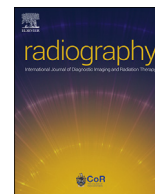




Since January 2020 Elsevier has created a COVID-19 resource centre with free information in English and Mandarin on the novel coronavirus COVID-19. The COVID-19 resource centre is hosted on Elsevier Connect, the company's public news and information website.

Elsevier hereby grants permission to make all its COVID-19-related research that is available on the COVID-19 resource centre - including this research content - immediately available in PubMed Central and other publicly funded repositories, such as the WHO COVID database with rights for unrestricted research re-use and analyses in any form or by any means with acknowledgement of the original source. These permissions are granted for free by Elsevier for as long as the COVID-19 resource centre remains active.



Spanish radiographers' concerns about the COVID-19 pandemic

C. Ruiz ^{a,1}, D. Llopis ^{b,1}, A. Roman ^c, E. Alfayate ^d, I. Herrera-Peco ^{e,*}

^a High Resolution Hospital, APES Poniente, Av. Tierno Galván, Loja, Granada, 18300, Spain

^b Bellvitge University Hospital, Clinical Imaging Unit IDI-ICS, Gran Via, 199, Hospitalet de Llobregat, Barcelona, 28691, Spain

^c Taulí University Hospital Taulí Park, 1, Sabadell, Barcelona, 080208, Spain

^d Neurology Diseases Investigation Center, Fundación CIEN, Carlos III Institute, Calle de Valderrebollo, 5, Madrid, 28031, Spain

^e Faculty of Health Sciences, Alfonso X El Sabio University, Avda Universidad, 1, Villanueva de la Cañada, Madrid, 28691, Spain



ARTICLE INFO

Article history:

Received 17 August 2020

Received in revised form

1 October 2020

Accepted 3 October 2020

Available online 9 October 2020

Keywords:

COVID-19

Mental health

Pandemic

Radiographer

Radiology

Stress

ABSTRACT

Introduction: The current outbreak of COVID-19 has caused worldwide healthcare and social emergency in which healthcare professionals were under extreme work conditions while being fearful of becoming infected or spreading the disease to their relatives. The perceived threat of COVID-19 has the potential to cause severe psychological maladjustment. The aim of the study is to explore Spanish radiographers' concerns about the COVID-19 pandemic.

Methods: This study was quantitative, observational and cross-sectional. The sample was made up of 546 radiographers working in Spain during the outbreak. The instrument used for analysis was an ad hoc questionnaire with socio-demographic questions and the questionnaire on perception of threat from COVID-19 validate to Spanish healthcare professionals.

Results: The sample consisted of 70.1% of female, 29.7% of male and 0.2% undeclared sex participants. The results showed a high level of a perceived threat from COVID-19 (7.57 ± 0.088), furthermore we observed a high level of threat about the possibility of infecting family members (8.49 ± 0.25), patients (8.33 ± 0.086), and coworkers (8.35 ± 0.084). Furthermore, females have a higher level of a perception of threat to spread infection between patients ($r = -0.136$; $p = 0.001$) and coworkers ($r = -0.118$; $p = 0.006$), than males.

Conclusion: COVID-19 pandemic is perceived as a serious threat, being especially concerned about the threat of spreading the infection to family, coworkers, and patients. The perception of risk depends partly on professionals' gender and family responsibilities.

Implications for practice: Our findings suggest that it is recommended that healthcare professionals receive formation to reinforce and improve their emotional competencies for coping successfully with potentially stressful situations like COVID-19 pandemic.

© 2020 Published by Elsevier Ltd on behalf of The College of Radiographers.

Introduction






In December 2019, a series of cases of pneumonia were detected in Wuhan, China. In early January 2020, the pathogen involved in these cases was identified: a new virus, SARS-CoV-2, which can

cause disease (COVID-19)^{1–3} that manifests with a wide range of systemic symptoms, including fever, cough, headache, and diarrhoea, as well as respiratory symptoms such as pneumonia and acute respiratory distress syndrome^{3–5} COVID-19's long incubation period⁶ and asymptomatic transmission⁷ favour its rapid spread, and the World Health Organization declared the outbreak a global pandemic on January 31, 2020.⁸

Given the rapid spread of the disease and the lack of vaccinations or effective treatments,⁹ health authorities had to take measures to prevent its transmission, restricting movement and interpersonal interactions.^{10,11} The pandemic and the measures imposed to control it can affect not only the physical health of the general population and healthcare professionals but also their

* Corresponding author. Faculty of Health Sciences, Alfonso X el Sabio University, Avenida de la Universidad s/n. Villanueva de la Cañada, Madrid, Spain.

