnoses per visit (10.2 vs 10, p <0.05).

Discussion

In this cross-sectional survey study, we found a significant association between primary care healthcare professionals' burnout and empathy and the annual number of visits per patient under their care. This large, highly representative sample is the first (to our knowledge) to analyse this association and is strengthened by the inclusion of both physicians and nurses. Few similar studies make it difficult to compare our results to the existing literature.

The healthcare professionals' degree of burnout and level of empathy were associated with the annual number of visits per patient under their care. The most empathic and least burned out physicians received fewer visits. We hypothesize that this relationship could be due to the fact that these physicians can better solve their patients' problems with fewer visits. We were unable to compare these results with other similar ones, since to date the literature[10] has only related the severity of consultation with the

duration of the consultation, not with the number of encounters between physician and patient.

However among nurses, the associations we found were different. Nurses with less burnout received a greater number of consultations. We should consider that tasks performed by nurses were generally associated with cures, health promotion, and case management[35]. We hypothesize that the nature of nurses' roles and responsibilities within the care team could influence this relationship, i.e., patients may perceive that they can consult the nurse more in a single visit without encountering resistance. If so, less burned out nurses may not have minded receiving more visits by the same patient, to follow up and monitor the evolution of the patient's problems[36],[37]. Also in the field of nursing, we suspect this greater autonomy of visits and case management may be related to greater professional satisfaction[38]. Likewise, the professional situation also has an association in the documentation of the patients' diagnoses.

In reference to the number of diagnoses coded per visit, we believe that the results we have obtained reflect an association with the professional situation. As for empathy, both less empathic nursing staff and physicians document more diagnoses per visit. We hypothesize that professionals with better communication (and empathy) skills spend more time with the patient and less time documenting diagnoses. It should be noted that the recording of diagnoses in the computer program is important for two main reasons. On the one hand, these diagnoses can serve as a rapid reference for other healthcare professionals caring for the same patient. On the other hand, the patient's clinical complexity is determined by the coded diagnoses, thus qualifying for certain clinical programmes (i.e., inclusion in domiciliary health programmes or palliative care) may depend on correct coding. For these reasons, we believe that healthcare professionals with medium levels of empathy are the ones that focus on patient care at the interview but also understand the importance of the health records.

However, it is striking that in the case of physicians, the most burned out are the ones who record the most visits. This finding has been described previously[39], i.e., that

burned out healthcare professionals are more likely to dehumanize their patients and focus more on the *iPatient* than the actual human being in front of them. Similarly in Spain, documentation of more diagnoses increases financial incentives linked to quality indicators[8].

We acknowledge several limitations to our study including the use of self-reported outcomes which, though validated and widely used, could lead to a reporting bias. Furthermore, the 52% response rate could cause selection bias. In our region, a large number of healthcare professionals work in rural areas where access to family physicians and nurses (given the great geographical dispersion) [40] may be more difficult than in urban areas. There is also another bias, the number of hours the nurse or physician is working. This information could be important to evaluate the effect on empathy/burnout or number of visits. In addition, the majority of healthcare professionals are over 50 years of age. The study design does not allow us to establish cause and outcome. We have chosen this interpretation but we must assume that interpretations could be made in other directions. 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.

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

We also consider an interesting line of further investigation would be to perform a qualitative study in order to detect differences between doctors and nurses, and to analyse the relationship between teamwork and its influence on 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 healthcare and affect quality indicators. An interesting line would be the performance of a qualitative

study to detect differences between doctors and nurses, and thus to be able to develop the concept of the grouping of empathy.

In conclusion, we believe that future research should focus on which communication skills and work situations can improve the quality of care. Promoting such skills could lead to an improvement not only in the clinical quality of care but also in the working environment. Burnout levels have been linked with work effort. One of the most important implications of our study is to quantify the effect of healthcare professionals' burnout on patient care[41]. Health policymakers should be aware of the different measures that can reduce professional burnout (promoting professional engagement, team building, flexible work schedule,..). Perhaps our findings should encourage introspection on the alignment of financial incentives based on communication and empathy rather than on traditional quality indicators like the number of diagnoses entered in the electronic health record. We believe that the results of our study may prove interesting for health organization leaders to encourage programmes that promote empathic skills and to establish strategies that reduce the degree of burnout of healthcare professionals to improve the quality of patient care.

