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ORIGINAL ARTICLE

Covid-19 pandemic impact in pediatricians: stress factors and their consequences

El impacto de la epidemia Covid-19 en los pediatras: factores estresantes y sus consecuencias

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What do we know about the subject matter of this study?

The Covid-19 pandemic has caused negative psychological effects on healthcare workers. In Spain, 79.5% of healthcare workers were reported to be affected by anxiety and 51.1% by depressive symptoms. In addition, validated instruments are available to measure the effects on the mental health of healthcare workers facing highly contagious infectious outbreaks.

What does this study contribute to what is already known?

The evaluation of the Covid-19 pandemic's impact on the mental health of Spanish pediatricians shows a high prevalence of anxiety symptoms, which generates physical and emotional discomfort in these professionals.

Abstract

Previous studies have demonstrated that the COVID-19 pandemic has had negative psychological consequences on healthcare professionals, however, specific data on pediatricians are scarce. **Objective:** To evaluate anxiety among pediatricians after the first COVID-19 wave as well as to identify possible related risk factors. **Material and Method:** A cross-sectional multicentric survey study was designed and sent to Spanish pediatricians through the *Asociación Española de Pediatría*'s e-mail lists. Demographic, socio-familial, occupational, emotional self-perception, psychosomatic symptoms, smoking, alcohol, and psychotropic drugs use data were collected. The State-Trait Anxiety Scale (STAI) was included, and its association with qualitative and quantitative variables of the sample was studied. **Results:** 440 surveys were registered. 42.2% of the participants expressed moderate-intense anxiety symptomatology according to the Anxiety-State scale and 26.9% on the Anxiety-Trait scale. Isolation at home was associated with a higher score on both scales. A change in the work situation of the cohabitant resulted in a higher score on the Anxiety-State scale. 41.1% of the respondents clas-

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sified the psychological impact suffered as mild, 50% as moderate, and 8.9% as severe. Up to 71.8% of the participants manifested some psychosomatic symptoms, with a linear association between the concurrence of symptoms and higher scores on the two scales. **Conclusions:** After the first pandemic wave, pediatricians have suffered anxiety, causing physical and emotional discomfort. Personal situations were the main source of concern. Likewise, the presence of several somatic symptoms was associated with higher levels of anxiety.

Introduction

In December 2019, the first cases of COVID-19, the disease caused by the SARS-Cov-2 coronavirus, were identified. An international pandemic was declared by the World Health Organization on March 11, 2020. In Spain, a State of Alarm was decreed on March 14, confining the population to their homes[1]. From May 11 onwards, the phases established for the de-escalation of restrictive measures and the transition to what was called "the new normal" were introduced in Spain, bringing this first wave to an end with a total of 231,765 cases affected and 18,352 deaths[2].

The negative psychological effects on health professionals due to previous infectious disease outbreaks have been already described in the literature[4-10]. Regarding the COVID-19 pandemic, there is a systematic review of 33 studies where the combined prevalence of anxiety was 23.2% and depression 22.8%[11]. In Spain, the Ministry of Health reports the vulnerability of healthcare professionals in one of its technical documents[12], and as of May 18, 2020, preliminary results of the study "Sanicovid-19: emotional impact of the Covid-19 pandemic on healthcare workers at work" showed 79.5% of anxiety and 51.1% of depressive symptoms[13].

Pediatricians have constituted a special group during the Covid-19 pandemic because, although the prevalence and severity of this infection in children have generally been lower than in other age groups[14-16], many of them have had to deal working for the adult population, which may have generated, in addition to the socio-familial circumstances, a greater sense of insecurity, fear and anxiety, compared with other professionals.

The main objective of this study was to evaluate the state of anxiety of pediatricians in Spain after the first wave of the COVID-19 pandemic and to identify possible factors related to a greater degree of anxiety. Secondarily, we explored the ability of professionals to perceive their own emotions and evaluated the presence of somatic symptoms due to stress.

Material and Method

Multicenter cross-sectional survey study designed and carried out between June 10 and July 5, 2020. By that time, the population could leave their homes, but with restrictions on the maximum number of people in meetings, limited capacity in leisure venues and mobility between regions (until May 11, 2020, home confinement was mandatory except for essential service workers).

