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Factors associated with self-perceived stress, anxiety, and depression in school teachers during the COVID-19 pandemic: analysis of a Peruvian national survey

Factores asociados a la autopercepción de estrés, ansiedad y depresión en docentes escolares durante la pandemia de COVID-19: análisis de una encuesta nacional peruana

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ABSTRACT

Objective: To explore factors associated with self-perceived stress, anxiety, and depression in Peruvian school teachers during the COVID-19 pandemic. **Methods:** A cross-sectional analytical study was conducted using data from the National Teacher Survey (ENDO) of 2021. Public school teachers at the preschool, elementary, and secondary levels in Peru were included. Associated factors were assessed by estimating prevalence ratios with a 95% confidence interval using Poisson regression with robust variance. **Results:** The final analyzed sample included 9,765 teachers. The main self-perceived mental health problem was stress (55.8%), followed by anxiety (28.4%) and depression (19.1%). Stress was associated with female gender (aPR: 1.06; 95% CI: 1.04–1.09) and responsibility for the care of a vulnerable person (aPR: 1.02; 95% CI: 1.01–1.05). Anxiety was associated with residing in urban areas (aPR: 1.03; 95% CI: 1.01–1.05) and having three or more comorbidities (aPR: 1.33; 95% CI: 1.29–1.38). Depression was associated with female gender (aPR: 1.04; 95% CI: 1.02–1.06) and being responsible for a vulnerable person (aPR: 1.05; 95% CI: 1.03–1.07). **Conclusions:** Stress was the primary self-perceived mental health problem. Several factors associated with stress, anxiety, and depression were identified. Therefore, the implementation of intervention strategies focused on teachers' mental health is recommended.

Keywords: stress, psychological; anxiety; depression; school teachers; COVID-19.

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RESUMEN

Objetivo: Explorar los factores asociados con estrés, ansiedad y depresión autopercibido en docentes escolares peruanos durante la pandemia por COVID-19. **Materiales y métodos:** Se realizó un estudio analítico transversal con datos de la Encuesta Nacional de Docentes (ENDO) de 2021. Se incluyeron docentes de educación pública de los niveles preescolar, primaria y secundaria de Perú. La asociación se evaluó mediante razones de prevalencia con un intervalo de confianza del 95 %, utilizando regresión de Poisson con varianza robusta. **Resultados:** La muestra analizada incluyó a 9765 docentes. El principal problema de salud mental autopercibido fue estrés (55,8 %), seguido de ansiedad (28,4 %) y depresión (19,1 %). El estrés se asoció con el sexo femenino (RPa: 1,06; IC 95 %: 1,04-1,09) y con ser responsable de una persona vulnerable (RPa: 1,02; IC 95 %: 1,01-1,05). La ansiedad se asoció con residir en zonas urbanas (RPa: 1,03; IC 95 %: 1,01-1,05) y tener tres o más comorbilidades (RPa: 1,33; IC 95 %: 1,29-1,38). La depresión se asoció con el sexo femenino (RPa: 1,04; IC 95 %: 1,02-1,06) y con ser responsable de una persona vulnerable (RPa: 1,05; IC 95 %: 1,03-1,07). **Conclusiones:** El estrés fue el principal problema de salud mental autopercibido. Se identificaron varios factores asociados al estrés, ansiedad y depresión. Se recomienda establecer estrategias de intervención centradas en la salud mental de los docentes.

Palabras clave: estrés psicológico; ansiedad; depresión; maestros; COVID-19.

INTRODUCTION

Educational teaching requires both cognitive and emotional effort to meet students' daily learning needs, making adequate mental well-being essential (1). However, teachers are exposed to stressful situations caused by workplace tension and workload (2). This exposure leads to mental health issues such as stress, anxiety, and depression, which are common throughout the teaching profession and negatively impact professional satisfaction and job performance (3).

During the COVID-19 pandemic, biosecurity measures such as social isolation were implemented, leading to the closure of educational institutions in most countries (4, 5). The in-person teaching modality was replaced by a virtual distance modality (6). However, difficulties such as inadequate training on virtual platforms, changes in learning strategies, and increased workload may have impacted teachers' mental health (7). Stress (30%), depression (19%), and anxiety (17%) were the most prevalent mental health issues among teachers during the COVID-19 pandemic (8). Factors associated included gender, age, area of residence, educational level of work, adaptation to virtual teaching, and concerns about COVID-19 (9).