Declarations/ Acknowledgements:

1. Contributor statement: OY designed the study and wrote the main part of the paper. EM collaborated in the design of the paper and in its revision. JM performed the statistical analysis. ME collaborated in the collection of data and in the introductory research. JS reviewed the manuscript and collaborated in the revision of the entire process.
2. Competing interests: The authors declare no conflicts of interest.
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4. Data sharing statement: All data are included in the article.

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Table 1

Sociodemographic variables depending on place of work

	Urban (n=111)		Rural (n=156)		Total (n=267)		
	N	n (%)	N	n (%)	N	n (%)	P
Age	111		156		267		0,915
31 - 40		26 (23.4%)		34 (21.8%)		60 (22.5%)	
41 - 50		40 (36%)		55 (35.3%)		95 (35.6%)	
>50		45 (40.5%)		67 (42.9%)		112 (41.9%)	
Professional Role	111		156		267		0.405
Nurse		50 (45%)		81 (51.9%)		131 (49.1%)	
Physician		61 (55%)		75 (48.1%)		136 (50.9%)	
Gender	111		156		267		0.349
Men		21 (18.9%)		37 (23.7%)		58 (21.7%)	
Women		90 (81.1%)		119 (76.3%)		209 (78.3%)	
Empathy (JSPE)	**111**		**156**		**267**		**0.018**
Low		27 (24.3%)		62 (39.7%)		89 (33.3%)	
Medium		38 (34.2%)		50 (32.1%)		88 (33%)	
High		46 (41.4%)		44 (28.2%)		90 (33.7%)	
Burnout	111		156		267		0.774
Low		63 (56.8%)		94 (60.3%)		157 (58.8%)	
Medium		43 (38.7%)		57 (36.5%)		100 (37.5%)	
High		5 (4.5%)		5 (3.2%)		10 (3.7%)	

Table 2

Characteristics of patients according to Empathy and Burnout of Nursing staff

EMPATHY	Low (n=52,173) mean (SD)	Medium (n= 51,298) mean (SD)	High (n= 49,354) mean (SD)	Total (n=152,825) mean (SD)	p
Women Patients	25,851(49.5%)	25,290 (49.3%)	24,452 (49.5%)	75,593 (49.5%	0.977
Age	48.1 (19.1)	48.4 (19.2)	48.5 (19.4)	48.3 (19.2)	0.014
Visits 2014	4.5 (6.9)	4.4 (6.6)	4.4 (6.6)	4.5 (6.7)	0.065
Visits 2012	18.9 (23.7)	18.6 (23.2)	18.6 (23)	18.7 (23.3)	0.075
Number of diagnoses	10.2 (8.5)	9.7 (8.3)	10 (8.3)	10 (8.4)	0.001
BURNOUT	**High (n=1,496) mean (SD)**	**Medium (n=54,441) mean (SD)**	**Low (n=968,888) mean (SD)**	**Total (n=152,825) mean (SD)**	**p**
Women patients	788 (52.7%)	27167 (49.9%)	47638 (49.2%)	75593 (49.5%)	0.001
Age	48.6 (18.8)	47.6 (18.8)	48.7 (19.5)	48.3 (19.2)	0.001
Visits 2014	3.7 (5.3)	4.3 (6.4)	4.5 (6.8)	4.5 (6.7)	0.001
Visits 2012	16.1 (19.7)	18.1 (22.1)	19.1 (24)	18.7 (23.3)	0.001
Number of diagnoses	8.4 (6.7)	10.2 (8.4)	9.9 (8.4)	10 (8.4)	0.001

Table 3

Characteristics of patients based on Empathy and Burnout of physicians.