We included all the forms filled in by specialist Pediatricians, working both in and outpatient settings. The exclusion criteria were the following: being a resident doctor in training and having a temporary disability from the beginning of the pandemic until the end of the first pandemic wave in Spain.

The study complied with the norms of the Declaration of Helsinki. It was performed with the informed consent of the participants and had the approval of the Ethics and Clinical Research Committee of the center to which the principal investigator belongs.

Variables and data collection

We collected demographic data (sex, age, main residence characteristics), socio-familial data (stable partner, children, confirmed SARS-Cov-2 infection themselves or a close relative, admissions for this reason, need for isolation), occupational data (usual place of work and during the pandemic, cohabitants job situation), factors related to emotional self-perception, psychosomatic symptoms, and smoking, alcohol consumption, and psychotropic drugs use (sleep inducers, anxiolytics, antidepressants). The questions related to the perception of emotions and the presence of stress-related somatic symptoms were determined by consensus among the investigators. Initially, 15 questions were proposed; after voting (Delphi method), the 10 questions with the highest scores were included.

A survey was prepared in Google docs® format to be completed online and was shared through e-mail distribution lists of the Spanish Pediatric Association and published on their websites. The form was completed anonymously online, and the data were collected and stored in compliance with current data pro-

tection regulations, accessible only by the principal investigators.

The form begins by asking for consent to participate in the study, continues (if consent was given) with questions related to the variables mentioned, and finally explores the degree of anxiety using the State-Trait Anxiety Inventory (STAI). The time to complete the scale is approximately 15 minutes and can be unlimited if required by the participant.

Anxiety measurement

The State-Trait Anxiety Inventory (STAI), a scale validated in Spanish in 1982[17], was used to evaluate the main objective of the study. This scale assesses anxiety in two dimensions, State-Anxiety as a transitory state (20 items) and Trait-Anxiety as an innate personality trait (20 items). Each question is scored according to a Likert-type scale from 0 to 3, with a maximum score of 60 for the complete form. This scale consists of positive questions (exploring the presence of anxiety) where ratings of "not at all", "somewhat", "quite a lot", and "very much" correspond to scores from 0 to 3; and negative questions (denoting absence of anxiety) corresponding to scores from 3 to 0; responses with scores 2 or 3 were considered as moderate or intense manifestation of anxiety symptoms. No categories of anxiety have been established based on the score on the scale; higher scores simply correspond to a greater degree of anxiety. The questionnaire has an internal consistency in the Spanish adaptation between 0.9 and 0.93 in state/anxiety and between 0.84 and 0.87 in trait/anxiety[18].

Statistical analysis

The data were analyzed with the SPSS v.21 statistical package. Qualitative variables are presented as absolute frequencies and percentages and quantitative variables according to their distribution as mean and standard deviation (SD) or median and interquartile range (Q1-Q3). The association between the level of anxiety in the STAI scale and qualitative variables was evaluated using the Student's t-test for variables with 2 categories or Analysis of Variance (ANOVA) for variables with more than two categories, and by simple linear regression in the case of quantitative variables.

In order to evaluate the relationship between anxiety as a state and as a personality trait and other recorded variables, multivariate backward stepwise linear regression models were created for each of them, with the scores of the State-Anxiety and Trait-Anxiety scales as dependent variables. Those independent variables with statistically significant associations found in the univariate analysis were included in the baseline models (full models). Those variables with more than 2 categories were transformed into dichotomous variables after being explored to facilitate their understanding. The intensity of this association was assessed by regression coefficient (B), which expresses the magnitude of change in the scale score for each unit of variation of the variable analyzed, and its 95% confidence interval.

The capacity for emotional self-perception was explored through Spearman's Rho coefficient, relating the score of the responses referring to concern and feelings (Likert scale score from 0 = not at all to 2 = very much) with the score obtained on the STAI scale. Taking the absolute value of Rho, this correlation was considered perfect for a value of 1, strong between 0.76 and 0.99, moderate between 0.51 and 0.75, weak between 0.26 and 0.50, and scarce or void between 0 and 0.25[19].

Statistical significance was considered at $p < 0.05$.

Results

440 surveys were completed by physicians from 15 Autonomous Communities (no participants from the regions of Cantabria or La Rioja). There were no exclusions. Due to the share of the survey through distribution lists and publications on the websites of the Spanish Association of Pediatrics, it was not possible to record the response rate.