E-mail addresses: cruiznu@gmail.com (C. Ruiz), david.llopis.idi@gencat.cat (D. Llopis), aroman@tauli.cat (A. Roman), evaalfayate@gmail.com (E. Alfayate), iherrpec@uax.es (I. Herrera-Peco).

 (C. Ruiz),  (D. Llopis),  (A. Roman),  (E. Alfayate),  (I. Herrera-Peco)

¹ Equal contributors.

mental health through situations involving continuous stress, anxiety, fear and uncertainty, among other.^{12,13}

Background

Healthcare professionals are at increased risk of infection from exposure during their professional activity.¹⁴ In Spain, the severe outbreak of COVID-19 resulted in a high number of healthcare professionals being infected. The most recent official report counted 40,921 healthcare professionals among the infected; of these, 4177 required hospitalization, with 310 admitted to intensive care units and 53 deaths.¹⁵ This threat to professionals' physical well-being, together with the increased workload due to the outbreak, had a great impact on clinical decision making and professionals' mental health, as has also been reported by authors in other countries.^{1,16}

This scenario in which healthcare professionals' physical and mental health are endangered and the high level of uncertainty during the COVID-19 pandemic offers an opportunity to improve safety measures and protocols,¹⁷ especially in relation to exhaustion or anxiety management.^{18–21} Another important element deriving from this atypical situation is the fear of contagion with a pathogen that is still poorly understood. Uncertainty due to a lack of information both in the workplace and outside it through traditional media²¹ can generate anxiety, stress²² and/or depression, among other consequences.^{23,24} Among the repercussions of this scenario is healthcare professionals' perception of risk, an element that has been successfully managed in other situations, but that is difficult to monitor in the exceptional circumstances arising from the pandemic.²⁵ Professionals vary in their perceptions of risks of contagion at work of spreading the infection to family members and social discrimination even.^{26–30}

Little is known about the impact of COVID-19 pandemic on Spanish radiographers' mental health status, mainly oriented to the perception of threat like a way to develop stress, anxiety, etc. This study aimed to determine radiographers' perceptions of threat-related with possible exposure to COVID-19 and the possibility to spread the infection between family, patients and co-workers.^{31,32}

Materials and methods

Design and participants

All individuals actively employed as radiographers in hospitals in Spain were eligible for inclusion in this quantitative, cross-sectional, observational study.

A convenience sample was recruited by snowball sampling, in which professional and scientific associations asked their members to participate by completing the study questionnaire.

Ethics

Before data collection commenced, compliance with information standards, confidentiality, and ethics in data processing was ensured. This study was approved by Alfonso X el Sabio University Research Ethics Committee (Spain) (date of approval 5/04/2020).

Data collection

Researchers designed an ad hoc questionnaire with questions divided into blocks to solicit information about participants' socio-demographic background and perception of health and threat to health in relation to COVID-19. To evaluate professionals' perceived threat, we used the validated to Spanish population Questionnaire on Perception of Threat from COVID-19,³³ which asks participants

to answer five questions focused on the perceived threat from the disease using a Likert scale ranging from 0 (absolutely none) to 10 (extreme). This questionnaire has been validated for the adult population of Spain (Cronbach's alpha = 0.730). Participants completed the questionnaire online between May 5 and June 1, 2020. To avoid multiple replies from the same person, researchers compare internet IP addresses to eliminate replies from equal IPs. To control for random or incongruent answers, a series of control questions were included, and any cases detected were excluded from the analyses.