In Peru, the 'Aprendo en Casa' (Learning at Home) program was implemented to ensure the continuity of students' education (10). However, the unprecedented shift to virtual teaching, the digital divide, limited internet access, and increased extracurricular responsibilities have collectively contributed to a heavier workload for teachers (11). Although it is known that increased workload can negatively affect teachers' psychological well-being (12), it is not clearly established whether changes resulting from the COVID-19 pandemic, both in the work environment and in health-related factors, have contributed to the deterioration of Peruvian teachers' mental health. With this information, effective prevention and intervention strategies could be implemented, emphasizing the management of mental health issues to enhance teachers' quality of life (13). Therefore, the objective of this study was to explore the factors associated with self-perceived stress, anxiety, and depression among Peruvian teachers during the COVID-19 pandemic.

METHODS

Design and sources of information

An observational cross-sectional study was conducted, based on the analysis of a secondary database from the National Teacher Survey (ENDO) carried out by the Ministry of Education of Peru (MINEDU) in 2021. The survey aimed to gather information on teachers' perspectives regarding personal, family, and professional aspects. The survey used a simple two-stage random

sampling to select participants (Figure 1). The first stage involved the random selection of the primary sampling unit, consisting of public educational services at the preschool, primary, and secondary levels, excluding high-performance schools (COAR) as they cater exclusively to students with outstanding educational abilities, and the non-school-based initial education programs (PRONOEI), which are mostly attended by non-teaching staff known as promoters. The second stage involved the selection of the secondary sampling unit, consisting of teachers randomly chosen from the previously selected educational services. Selected teachers were required to have a mobile phone number registered in the telephone directory of the Ministry of Education's Monitoring and Evaluation Unit. Survey data were collected through telephone calls and digital questionnaires from December 7 to December 17, 2021.

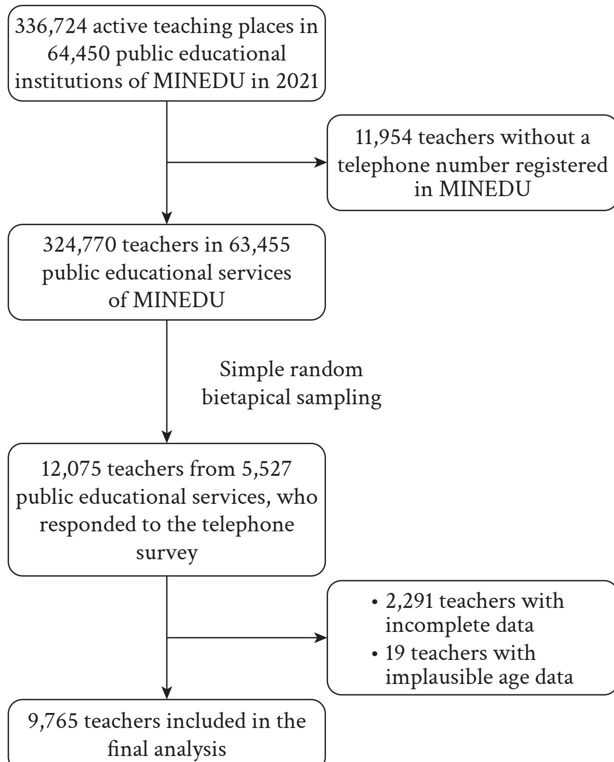

Figure 1. Flowchart for the selection of study participants.

Population and sample

The study participants were teachers holding active positions, randomly selected from public preschool, elementary, and secondary educational services across the 24 departments of Peru. Teachers who provided implausible data regarding age, with 65 years as the reference limit for the end of the teaching career in Peru (14), were excluded. Additionally, participants with incomplete data in the dependent variables of interest were excluded. Based on the sample size obtained, the statistical power was calculated using reference studies, resulting in a statistical power of 0.96 (15, 16).

Variables

Self-perceived mental health problems (stress, anxiety, and depression) were the dependent variables and were assessed using the following question: 'During this year, did you suffer from or are you currently suffering from any of the following illnesses or discomforts?' Stress, Anxiety, Depression. The response for each mental health problem was dichotomous (no, yes).