Measurement of the degree of anxiety

Tables 1 and 2 show the sociodemographic characteristics of the professionals, their personal and job situation, and their association by univariate analysis with anxiety as a state and as a personality trait.

The resulting mean score was 26.9 (SD: 11.4) on the State-Anxiety scale and 20.6 (SD: 10.1) on the Trait-Anxiety. Between 17.7% and 79.8% of respondents reported moderate or severe symptoms related to State-Anxiety (mean: 42.2%; SD: 20.6%) and between 11.1% and 64.1% to Trait-Anxiety (mean: 26.9%; SD: 14.4%). Annex 1 shows the scores for each item of the STAI questionnaire.

When the multivariate analysis was performed, the association was not confirmed in the cases of separating oneself from home (B = 2.6; 95%CI:-5.1-10.3; p = 0.503), living in a dwelling smaller than 60 m^2 (B = 3.5; 95%CI:-1.6-8.6; p = 0.173), or having dedicated oneself to work on adult emergencies (B = 5.3; 95%CI:-1.1-11.7; p = 0.103). This multivariate analysis showed that having had to be in home isolation (B = 2.7; 95%CI:0.1-5.4; p = 0.047) and changes in the cohabitant's job situation (B = 1.7; 95%CI:0.1-3.2; p = 0.040) were related to a higher score on the State-Anxiety scale.

In a second multivariate model, after stepwise adjustment, having had to be in home isolation (B = 2.6;

95%CI:0.5-4.8; p = 0.018) was identified as a factor related to a higher score on the State-Anxiety scale. On the contrary, lower scores on this scale were observed in professionals with children (B = -3.3; 95%CI: -1.4-(-5.2); p = 0.001) and those who had had a family member diagnosed with COVID-19 (B = -3.4; 95%CI: -1.3-(-5.5); p = 0.002). No association was observed with age (B=-0.0; 95%CI: -0.1-0.1; for each year of increase in age; p = 0.932), living in a dwelling smaller than 60 m^2 (B = -0.7; 95%CI: -4.2-2.9; p = 0.715), or having suffered COVID-19 deaths in the family (B = -3.2; 95%CI:-7.8-1.3; p = 0.165).

Emotional self-perception

Table 3 shows the responses to the questions related to worry and feelings at the time of the 1st pandemic wave and at the time of completing the survey and their correlation with the State-Anxiety and Trait-Anxiety values.

181 participants (41.1%) classified the psychological impact suffered during the pandemic as mild, 220 (50.0%) as moderate, and 39 (8.9%) as severe (r = 0.587 with respect to the State-Anxiety score; p < 0.001 and r = 0.394 with respect to the Trait-Anxiety score; p < 0.001).

Table 1. Sociodemographic characteristics and their association with anxiety levels (scores obtained in STAI)

Variable	Descripción n (%)	Puntuación AE	Valor p	Puntuación AR	Valor p
Age (years)	43.8 (11.9)*	-0.1[a]	0.154[a]	-0.1[a]	0.069[a]
Gender					
Female	353 (80.2)	27.3 (11.4)	0.102	21.0 (10.1)	0.116
Male	87 (19.8)	25.1 (11.2)		19.1 (10.2)	
Stable partner					
Yes	374 (85.0)	26.6 (11.0)	0.337	20.2 (9,7)	0.112
No	66 (15.0)	28.3 (13.3)		22.7 (12,0)	
Children					
Yes	267 (60.7)	26.3 (11.3)	0.150	19.3 (9.7)	0.001
No	173 (39.3)	27.9 (11.5)		22.5 (10.4)	
House size					
< 60 m^2	38 (8,6)	29.8 (10.8)[b]	0.026[b]	22.0 (9.1)[b]	0.007[b]
60-80 m^2	80 (18,2)	27.1 (13.2)[b]		23.1 (11.3)[b]	
80-100 m^2	108 (24,5)	28.8 (11.4)[b]		21.5 (10.1)[b]	
> 100 m^2	214 (48,6)	26.9 (11.4)[b]		19.0 (9.6)[b]	
Housing costs					
Rent	140 (31.8)	27.7 (11.6)	0.340	21.7 (10.4)	0.263
Mortgage	167 (38.0)	27.2 (12.1)		20.1 (10.5)	
No cost	133 (30.2)	25.7 (10.2)		20.0 (9.3)	
Terrace or backyard					
Yes	249 (56.6)	26.8 (11.3)	0.820	20.0 (10.1)	0.158
No	191 (43.4)	27.0 (11.5)		21.4 (10.0)	
Number of cohabitants[c]	3 (2-4)**	0.2[a]	0.661[a]	-0.5[a]	0.199[a]
Years of experience as pediatrician	11.5 (4-23)**	-0.1[a]	0.148[a]	-0.1[a]	0.052[a]
Work setting					
Outpatient	165 (37.5)	28.3 (11.2)	0.050	21.2 (10.0)	0.308
Inpatient	275 (62.5)	26.1 (11.5)		20.2 (10.2)	
Hospital complexity					
First level	36 (13.1)	26.2 (13.4)	0.109	21.9 (10.5)	0.273
Second level	77 (28.0)	28.3 (11.5)		21.1 (10.7)	
Third level	162 (58.9)	25.0 (10.9)		19.4 (9.8)	
Hospital management					
Associate	45 (16.4)	24.3 (12.0)	0.515	18.4 (8.9)	0.384
Public	208 (75.9)	26.4 (11.0)		20.6 (10.0)	
Private	21 (7.7)	26.8 (15.1)		21.4 (13.8)	
Unknown	1	-	-	-	-
Another speciality in addition to Pediatrics					
Yes	37 (8.4)	26.2 (12.2)	0.716	20.6 (10.6)	0.992
No	403 (91.6)	27.0 (11.3)		20.6 (10.1)	