Data analysis

A descriptive study determined the frequencies and percentages, as well as measures of central tendency and dispersion of all variables. To compare groups, we used t-tests to compare mean values and chi-square tests to compare distributions within the groups. To evaluate the relationships among variables associated with concern about the pandemic, we constructed a linear regression model. Statistical significance was set at $p < 0.05$. IBM SPSS for Windows version 23.0 (IBM Corp., Armonk, NY, USA) was used for all analyses.

Results

Participant characteristics

A total of 593 radiographers completed the questionnaire; 47 of these participants were excluded because incongruent or random answers were detected through randomly distributed control questions. Thus, we analyzed responses from 546 participants with mean age, 40.86 years (range, 20–63 years); where the 70.1% were females. The mean age of the men was 41.9 ± 9.5 years, and the mean age of the women was 40.4 ± 9.5 years. Our data showed that more than half (53.5%) of participants had minor children. Furthermore, we observed that 93.8% of participants were working in radiology service (Table 1).

Perception of threat

Participants' responses revealed a high level of perceived threat. On the five questions related to a perceived threat from COVID-19, from Questionnaire on Perception of Threat from COVID19, the mean score was 7.57 (SD \pm 0.088; CI (95%) = 7.4–7.74).

On the questions related to the degree of concern about the possibility of infecting different groups of persons, the mean score was 8.78 (SD \pm 0.086; CI (95%) = 8.61–8.94) to spreading the infection to family members, being 8.78 (SD = \pm 0.008; CI (95%) = 8.16–8.5) spreading the infection to patients, and finally 8.35 (SD = \pm 0.084; CI (95%) = 8.18–8.51) to coworkers.

In order to analyze the possible effects of variables like sex, have children or working in a radiology service (in direct contact with patients) during COVID-19 pandemic, we observed the existence of a correlation between sex and level of concern about the possibility of spreading the infection between patients ($r = -0.136$; $p = 0.001$) and coworkers ($r = -0.118$; $p = 0.006$). Exist a positive relationship between having children and the level of concern about infecting family members ($r = 0.121$; $p = 0.005$). We have not observed any correlation between the remaining variables (Table 2).

The level of concern about infecting others did not differ between sexes, where the mean score were 7.52 in men and 7.58 in women ($t = 0.297$; $p = 0.194$), but the level of concern about infecting healthy patients ($t = 3.11$; $p = 0.001$) and about infecting coworkers ($t = 2.88$; $p = 0.004$) was higher in women (Table 3).

Table 1
Sociodemographic characteristics.

Variables	n	Mean	SD	%	CI (95%)	
					Lower	Upper
Age	546	40.86	9.496		40.06	41.66
Sex	546					
Female	383			70.15		
Male	162			29.67		
Undeclared	1			0.18		
Do you have children?	546					
Yes	292			53.48		
No	254			46.52		
Have you worked in Radiology service during COVID-19 pandemic?	546					
Yes	512			93.77		
No	34			6.23		

Note: SD, means Standard deviation; CI, means confidence interval.

Table 2
Relationship between socio-demographic variables and spanish radiographers' concerns about COVID-19.

	Sex	Do you have children?	Have you worked in radiology service during COVID-19 pandemic?
	r (p-value)		
Are you concerned about coronavirus infection?	-0.011 (0.803)	0.121 (0.005)**	0.019 (0.655)
Level of concern about the possibility of spreading the infection to family members	-0.082 (0.055)	0.088 (0.075)	0.013 (0.76)
Level of concern about the possibility of spreading the infection to patients	-0.136 (0.001)**	0.033 (0.449)	0.01 (0.825)
Level of concern about the possibility of spreading the infection to coworkers	-0.118 (0.006)**	0.61 (0.157)	0.006 (0.895)

**p < 0.01.

Table 3
Correlation pairs to sex and concerns about COVID-19 pandemic.