EMPATHY	Low (n=42,138) mean (SD)	Medium (n= 45,070) mean (SD)	High (n= 61,624) mean (SD)	Total (n=148,832) mean (SD)	p
Women patients	20,793 (49.3 %)	22,246 (49.4%)	30,765 (49.9%)	73,804 (49.6%)	0.052
Age	48.9 (19.3)	48.9 (19.4)	47.9 (19)	48.5 (19.2)	0.001
Visits 2014	4.6 (6.7)	4.5 (6.7)	4.1 (6.3)	4.4 (6.5)	0.001
Visits 2012	19.4 (23.5)	18.9 (23.8)	17.2 (21.7)	18.3 (22.9)	0.001
Number of diagnoses	9.7 (7.8)	10.2 (8.6)	9.7 (8.3)	9.8 (8.3)	0.001
BURNOUT	**High (n=9,660) mean (SD)**	**Medium (n=57,742) mean (SD)**	**Low (n=81,430) mean (SD)**	**Total (n=148,832) mean (SD)**	**p**
Women patients	4,676 (48.4%)	28,798 (49.9%)	40,330 (49.5%)	73,804 (49.6%)	0.589
Age	47.9 (18.7)	48.6 (19.3)	48.5 (19.1)	48.5 (19.2)	0.003
Visits 2014	4.5 (6.6)	4.4 (6.5)	4.4 (6.5)	4.4 (6.5)	0.069
Visits 2012	18.9 (22.9)	18.4 (23.1)	18.1 (22.8)	18.3 (22.9)	0.002
Number of diagnoses	10.2 (8.8)	9.6 (7.9)	10 (8.5)	9.8 (8.3)	0.001

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STROBE Statement—Checklist of items that should be included in reports of ***cross-sectional studies***

	Item No	Recommendation
Title and abstract	1	(*a*) Indicate the study's design with a commonly used term in the title or the abstract **DONE PAGE 2**
		(*b*) Provide in the abstract an informative and balanced summary of what was done and what was found **DONE PAGE 2**
Introduction		
Background/rationale	2	Explain the scientific background and rationale for the investigation being reported **DONE PAGE 3- 4**
Objectives	3	State specific objectives, including any prespecified hypotheses **DONE PAGE 4**
Methods		
Study design	4	Present key elements of study design early in the paper **DONE PAGE 4**
Setting	5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection **DONE PAGE 5**
Participants	6	(*a*) Give the eligibility criteria, and the sources and methods of selection of participants **DONE PAGE 4-5**
Variables	7	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable **DONE PAGE 5**
Data sources/ measurement	8*	For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group **DONE PAG 5-6**
Bias	9	Describe any efforts to address potential sources of bias **DONE PAGE 9**
Study size	10	Explain how the study size was arrived at **DONE PAGE 5**
Quantitative variables	11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why **DONE PAGE 5**
Statistical methods **(PAGE 5-6)**	12	(*a*) Describe all statistical methods, including those used to control for confounding
		(*b*) Describe any methods used to examine subgroups and interactions
		(*c*) Explain how missing data were addressed
		(*d*) If applicable, describe analytical methods taking account of sampling strategy
		(*e*) Describe any sensitivity analyses
Results		
Participants	13*	(a) Report numbers of individuals at each stage of study—eg numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analysed **DONE PAGE 7**
		(b) Give reasons for non-participation at each stage NOT NECESSARY
		(c) Consider use of a flow diagram NOT NECESSARY
Descriptive data	14*	(a) Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders **DONE PAGE 7**
		(b) Indicate number of participants with missing data for each variable of interest
Outcome data	15*	Report numbers of outcome events or summary measures **DONE PAGE 7**
Main results	16	(*a*) Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (eg, 95% confidence interval). Make clear which confounders were adjusted for and why they were included **DONE PAGE 7**
		(*b*) Report category boundaries when continuous variables were categorized **DONE PAGE 7**
		(*c*) If relevant, consider translating estimates of relative risk into absolute risk for a

		meaningful time period
Other analyses	17	Report other analyses done—eg analyses of subgroups and interactions, and sensitivity analyses **NOT APPLICABLE**
Discussion		
Key results	18	Summarise key results with reference to study objectives **DONE PAGE 8**
Limitations	19	Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias **DONE PAGE 9**
Interpretation	20	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence **DONE PAGE 8**
Generalisability	21	Discuss the generalisability (external validity) of the study results **DONE PAGE 9**
Other information		
Funding	22	Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based **DONE PAGE 10**

*Give information separately for exposed and unexposed groups.

Note: An Explanation and Elaboration article discusses each checklist item and gives methodological background and published examples of transparent reporting. The STROBE checklist is best used in conjunction with this article (freely available on the Web sites of PLoS Medicine at http://www.plosmedicine.org/, Annals of Internal Medicine at http://www.annals.org/, and Epidemiology at http://www.epidem.com/). Information on the STROBE Initiative is available at www.strobe-statement.org.