The values in Description are expressed as absolute numbers (N) and percentage (%). *The values in Description are expressed as mean and standard deviation (SD). **The values in Description are expressed as median and interquartile interval (Q1-Q3). The scores in the scales A-S (Anxiety-State) and A-T (Anxiety-Trait) are expressed as mean (SD). [a]Increase in the score of each scale for every unit that the variable increases (Coefficient B). [b]Increase in the score of each scale for every increase in the house size (Coefficient B): -1,3 (p = 0,018) for A-S and -1,5 (p = 0,002) for A-T. [c]Participant included.

Table 2. Personal and working situation during the first pandemic wave and its association with the grade of anxiety (scores obtained in STAI)

Questions	Description N (%)	Score A-S**	p value	Score A-T**	p value
Have you suffered COVID-19 infection?					
Yes	79 (18.0)	27.4 (12.6)	0.646	20.5 (11.1)	0.944
No	361 (82.0)	26.8 (11.1)		20.6 (9.9)	
Did you require hospital admission?					
Yes	2 (2.5)[a]	21.5 (12.0)	0.503	19.0 (7.1)	0.847
No	77 (97.5)	27.6 (12.6)		20.6 (11.2)	
If asymptomatic, was any test performed?					
Yes	374 (85.0)	26.6 (11.5)	0.186	20.5 (10.2)	0.621
No	66 (15.0)	28.6 (10.5)		21.2 (9.5)	
Did you have to remain in domiciliary isolation?					
Yes	104 (23.6)	29.5 (11.5)	0.007	22.3 (10.5)	0.046
No	336 (76.4)	26.1 (11.3)		20.1 (9.9)	
Number of days isolated	14 (7-20)*	-0.1[b]	0.367	-0.2[b]	0.171
Did other cohabitants need domiciliary isolation?[c]					
Yes	67 (18.1)	28.4 (11.1)	0.168	20.5 (10.7)	0.791
No	303 (81.9)	26.3 (11.1)		20.1 (9.6)	
Have any of your family members been diagnosed of COVID?					
Yes	114 (25.9)	25.3 (12.2)	0.076	18.3 (10.1)	0.006
No	326 (74.1)	27.5 (11.1)		21.4 (10.0)	
Have any of your family members died due to COVID?					
Yes	21 (4.8)	26.2 (9.2)	0.787	15.7 (8.8)	0.023
No	419 (95.2)	26.9 (11.5)		20.8 (10.1)	
Are any of your cohabitants considered as "vulnerable"?					
Yes	87 (19.8)	28.7 (12.6)	0.138	21.5 (10.6)	0.343
No	353 (80.2)	26.5 (11.0)		20.4 (10.0)	
Is your partner a healthcare professional?					
Yes	137 (31.1)	25.6 (10.3)	0.199	18.8 (9.7)	0.014
No	259 (58.9)	27.7 (11.8)		21.8 (10.1)	
Single	44 (10)	26.3 (12.2)		19.4 (10.4)	
In case any of your cohabitants is an adult, has his/her working situation suffered changes during the pandemic?[d]					
Yes	168 (50.9)	28.1 (11.4)	0.040	21.3 (10.1)	0.080
No	162 (49.1)	25.7 (10.5)		19.5 (9.2)	
In case any of your cohabitants is an adult, has she/he had to work out of home during the pandemic?[e]					
Yes, essential work	164 (41.3)	26.1 (10.8)	0.161	19.5 (10.2)	0.101
No	233 (58.7)	27.7 (11.7)		21.2 (10.0)	
Has the number of cohabitants changed in order to prevent infection transmission?					
Yes, I isolated myself	13 (3.0)	35.2 (13.6)	0.027	25.2 (14.1)	0.134
Yes, one cohabitant isolated himself	15 (3.4)	27.1 (10.0)		23.3 (8.2)	
No	412 (93.6)	26.6 (11.3)		20.3 (10.0)	
If you have children, have you had to turn to someone to take care of them?[f]					
Yes to a family member	24 (9.1)	27.0 (11.1)	0.759	20.9 (8.6)	0.587