Concerns about COVID-19 pandemic	Sex	Mean (SD)	t	p-value	CI (95%)	
					Lower	Upper
Concern about coronavirus infection?	Male	7.58 (2.084)	0.301	0.764	-0.323	0.483
	Female	7.52 (2.025)	0.297	0.766	0.03	0.34
Level of concern about the possibility of spreading the infection to family members	Male	8.89 (1.849)	2.004	0.049	0.007	0.774
	Female	8.5 (2.168)	2.137	0.033	0.032	0.749
Level of concern about the possibility of spreading the infection to patients	Male	8.51 (1.878)	3.113	0.002	0.229	1.017
	Female	7.89 (2.235)	3.339	0.001	0.256	0.989
Level of concern about the possibility of spreading the infection to coworkers	Male	8.51 (1.807)	3.134	0.002	0.213	0.927
	Female	7.94 (2.22)	2.883	0.004	0.181	0.959

Note: CI, means confidence interval.

Multivariate model

We elaborated a model of the level of concern about COVID-19 disease including the variables being a parent, concern about infecting family members, and concern about infecting healthy patients; since sex and concern about infecting coworkers were not significant, they were not included in the model. This model explained 24.9% of the perceived threat from the coronavirus. The correlation was direct and positive and the regression contrast verified that the linear dependence was statistically significant (p < 0.05), showing that the proposed model was a good fit (Table 4).

Discussion

The present study provides novel information about Spanish radiographers' perceptions of the threat from COVID-19 between February and June 2020. First, working in direct contact with patients infected with COVID-19 did not affect radiographers' concerns about infecting family members, coworkers, or patients.⁷ Our

results could be related to working conditions, where previous studies show that have disponibility of adequate personal protective equipment to COVID-19 an appropriate training about how to use this protective equipment, like face shield, scrubs, face mask or apron, among others, in the correct way increase your safety sensation and motivation³⁴ and reduce the uncertainty about the risk infection decreasing the perception of threat from COVID-19.²⁷

On the other hand, we found a positive correlation between healthcare professionals that have children with the perceived threat from COVID-19 or coronavirus infection. These concerns can be associated with the sensation of fear and uncertainty that children can acquire the disease or even die from it.^{1,35} These findings corroborate those of other studies that found that the fear of repercussions for families who have minor children is one of the most common among different healthcare professionals.^{6,28,30}

We observed no significant differences between sexes in the level of concern about COVID-19. These findings are in line with those of other studies that found that fear of infecting family members is one of the greatest fears of healthcare professionals and that professionals' sex did not play an essential role in this

Table 4
Modelization of level of concerns about COVID19.

Model	B	SD	t	p-value	CI (95%)	
					Lower	Upper
(Constant)	1.175	0.484	2.427	0.016	0.224	2.127
Sex	0.333	0.144	2.308	0.021	0.050	0.617
Do you have children?	0.074	0.176	0.418	0.676	-0.273	0.420
Have you worked in radiology service during COVID-19 pandemic?	-0.198	0.275	-0.721	0.471	-0.739	0.342
Are you concerned about coronavirus infection?	0.443	0.032	14.030	0.000	0.381	0.505
Level of concern about the possibility of spreading the infection to family members	0.176	0.046	3.807	0.000	0.085	0.267
Level of concern about the possibility of spreading the infection to patients	0.123	0.061	2.006	0.045	0.003	0.244
Level of concern about the possibility of spreading the infection to coworkers	0.025	0.067	0.368	0.713	-0.108	0.157

Note: CI, means confidence interval.

perception.^{27,28,30} On the other hand, we found that women were more concerned than men about the possibility of infecting patients and coworkers. This finding could be related to the social roles associated with female gender in caring for others³⁶ as well as with a greater degree of emotional identification and therefore with greater involvement in patients' physical and emotional well-being.^{37,38}

Finally, we sought to elaborate a model to explain Spanish radiographers' perceptions of the threat from COVID-19. Given that the variables sex and concern about infecting coworkers were not significant, we included only the following variables: i) being a parent, concern about infecting family members, and iii) concern about infecting patients. The model obtained explains 24.9% of the concerns identified, and there is a direct positive relationship between the level of concern and being a parent. These findings agree in part with those reported by other authors studying the general population, who found that adults with children aged <18 years were especially sensitive to the threat that COVID-19 poses for their health.³⁹ With respect to the association between the perceived threat of COVID-19 and the possibility of infecting family members, it is important to point out that although prior studies do not distinguish between sexes, they indicate that concern about this issue is common in health professionals.^{26–30}

Limitations of the study

One limitation of this study is a possible sampling bias; the snowballing technique used to recruit participants cannot guarantee the representativeness of the sample, so caution is warranted in extrapolating our results. Similarly, it deals with a small sample of Spanish radiographers with a larger number of women than men, and although this does reflect the characteristics of the population, it should still be taken into account in interpreting the results.