The independent variables considered for the multivariate analysis included: age presented in its numeric value and categorized into quartiles (19–39, 40–46, 47–53, 54–65); gender (male, female); area of residence (rural, urban); region of residence (Metropolitan Lima, coastal, highland, jungle); employment status (contracted, permanent); educational level of work (preschool, elementary, secondary); economic debt (no, yes); comorbidities (none, one, two, three or more); responsible for a vulnerable person (no, yes), such as an adult over 65 years or someone with chronic comorbidities (hypertension, diabetes, obesity, cardiovascular disease, chronic lung disease, or cancer) or COVID-19; financial support for health care (health insurance, personal funds, or property loan); and physical activity (no, yes).

Statistical analysis

The survey data were downloaded from the Ministry of Education of Peru's website. These data were compiled into a single database and were processed using R Studio (version 4.2.2) for statistical analysis.

For all analyses, sample weights were applied according to the stratum and weighting factor, using the "survey" package for complex samples. Categorical variables were presented as absolute and relative frequencies. Age, in its numeric value, was reported using the mean and standard deviation (SD). The chi-square test with the Rao-Scott correction was employed for bivariate analysis of categorical variables, and the student's t-test was used for age, with a significance level set at $p < 0.05$ as the cutoff point to identify differences between groups. Poisson regression with robust variance was utilized to calculate crude prevalence ratios (cPR) and adjusted prevalence ratios (aPR) with 95% confidence intervals (95% CI). The variables

included in the adjusted model were those that showed statistical significance ($p < 0.05$) in the crude regression analysis. Furthermore, multicollinearity was assessed in the multiple regression model to identify correlated variables. Variables with a variance inflation factor (VIF) > 5 were excluded from the regression model.

Ethical considerations

The database used is publicly available on the website of the Ministry of Education of Peru (https://www.gob.pe/minedu) and maintains strict confidentiality, preventing the identification of participants by name. Therefore, this study did not require approval from an ethics committee.

RESULTS

General characteristics of the study sample

The national survey was completed by 12,075 teachers, of which 19 were excluded due to implausible age data, and 2,291 were excluded due to incomplete data in the dependent variables of interest (Figure 1). Most of the excluded participants only responded to questions related to residence area, residence region, and teaching level, with no differences observed in the general characteristics compared with the included participants (Supplementary Material 1). The final analysis included 9,765 participants (80.9% of the total).

The mean age of the participants was 46.39 (SD: ± 9.41) years. Of the total sample, 63.3% (95% CI: 61.66–64.83) were women, 55.0% (95% CI: 54.09–55.88) resided in rural areas, 41.4% (95% CI: 40.46–42.26) worked at the elementary level, and 67.5% (95% CI: 65.92–69.00) reported having economic debt. Additionally, 63.7% had at least one comorbidity, 71.7% (95% CI: 70.24–73.13) were responsible for a vulnerable person, and 59.9% (95% CI: 58.22–61.52) used their health insurance to cover healthcare expenses (Table 1).

Prevalence of stress, anxiety, and depression according to characteristics of the study sample

The primary self-perceived mental health problem was stress (55.8%), followed by anxiety (28.4%) and depression (19.1%). The prevalence of self-perceived stress was higher among women (60.7% vs. 47.3%; $p < 0.001$) and permanent teachers (59.0% vs. 52.1%; $p < 0.001$). Furthermore, teachers with three or more comorbidities had a higher prevalence of self-perceived stress than those without comorbidities (80.3% vs. 42.8%; $p < 0.001$). A higher prevalence of self-perceived stress was also observed among those responsible for a vulnerable person (58.9% vs. 47.9%; $p < 0.001$) (Table 2).

Regarding the prevalence of self-perceived anxiety, it was higher among women (30.8% vs. 24.3%; $p < 0.001$), urban residents (31.3% vs. 25.0%; $p < 0.001$), and those with an economic debt (30.2% vs. 24.8%; $p = 0.001$). Similarly, teachers responsible for a vulnerable person (31.7% vs. 20.2%; $p < 0.001$) or those who resorted to loans or selling assets to cover their medical care compared to those who used health insurance (36.9% vs. 26.3%; $p < 0.001$) had a higher prevalence of self-perceived anxiety (Table 2).