Yes, I hired someone	45 (17.0)	25.2 (10.0)		18.4 (10.4)	
No	196 (74.0)	26.5 (11.6)		19.4 (9.7)	
Has your work contract changed during the pandemic?					
Yes,I had a COVID contract	19 (4.3)	29.1 (9.9)	0.388	22.5 (8.4)	0.405
No	421 (95.7)	26.8 (11.5)		20.5 (10.2)	
What type of patients did you attend during the pandemic?[g]					
Adults in outpatient setting	6 (1.4)	24.3 (11.9)	0.030	16.3 (10.5)	0.073
Inpatient adults	66 (15.1)	26.3 (11.3)		19.8 (9.5)	
Adults in Critical care unit	13 (3.0)	24.5 (12.1)		18.1 (10.4)	
Adults In Emergency Department	20 (4.6)	34.8 (13.3)		26.3 (13.4)	
Children	333 (76.0)	26.7 (11.1)		20.6 (9.9)	

COVID: SARS-CoV-2 infection. A-S: Anxiety-State. A-T: Anxiety-Trait. The values in Description are expressed as absolute numbers (N) and percentage (%). *The values in Description are expressed as median and interquartile interval (Q1-Q3). **The values in Description are expressed as mean and standard deviation (SD). [a]Inpatient settings. [b]Increase in the score of the inventory for every unit that the variable increases. [c]Without cohabitants=56, Does not answer=14. [d]Remote working, Temporal Collective dismissal or "Expediente de regulación de empleo temporal" (ERTE), work loss, others… Does not know/Does not answer=67. [e]Without adult cohabitants=43. [f]Without children=173, Does not know/Does not answer=2. [g]Adult patients without specifying in which setting=2.

Table 3. Emotional self perception and its association with the scores in the anxiety scales (STAI)

Questions	Answers			Anxiety-State		Anxiety-Trait	
	Nothing n (%)	A little n (%)	A lot n (%)	r*	p value	r*	p value
[a]The hospital was overloaded	25 (5.7)	109 (24.8)	306 (69.5)	0.134	0.005	0.125	0.009
[a]Did you feel impotence?	10 (2.3)	94 (21.4)	336 (76.4)	0.220	< 0.001	0.219	< 0.001
[a]Lack of professional preparation	35 (8.0)	159 (36.1)	246 (55.9)	0.274	< 0.001	0.218	< 0.001
[a]Fear of infection	41 (9.3)	216 (49.1)	183 (41.6)	0.336	< 0.001	0.212	< 0.001
[a]Fear of infection transmission to your family	19 (4.3)	106 (24.1)	315 (71.6)	0.251	< 0.001	0.142	0.003
[a]Fear of infection transmission to your workmates	17 (3.9)	193 (43.9)	230 (52.3)	0.241	< 0.001	0.136	0.004
[a]Workmates' emotional state	11 (2.5)	127 (28.9)	302 (68.6)	0.249	< 0.001	0.111	0.02
[a]Impossibility to disconnect from work	22 (5.0)	117 (26.6)	301 (68.4)	0.367	< 0.001	0.239	< 0.001
[a]Information overload	7 (1.6)	66 (15.0)	367 (83.4)	0.227	< 0.001	0.176	< 0.001
[a]Uncertainty about the future	16 (3.6)	98 (22.3)	326 (74.1)	0.377	< 0.001	0.258	< 0.001
[a]Incapability to return to normal life	27 (6.1)	152 (34.5)	261 (59.3)	0.418	< 0.001	0.334	< 0.001
[b]Emotional fatigue due to work	98 (22.3)	254 (57.7)	88 (20.0)	0.550	< 0.001	0.371	< 0.001
[b]Nervous or tense	130 (29.5)	248 (56.4)	62 (14.1)	0.663	< 0.001	0.504	< 0.001
[b]Incapable of enjoying as you did before	172 (39.1)	221 (50.2)	47 (10.7)	0.553	< 0.001	0.473	< 0.001
[b]Worried or anguished for a possible upturn	37 (8.4)	277 (63.0)	126 (28.6)	0.387	< 0.001	0.275	< 0.001