Conclusions

The findings of the current study show that the first phase of the COVID-19 pandemic in Spain generated great concern among healthcare professionals, including Spanish radiographers, which clearly manifested in the perceived risk of spreading the infection to family members, coworkers, and patients.

Moreover, the results derived from this study offer information that can help to detect and identify more susceptible groups, within the population of Spanish radiographers, to be emotionally affected by stressful situations like the threat or fear to spread the COVID-19 between people near them, which could be derived in mild mental disturbances that could derive from stress or exhaustion, such as anxiety or depression, which must be treated not only to ensure

healthcare workers' quality of life but also to ensure the quality of care.

So, we consider that it is recommended to develop strategies to monitoring radiographers' concerns and emotional situations related to COVID-19, but too implement training programs to promote emotional well-being through managing emotions, communication, and other initiatives that have proven effective in reducing mild mental disturbances in situations with a high emotional impact like COVID-19 pandemic.

Conflict of interest statement

None.

References

- Lai CC, Shih TP, Ko WC, Tang HJ, Hsueh PR. Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) and coronavirus disease-2019 (COVID-19): the epidemic and the challenges. *Int J Antimicrob Agents* 2020;**55**(3):105924. <https://doi.org/10.1016/j.ijantimicag.2020.105924>.
- Rodríguez-Morales AJ, MacGregor K, Kanagaraj S, Patel D, Schlagenhauf P. Going global- travel and the 2019 novel coronavirus. *Trav Med Infect Dis* 2020;**33**:101578. <https://doi.org/10.1016/j.tmaid.2020.101578>.
- Rothan HA, Byrareddy SN. The epidemiology and pathogenesis of coronavirus disease (COVID-19) outbreak. *J Autoimmun* 2020;**26**:102433. <https://doi.org/10.1016/j.jaut.2020.102433>.
- Lake MA. What we know so far: COVID19 current clinical knowledge and research. *Clin Med* 2020;**20**(2):124–7. <https://doi.org/10.7861/clinmed.2019-coron>.
- Chen N. Epidemiological and clinical characteristics of 99 cases of 2019 novel coronavirus pneumonia in Wuhan, China: A descriptive study. *Lancet* 2020;**395**:507–13. [https://doi.org/10.1016/S0140-6736\(20\)30211-7](https://doi.org/10.1016/S0140-6736(20)30211-7).
- Li Q, Guan X, Wu P, Wang X, Zhou L, Tong Y, et al. Early transmission dynamics in Wuhan, China, of novel coronavirus-infected pneumonia. *N Engl J Med* 2020;**382**:1199–207. <https://doi.org/10.1056/NEJMoa2001316>.
- Rothe C, Schunk M, Sothmann P, Froeschl G, Wallrauch C, Zimmer T, et al. Transmission of 2019-nCoV infection from an asymptomatic contact in Germany. *N Engl J Med* 2020;**382**(10):970–1. <https://doi.org/10.1056/NEJMc2001468>.
- Wang FS, Zhang C. What to do next to control the 2019-nCoV epidemic? *Lancet* 2020;**395**(10222):391–3. [https://doi.org/10.1016/S0140-6736\(20\)30300-7](https://doi.org/10.1016/S0140-6736(20)30300-7).
- Abdelhafiz AS, Mohammed Z, Ibrahim ME, Ziady HH, Alorabi M, Ayyad M, et al. Knowledge, perceptions, and attitude of Egyptians towards the novel coronavirus disease (COVID-19). *J Community Health* 2020;1–10. <https://doi.org/10.1007/s10900-020-00827-7>.
- Lau H, Khosrawipour V, Kocbach P, Mikolajczyk A, Schubert J, Bania J, et al. The positive impact of lockdown in Wuhan on containing the COVID-19 outbreak in China. *J Trav Med* 2020;taaa037. <https://doi.org/10.1093/jtm/taaa037>.
- Lades LK, Laffan K, Daly M, Delaney L. Daily emotional well-being during the COVID-19 pandemic. *Br J Health Psychol* 2020. <https://doi.org/10.1111/bjhp.12450>.
- Dong L, Bouey J. Public mental health crisis during COVID-19 pandemic. *China. Emerg Infect Dis* 2020;**26**(7):1616–8. <https://doi.org/10.3201/eid2607.200407>.
- Greenberg N, Docherty M, Gnanapragasam S, Wessely S. Managing mental health challenges faced by healthcare workers during COVID-19 pandemic. *BMJ* 2020;**368**:m1211. <https://doi.org/10.1136/bmj.m1211>.
- Kursumovic E, Lennane S, Cook TM. Deaths in healthcare workers due to COVID-19: the need for robust data and analysis. *Anaesthesia* 2020;12. <https://doi.org/10.1111/anae.15116>.
- ISCI. <https://cncovid.iscii.es/covid19/>, 2020. [Accessed 1 July 2020].