On the other hand, the prevalence of self-perceived depression was higher among women (21.6% vs. 14.8%; $p < 0.001$), teachers with economic debt (20.6% vs. 15.9%; $p < 0.001$), and those who did not engage in physical activity (24.9% vs. 17.4%; $p < 0.001$). Additionally, teachers with three or more comorbidities had a higher prevalence of self-perceived depression compared to those without comorbidities (39.6% vs. 10.9%; $p < 0.001$) (Table 2).

Factors associated with stress, anxiety, and depression

In the multivariate analysis, women had a higher prevalence of self-perceived stress than men (aPR: 1.06; 95% CI: 1.04–1.09), as did urban residents (aPR: 1.05; 95% CI: 1.02–1.07) compared to rural residents. Teachers with three or more comorbidities had a 23% higher prevalence of self-perceived stress compared with those without comorbidities (aPR: 1.23; 95% CI: 1.19–1.27). Similarly, being responsible for a vulnerable person increased the prevalence of self-perceived stress (aPR: 1.02; 95% CI: 1.01–1.05) (Table 3).

Self-perceived anxiety was associated with female gender (aPR: 1.03; 95% CI: 1.01–1.05) and residing in urban areas (aPR: 1.03; 95% CI: 1.01–1.05). Teachers with three or more comorbidities had a 33% higher prevalence of self-perceived anxiety compared with those without comorbidities (aPR: 1.33; 95% CI: 1.29–1.38). In addition, being responsible for a vulnerable person was associated with higher self-perceived anxiety (aPR: 1.04; 95% CI: 1.02–1.07) (Table 3).

Finally, the prevalence of self-perceived depression was 4% higher in women compared with men (aPR: 1.04; 95% CI: 1.02–1.06). A higher prevalence of self-perceived depression was reported in teachers with three or more comorbidities (aPR: 1.21; 95% CI: 1.17–1.26). Additionally,

being responsible for a vulnerable person was associated with higher self-perceived depression (aPR: 1.05; 95% CI: 1.03–1.07). Similarly, a higher prevalence of self-perceived depression was found in those who resorted to loans or selling assets to cover their medical care (aPR: 1.07; 95% CI: 1.02–1.11) (Table 3).

Table 1. General characteristics of teachers working in public preschool, elementary, and secondary educational services in Peru (n = 9,765).

Characteristics	n	%	95% CI
Age* (n = 9,746)	46.39 ± 9.41		46.09–46.70
19–39	2,762	26.8	25.36–28.23
40–46	2,387	21.7	20.51–23.04
47–53	2,424	25.8	24.33–27.32
54–65	2,173	25.7	24.23–27.20
Gender			
Male	2,942	36.7	35.17–38.34
Female	6,823	63.3	61.66–64.83
Residence area			
Rural	5,517	55.0	54.09–55.88
Urban	4,248	45.0	44.12–45.91
Residence region			
Lima Metropolitan	893	14.4	13.64–15.18
Coast	2,496	23.1	22.27–24.12
Highlands	4,145	40.0	39.09–40.86
Jungle	2,231	22.5	21.74–23.18
Employment condition			
Contract teacher	4,734	46.4	44.82–47.99
Permanent teacher	5,031	53.6	52.01–55.18
Educational level of work			
Preschool	3,306	40.7	39.74–41.76
Elementary	4,041	41.4	40.46–42.26
Secondary	2,418	17.9	17.41–18.39
Economic debts (n = 9764)			
No	3,079	32.5	31.00–34.08
Yes	6,685	67.5	65.92–69.00
Comorbidities			
None	3,667	36.3	34.76–37.90
One comorbidity	3,165	32.2	30.70–33.83
Two comorbidities	1,748	18.8	17.54–20.20
Three or more comorbidities	1,185	12.7	11.55–13.74
Responsible for a vulnerable person			
No	2,835	28.3	26.87–29.76
Yes	6,930	71.7	70.24–73.13
Financial support for health care (n = 9764)			
Health insurance	5,778	59.9	58.22–61.52
Self-financed	3,146	31.9	30.31–33.49
Property loan	840	8.2	7.36–9.21
Physical activity (n = 9761)			
No	2,159	22.6	21.14–24.09
Yes	7,602	77.4	75.91–78.86

*Mean ± Standard deviation (SD).

Table 2. Bivariate analysis relating general characteristics to self-perceived stress, anxiety, and depression in teachers working in public preschool, elementary, and secondary educational services in Peru (n = 9,765).