*Spearmans' Rho association coefficient between the scores obtained in Anxiety-State (A-S) and Anxiety-Trait (A-T) and the different variables studied. [a]During the first pandemic wave, you consider you have been worried about... [b]At the present time you feel...

Stress-related somatic symptoms

Among the pediatricians surveyed, 316 (71.8%) had experienced fatigue or physical tiredness; 117 (26.6%) elevated heart rate perception; 270 (61.4%) nervousness; 321 (73.0%) sadness or fear; 249 (56.6%) concentration problems; 230 (52.3%) headaches; 267 (60.7%) moodiness or hypersensitivity; 288 (65.5%) difficulty in falling asleep, frequent awakenings, or nightmares; and 144 (32.7%) abdominal pain, loss of appetite, or excessive appetite. The presence of these symptoms was associated with higher scores on the anxiety scales (Table 4). The univariate linear regression analysis that related the number of symptoms with the score on the scale showed that for each symptom added, there were 2.5 points more in the State-Anxiety scale ($p < 0.001$) and 1.9 points more on the Trait-Anxiety scale ($p < 0.001$).

Regarding other situations that could be related to anxiety, 82 professionals (18.6%) reported having increased alcohol consumption, 16 of those declared as smokers (6.0%) smoked more than usual or had started smoking again, 102 (23.2%) used some type of medication to sleep (29 people had previously used it regularly), and 56 (12.7%) required medication for depression or anxiety (27 had previously used it).

Discussion

The main finding of this study was a high frequency of moderate to severe anxiety symptoms among Spanish pediatricians after the first wave of the COVID-19 pandemic, 42.2% according to the State-Anxiety scale and 26.9% according to the Trait-Anxiety scale. The scales used vary between studies and are therefore not comparable, but the results obtained in all of them point to a high prevalence of anxiety among pediatric medical personnel, with 14-18% in China[20,21] and 19.4% in Italy[22]. A systematic review found similar results among other healthcare professionals, with a combined prevalence of anxiety of 23.2%[11], although in certain publications this value increases to 44.6% in China[23] or 37% in Spain[24].

Although the job situation was very complicated due to the workload, the pressure of care and, in many cases, due to the care of adult patients, it did not have a significant impact on anxiety. For this reason, it seems that the management of emotions and adaptability at work were adequate and did not have a negative influence. However, changes in some situations in the personal or family environment did have an impact on anxiety.

In this study, isolation was the common deno-

minator that altered both State-Anxiety and Trait-Anxiety, being one of the factors most strongly associated with stress, even months after the end of the study. Its severity has been shown to be proportional to the time spent in quarantine[7,26,27]. Regarding the family sphere, State-Anxiety was also negatively affected by changes in the cohabitant's job situation. Previous research shows detrimental effects on mental health when the individual personal situation is affected, as in cases of decreased family income, job loss, or forced job interruption[6,26,28]. On the other hand, it seems that having a single child versus not having a child or having several children enhances psychological distress[26,28] and, in this sense, the results of this study show a lower score on the Trait-Anxiety scale among professionals with children. The fear of infecting their family members is usually a constant factor reported among health professionals in epidemics[29-31]. However, we found lower levels of anxiety on the Trait-Anxiety scale when having had family members diagnosed with COVID-19. We think that these results may be due to the possibility of infecting their relatives, generating anxiety. However, once they have been diagnosed and the evolution has been good, this anxiety decreases. This hypothesis could not be evaluated from the study data.