16. Wu P, Fang Y, Guan Z. The psychological impact of the SARS epidemic on hospital employees in China: exposure, risk perception, and altruistic acceptance of risk. *Can J Psychiatry* 2009;**54**:302–11. <https://doi.org/10.1177/070674370905400504>.
17. El-Hage W, Hingray C, Lemogne C, Yrondi A, Brunault P, Bienvenu B, et al. Health professionals facing the coronavirus disease 2019 (COVID-19) pandemic: what are the mental health risks? *Encephale* 2020;**46**(3S):S73–80. <https://doi.org/10.1016/j.encep.2020.04.008>.
18. Moreno-Jiménez B, Morante M, Losada M, Rodríguez R, Garrosa E. El estrés traumático secundario. Evaluación, prevención e intervención. *Terapia Psicológica* 2004;**22**(1):69–76. <https://www.redalyc.org/pdf/785/78522108.pdf>. [Accessed 3 July 2020].
19. Pfefferbaum B, North CS. Mental health and the COVID-19 pandemic. *N Engl J Med* 2020;**2020**(383):510–2. <https://doi.org/10.1056/NEJMp2008017>.
20. Restauri N, Sheridan AD. Burnout and posttraumatic stress disorder in the coronavirus disease 2019 (COVID-19) pandemic: intersection, impact, and interventions. *J Am Coll Radiol* 2020;**17**(7):921–6. <https://doi.org/10.1016/j.jacr.2020.05.021>.
21. Rubin GJ, Wessely S. The psychological effects of quarantining a city. *BMJ* 2020;**368**:m313. <https://doi.org/10.1136/bmj.m313>.
22. Bora K, Das D, Barman B, Borah P. Are internet videos useful sources of information during global public health emergencies? A case study of Youtube videos during the 2015–2016 Zika virus pandemic. *Pathog Global Health* 2018;**112**(6):320–8. <https://doi.org/10.1080/20477724.2018.1507784>.
23. Bienertova-Vasku J, Lenart P, Scheringer M. Eustress and distress: neither good nor bad, but rather the same? *Bioessays* 2020;**42**(7):e1900238. <https://doi.org/10.1002/bies.201900238>.
24. Fung IC, Fu KW, Chan CH, Chan BS, Cheung CN, Abraham T, et al. Social media's initial reaction to information and misinformation on Ebola, August 2014: facts and rumors. *Publ Health Rep* 2016;**131**(3):461–73. <https://doi.org/10.1177/003335491613100312>.
25. Bao Y, Sun Y, Meng S, Shi J, Lu L. 2019-nCoV epidemic: address mental health care to empower society. *Lancet* 2020;**395**(10224):e37–8. [https://doi.org/10.1016/S0140-6736\(20\)30309-3](https://doi.org/10.1016/S0140-6736(20)30309-3).
26. Luo M, Guo L, Yu M, Jiang W, Wang H. The psychological and mental impact of coronavirus disease 2019 (COVID-19) on medical staff and general public - a systematic review and meta-analysis. *Psychiatry Res* 2020;**291**:113190. <https://doi.org/10.1016/j.psychres.2020.113190>.
27. Roman A, Ruiz C, Alfayate E, Llopis D, Rincón-Gayán L, Font J, et al. COVID-19 y uso de los equipos de protección individual: percepción de los Técnicos en Imagen para el Diagnóstico en España. *Imagen Diagnóstica* 2020;**11**(1):3–9. Full text. . [Accessed 3 July 2020].