Variables	Stress			Anxiety			Depression		
	n = 5,338	55.8% (95% CI: 54.16–57.41)	p value**	n = 2,824	28.4% (95% CI: 26.95–29.95)	p value**	n = 1,942	19.1% (95% CI: 17.83–20.40)	p value**
Age*	46.69 ± 9.07	46.29–47.11	0.045	47.08 ± 8.92	46.54–47.62	0.010	47.96 ± 9.05	47.30–48.62	<0.001
Categorized age†			0.010			0.003			<0.001
19–39	1,449	51.7 (48.51–54.88)		739	25.8 (23.15–28.54)		429	14.8 (12.74–17.07)	
40–46	1,341	57.8 (54.74–60.79)		686	25.9 (23.32–28.67)		432	16.9 (14.79–19.17)	
47–53	1,373	58.8 (55.53–62.12)		760	32.7 (29.59–35.96)		545	21.9 (19.15–24.97)	
54–65	1,161	55.1 (51.69–58.56)		633	28.9 (25.72–32.20)		533	22.7 (19.97–25.62)	
Gender			<0.001			<0.001			<0.001
Male	1,327	47.3 (44.37–50.28)		685	24.3 (21.84–26.91)		461	14.8 (12.91–16.92)	
Female	4,011	60.7 (58.79–62.63)		2,139	30.8 (29.03–32.70)		1,481	21.6 (19.95–23.27)	
Residence area			<0.001			<0.001			0.491
Rural	2,812	49.1 (47.25–50.91)		1,454	25.0 (23.39–26.63)		1,085	18.6 (17.19–20.11)	
Urban	2,526	61.3 (58.74–63.79)		1,370	31.3 (28.93–33.69)		857	19.5 (17.54–21.56)	
Residence region			<0.001			<0.001			0.002
Lima Metropolitan	550	61.5 (56.15–66.69)		305	32.7 (27.76–38.02)		172	17.9 (13.93–22.83)	
Coast	1,547	65.5 (61.82–68.98)		781	30.0 (26.69–33.45)		501	19.1 (16.55–21.99)	
Highlands	2,270	56.3 (53.95–58.56)		1,245	30.4 (28.28–32.64)		910	21.9 (20.00–23.91)	
Jungle	971	41.3 (38.30–44.29)		493	20.6 (18.23–23.13)		359	14.8 (12.75–17.01)	
Employment condition			<0.001			<0.001			<0.001
Contract teacher	2,411	52.1 (49.73–54.47)		1,169	23.7 (21.79–25.81)		749	14.6 (13.12–16.23)	
Permanent teacher	2,927	59.0 (56.73–61.22)		1,655	32.5 (30.36–34.69)		1,193	22.9 (21.05–24.98)	

*Mean ± Standard deviation (SD).
**p values were calculated using the Chi-square test for categorical variables and the student's t-test for age.
† The prevalence of self-reported stress, anxiety, and depression was 5,324, 2,818, and 1,939, respectively, among participants with complete data on age.
†† The prevalence of self-reported stress, anxiety, and depression was 5,336, 2,823, and 1,942, respectively, among those with complete data on physical activity.

Table 2. (*Continuation*).