Studies carried out in other epidemics associate lack of professional training and working in high-risk infection areas with detrimental effects on emotional well-being[6,32]. It is even considered that training is a protective factor for mental health, and that loss of control over work is a risk factor. In China, professionals dedicated to pediatric care who were more exposed to COVID-19 suffered higher rates of anxiety and depression[21,33]. In the sample of this study, there was a higher level of anxiety in professionals who cared for adult patients in the Emergency Department, but there was no statistically significant relationship.

The health professionals surveyed demonstrated a good ability to identify their emotions, which is similar to that published in the literature. In a study carried out in 194 Chinese cities, 53.8% of the respondents rated the psychological impact as moderate to severe, 28.8% suffered moderate-severe anxiety, and 16.5% showed moderate-severe depressive symptoms[34].

During the COVID-19 pandemic, a high prevalence of somatic symptoms was associated with adverse psychological outcomes[31,35]. Fatigue was the most frequent symptom identified and one of the most strongly associated with anxiety, as it had already been observed in other epidemics[31,35]. Several of these somatic symptoms frequently concur in the same person. In our study, the prevalence of somatic symptoms was very high, being fatigue was the most frequently reported

Table 4. Association between psychosomatic symptoms and the STAI scores

	A-S* score	p value	A-T* score	p value
Fatigue or physical exhaustion				
Yes	29.2 (11.1)	< 0.001	22.2 (10.1)	< 0.001
No	21.1 (10.2)		16.6 (9.0)	
Tachycardia				
Yes	35.3 (10.5)	< 0.001	26.6 (10.1)	< 0.001
No	23.8 (10.1)		18.4 (9.2)	
Nervousness				
Yes	30.8 (10.9)	< 0.001	23.5 (10.1)	< 0.001
No	20.7 (9.1)		16.0 (8.3)	
Fear or worry				
Yes	29.8 (10.9)	< 0.001	22.7 (10.0)	< 0.001
No	19.1 (8.8)		15.0 (8.2)	
Concentration problems				
Yes	30.8 (11.1)	< 0.001	23.4 (10.4)	< 0.001
No	21.8 (9.6)		16.9 (8.4)	
Headache				
Yes	29.9 (11.7)	< 0.001	22.7 (10.5)	< 0.001
No	23.6 (10.1)		18.3 (9.1)	
Bad humor o hypersensitivity				
Yes	30.6 (11.1)	< 0.001	23.3 (10.2)	< 0.001
No	21.2 (9.3)		16.4 (8.5)	
Sleep problems				
Yes	30.0 (11.3)	< 0.001	23.3 (10.1)	< 0.001
No	21.0 (9.1)		15.5 (8.0)	
Gastrointestinal problems				
Yes	33.5 (11.4)	< 0.001	25.9 (10.9)	< 0.001
No	23.7 (10.0)		18.0 (8.6)	
Increased alcohol consumption				
Yes	30.7 (11.2)	0.001	21.5 (10.7)	0.381
No	26.0 (11.3)		20.4 (10.0)	
Increased tobacco consumption				
Yes	31.0 (12.1)	0.190	23.6 (9.0)	0.253
No	27.1 (11.5)		20.6 (10.2)	
Treatment for sleep disorders				
Yes	32.8 (11.9)	< 0.001	25.5 (10.4)	< 0.001
No	25.1 (10.6)		19.1 (9.5)	
Anxiety or depression treatment				
Yes	35.0 (12.2)	< 0.001	27.9 (11.3)	< 0.001
No	25.7 (10.8)		19.5 (9.5)	

Results are expressed as mean and standard deviation (SD).
A-S: Anxiety-State. A-T: Anxiety-Trait.

physical symptom. A correlation was found between the concurrence of several of these symptoms and higher scores on the anxiety scales. Therefore, the anxiety of professionals contributes to the development of physical conditions, suggesting a greater probability of experiencing somatic symptoms.

Sleep is a key health indicator that can be negatively influenced by factors such as stress and anxiety[36,37]. In this context, during the COVID-19 outbreak, 34% of health care professionals[23] and 30% of pediatric personnel in China reported sleep disorders[20], a figure that increased to 67.4% among Italian pediatricians. Similarly, a correlation has been observed between the quality of sleep of physicians who worked with COVID-19 patients in China and the prevalence of post-traumatic stress[36,38]. In Spain, 28.9% of healthcare workers suffered from insomnia during the first wave[24]. The figures in this study are similar to those reported among Italian pediatricians[22].