28. Miotto K, Sanford J, Brymer MJ, Bursch B, Pynoos RS. Implementing an emotional support and mental health response plan for healthcare workers during the COVID-19 pandemic. *Psychol Trauma* 2020;**12**(S1):S165–7. <https://doi.org/10.1037/tra0000918>.
29. Kang Lijun, Li Yi, Hu Shaohua, Chen Min, Yang Can, Yang Bing Xiang, et al. The mental health of medical workers in Wuhan, China dealing with the 2019 novel coronavirus. *Lancet Psychiatry* 2020;**7**(3):e14. [https://doi.org/10.1016/S2215-0366\(20\)30047-X](https://doi.org/10.1016/S2215-0366(20)30047-X).
30. Rangachari P, Woods JL. Preserving organizational resilience, patient safety, and staff retention during COVID-19 requires a holistic consideration of the psychological safety of healthcare workers. *Int J Environ Res Publ Health* 2020;**17**(12):4267. <https://doi.org/10.3390/ijerph17124267>.
31. Liu Q, Luo D, Haase JE, Guo Q, Wang XQ, Liu S, et al. The experiences of healthcare providers during the COVID-19 crisis in China: a qualitative study. *Lancet Global Health* 2020;**8**(6):e790–8. [https://doi.org/10.1016/S2214-109X\(20\)30204-7](https://doi.org/10.1016/S2214-109X(20)30204-7).
32. Ornell F, Halpem S, Kessler F, Henrique P, Narvaez J. The impact of the COVID-19 pandemic on the mental health of healthcare professionals. *Cad Saúde Pública* 2020;**36**(4):e00063520. <https://doi.org/10.1590/0102-311x00063520>.
33. Pérez-Fuentes MDC, Molero-Jurado MDM, Oropesa-Ruiz NF, Martos-Martínez A, Simón-Márquez MDM, Herrera-Peco I, et al. Questionnaire on perception of threat from COVID-19. *J Clin Med* 2020;**9**:E1196. <https://doi.org/10.3390/jcm9041196>.
34. Sun N, Wei L, Shi S, Jiao D, Song R, Ma L, et al. A qualitative study on the psychological experience of caregivers of COVID-19 patients. *Am J Infect Control* 2020;**48**(6):592–8. <https://doi.org/10.1016/j.ajic.2020.03.018>.
35. Hernández BC, Rugarcía YT. Attitudes toward the risk prevention in health professionals in cases of epidemiological alert. *Med Segur Trab* 2015;**61**(239):254–72. <http://gesdoc.isciii.es/gesdoccontroller?action=download&id=17/11/2015-db41841d05>. [Accessed 3 July 2020].
36. Benson R, Glase K, Corna LM, Di Gessa G, Worts D, Price D, et al. Do work and family care histories predict health in older women? *Eur J Publ Health* 2017;**27**(6):1010–5. <https://doi.org/10.1093/eurpub/ckx128>.
37. Sharma N, Chakrabarti S, Grover S. Gender differences in caregiving among family - caregivers of people with mental illnesses. *World J Psychiatry* 2016 Mar 22;**6**(1):7–17. <https://doi.org/10.5498/wjp.v6.i1.7>.
38. Elwér S, Aléx L, Hammarström A. Gender (in)equality among employees in elder care: implications for health. *Int J Equity Health* 2012;**11**:1. <https://doi.org/10.1186/1475-9276-11-1>.
39. Molero MM, Herrera-Peco I, Pérez-Fuentes MC, Gázquez JJ. Analysis of the threat perceived by the COVID-19 in Spanish population. *Atencion Primaria* 2020. <https://doi.org/10.1016/j.aprim.2020.05.001>. S0212–6567(20)30147.