Variables	Stress			Anxiety			Depression		
	n = 5,338	55.8% (95% CI: 54.16–57.41)	p value**	n = 2,824	28.4% (95% CI: 26.95–29.95)	p value**	n = 1,942	19.1% (95% CI: 17.83–20.40)	p value**
Educational level of work			0.603			0.768			0.079
Preschool	1,898	57.2 (54.83–59.54)		1,019	28.9 (26.86–30.94)		685	21.1 (19.31–23.08)	
Elementary	2,169	55.2 (52.94–57.40)		1,126	27.9 (25.87–30.02)		820	19.7 (17.98–21.64)	
Secondary	1,271	55.8 (52.68–58.90)		679	28.8 (25.99–31.73)		437	17.5 (15.22–20.04)	
Economic debts			0.020			0.001			<0.001
No	1,614	53.0 (50.04–55.92)		777	24.8 (22.37–27.47)		522	15.9 (14.03–18.05)	
Yes	3,724	57.2 (55.21–59. 10)		2,047	30.2 (28.37–32.04)		1,420	20.6 (19.01–22.28)	
Comorbidities			<0.001			<0.001			<0.001
None	1,538	42.8 (40.15–45.53)		631	16.1 (14.19–18.26)		394	10.9 (9.30–12.70)	
One comorbidity	1,725	54.5 (51.52–57.42)		832	25.0 (22.59–27.52)		570	16.3 (14.46–18.40)	
Two comorbidities	1,124	66.7 (62.89–70.26)		680	37.8 (34.10–41.68)		475	25.8 (22.37–29.63)	
Three or more comorbidities	951	80.3 (76.19–83.85)		681	58.7 (54.07–63.14)		503	39.6 (35.22–44.20)	
Responsible for a vulnerable person			<0.001			<0.001			<0.001
No	1,284	47.9 (44.89–50.85)		571	20.2 (17.89–22.83)		372	12.3 (10.49–14.28)	
Yes	4,054	58.9 (56.96–60.87)		2,253	31.7 (29.84–33.53)		1,570	21.8 (20.20–23.43)	
Financial support for health care			0.002			<0.001			<0.001
Health insurance	3,032	53.5 (51.42–55.52)		1,553	26.3 (24.49–28.12)		1,021	17.0 (15.47–18.68)	
Self-financed	1,795	58.5 (55.39–61.47)		950	30.3 (27.53–33.25)		674	20.4 (18.22–22.80)	
Property loan	511	62.5 (56.66–67.91)		321	36.9 (31.47–42.72)		247	29.0 (23.86–34.65)	
Physical activity††			0.003			0.005			<0.001
No	1,286	61.0 (57.07–64.82)		744	32.5 (29.22–35.95)		544	24.9 (21.77–28.38)	
Yes	4,050	54.3 (52.49–56.07)		2,079	27.2 (25.60–28.95)		1,398	17.4 (16.08–18.77)	

*Mean ± Standard deviation (SD).

**p values were calculated using the Chi-square test for categorical variables and the student's t-test for age.

† The prevalence of self-reported stress, anxiety, and depression was 5,324, 2,818, and 1,939, respectively, among participants with complete data on age.

†† The prevalence of self-reported stress, anxiety, and depression was 5,336, 2,823, and 1,942, respectively, among those with complete data on physical activity.

Table 3. Factors associated with self-perceived stress, anxiety, and depression in teachers working in public preschool, elementary, and secondary educational services in Peru (n = 9,765).

Variables	Stress		Anxiety		Depression	
	cPR (95% CI)	aPR (95% CI)	cPR (95% CI)	aPR (95% CI)	cPR (95% CI)	aPR (95% CI)
Categorized age						
19–39	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.
40–46	1.04 (1.01–1.07)	1.02 (0.99–1.04)	1.00 (0.97–1.03)	0.97 (0.95–1.01)	1.02 (0.99–1.05)	1.00 (0.97–1.02)
47–53	1.05 (1.02–1.08)	0.99 (0.97–1.03)	1.06 (1.02–1.09)	1.00 (0.96–1.03)	1.06 (1.03–1.10)	1.02 (0.98–1.05)
54–65	1.02 (0.99–1.05)	0.97 (0.94–1.01)	1.02 (0.99–1.06)	0.96 (0.92–0.99)	1.07 (1.04–1.10)	1.02 (0.99–1.06)
Gender						
Male	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.
Female	1.09 (1.07–1.12)	1.06 (1.04–1.09)	1.05 (1.03–1.08)	1.03 (1.01–1.05)	1.06 (1.04–1.08)	1.04 (1.02–1.06)
Residence area						
Rural	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.
Urban	1.08 (1.06–1.10)	1.05 (1.02–1.07)	1.05 (1.03–1.07)	1.03 (1.01–1.05)	1.01 (0.99–1.03)	–
Residence region						
Lima Metropolitan	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.
Coast	1.02 (0.99–1.07)	1.04 (1.00–1.08)	0.98 (0.94–1.03)	0.99 (0.95–1.04)	1.01 (0.97–1.06)	–
Highlands	0.97 (0.93–1.00)	1.03 (0.99–1.07)	0.98 (0.95–1.03)	1.04 (0.99–1.09)	1.03 (0.99–1.08)	–
Jungle	0.87 (0.84–0.91)	0.93 (0.89–0.97)	0.91 (0.87–0.95)	0.96 (0.92–1.01)	0.97 (0.93–1.01)	–
Employment condition						
Contract teacher	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.
Permanent teacher	1.05 (1.02–1.07)	1.01 (0.98–1.03)	1.07 (1.05–1.10)	1.03 (0.99–1.05)	1.07 (1.05–1.10)	1.02 (1.00–1.05)

*The denial of the variable was taken as a reference. cPR: crude prevalence ratio; aPR: adjusted prevalence ratio; 95% CI: 95% confidence interval. Ref.: reference category. Adjusted RP for those variables that showed statistical significance in the bivariate analysis ($p < 0.05$).