COVID-19 has wrought a major challenge worldwide, generating an unprecedented health, economic, and social crisis. The effects of this pandemic are evident on healthcare professionals, as shown by the first studies carried out on this subject[11,20,21]. Our study is the first published work on pediatricians, both in hospital and primary care settings.

Limitations

This work has its limitations. The survey was shared through the Spanish Association of Pediatrics, so we cannot know the extent of diffusion or response rate. The distribution of pediatricians at the different levels of care is unknown. Also, the impact of the pandemic was heterogeneous in Spain and the healthcare organization was different across the country. In addition, we must consider the possibility of a greater participation among the most concerned pediatricians, which implies a selection bias. Due to these limitations, we cannot assure that the sample is representative of the situation of pediatricians throughout Spain and at the different levels of care, but we value positively the participation and consider the results to be important.

Questions referring to emotional self-perception and physical symptoms had not been previously validated, which could be affected by some type of bias. Even so, it is considered that an important number of questions and areas have been included that allow a broad knowledge of the topics evaluated.

Conclusions

According to the results obtained in our study, after the first wave of COVID-19, the pediatricians surveyed have frequently suffered anxiety, especially in relation to their personal situations, correlating with the individual perception they have had of themselves and with the physical discomfort this had generated. The successive waves have not given the health system time to recover, therefore the emotional well-being of workers could have worsened throughout the pandemic due to the pressure of care generated in already worn-out professionals. The mental health of workers should be a priority, as it has a direct influence on the quality of care. Therefore, a thorough evaluation of healthcare professionals, as well as further studies, are needed to determine the psychological consequences and the factors related to the emotional impact caused.

Ethical Responsibilities

Human Beings and animals protection: Disclosure the authors state that the procedures were followed according to the Declaration of Helsinki and the World Medical Association regarding human experimentation developed for the medical community.

Data confidentiality: The authors state that they have followed the protocols of their Center and Local regulations on the publication of patient data.

Rights to privacy and informed consent: The authors have obtained the informed consent of the patients and/or subjects referred to in the article. This document is in the possession of the correspondence author.

Conflicts of Interest

Authors declare no conflict of interest regarding the present study.

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Annex 1. Description of the scores obtained in Anxiety-State and Anxiety-Trait scales(STAI)

Anxiety-State				Anxiety-Trait			
Question	Median	IQI	Percentage of scores 2 or 3	Question	Median	IQI	Percentage of scores 2 or 3
1*	1	1-2	45.7%	21*	1	1-2	27.0%
2*	2	1-2	52.5%	22	1	0-1	22.7%
3	1	0-1	22.0%	23	1	0-1	11.6%
4	1	0-2	30.2%	24	1	0-1	22.0%
5*	2	1-2	61.1%	25	0	0-1	12.0%
6	1	0-1	19.3%	26*	2	1-2	64.1%
7	1	1-2	40.2%	27*	1	1-2	43.2%
8*	2	2-3	79.8%	28	1	0-1	11.1%
9	1	0-1	17.7%	29	1	0-1	20.7%
10*	2	1-2	67.0%	30*	1	1-2	28.9%
11*	1	1-2	40.9%	31	1	1-2	46.6%
12	1	0-1	20.9%	32	1	0-1	22.5%
13	1	0-1	20.0%	33*	1	1-2	48.0%
14	0	0-1	18.0%	34	1	0-1	13.4%
15*	2	1-3	66.8%	35	1	0-1	15.9%
16*	2	1-2	60.0%	36*	1	1-2	41.1%
17	1	1-2	41.8%	37	1	0-1	17.0%
18	1	0-1	16.8%	38	1	0-1	20.2%
19*	2	1-2	66.1%	39*	1	0-1	23.0%
20*	2	1-2	56.4%	40	1	1-2	25.9%

IQI: interquartile interval (Q1-Q3). In those questions which study the presence of anxiety, scores 2 or 3 correspond to the answers "quite-a lot". In those questions which study the absence of anxiety (*), scores 2 or 3 correspond to the answers "a little-nothing".

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