Table 3. (*Continuation*).

Variables	Stress		Anxiety		Depression	
	cPR (95% CI)	aPR (95% CI)	cPR (95% CI)	aPR (95% CI)	cPR (95% CI)	aPR (95% CI)
Educational level of work						
Preschool	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.
Elementary	0.99 (0.97–1.01)	–	0.99 (0.97–1.02)	–	0.99 (0.97–1.01)	–
Secondary	0.99 (0.97–1.02)	–	1.00 (0.97–1.03)	–	0.97 (0.95–1.00)	–
Economic debts*	1.03 (1.01–1.05)	1.02 (0.99–1.04)	1.04 (1.02–1.07)	1.02 (0.99–1.05)	1.04 (1.02–1.06)	1.02 (0.99–1.04)
Comorbidities						
None	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.
One comorbidity	1.08 (1.05–1.11)	1.07 (1.04–1.10)	1.08 (1.05–1.10)	1.07 (1.04–1.10)	1.05 (1.03–1.07)	1.04 (1.01–1.06)
Two comorbidities	1.17 (1.13–1.20)	1.15 (1.11–1.18)	1.19 (1.15–1.23)	1.17 (1.13–1.20)	1.13 (1.10–1.17)	1.10 (1.07–1.14)
Three or more comorbidities	1.26 (1.23–1.30)	1.23 (1.19–1.27)	1.37 (1.32–1.41)	1.33 (1.29–1.38)	1.26 (1.21–1.30)	1.21 (1.17–1.26)
Responsible for a vulnerable person*	1.07 (1.05–1.10)	1.02 (1.01–1.05)	1.09 (1.07–1.12)	1.04 (1.02–1.07)	1.08 (1.06–1.11)	1.05 (1.03–1.07)
Financial support for health care						
Health insurance	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.
Self-financed	1.03 (1.01–1.06)	1.03 (1.01–1.05)	1.03 (1.01–1.06)	1.02 (0.99–1.05)	1.03 (1.01–1.05)	1.02 (0.99–1.05)
Property loan	1.06 (1.02–1.10)	1.02 (0.99–1.06)	1.08 (1.04–1.13)	1.04 (0.98–1.08)	1.10 (1.05–1.15)	1.07 (1.02–1.11)
Physical activity	0.96 (0.93–0.98)	1.00 (0.97–1.03)	0.96 (0.93–0.99)	1.01 (0.97–1.03)	0.94 (0.91–0.97)	0.97 (0.95–1.01)

*The denial of the variable was taken as a reference. cPR: crude prevalence ratio; aPR: adjusted prevalence ratio; 95% CI: 95% confidence interval. Ref.: reference category. Adjusted RP for those variables that showed statistical significance in the bivariate analysis ($p < 0.05$).

DISCUSSION

The results of this study reveal some of the factors associated with the main self-perceived mental health problems (stress, depression, and anxiety) in a population of preschool, elementary, and secondary school teachers during the COVID-19 pandemic.

In descending order, self-perceived stress showed the highest prevalence, followed by anxiety, and then depression, consistent with the findings of Desouky and Allam (17), whose study conducted in Egypt reported a prevalence of 100%, 67.5%, and 23.2%, respectively. The prevalence of mental health problems may vary depending on the diagnostic instrument used and the context. During the pandemic, psychological alterations were observed in the general population (18), with higher levels among professionals with greater workload and higher exposure to COVID-19 (19).

More than half of the teachers experienced symptoms or were clinically diagnosed with stress, although reports suggest that extreme burnout and stress can vary between 8.3% and 87.15% (3). Therefore, the prevalence observed in our results reflects the situation in this geographical context. On the other hand, variables associated with the self-perception of stress among school teachers were identified, including female gender, urban area residence, and health-related factors such as the presence of comorbidities.

Ji et al. (20) also indicate that married teachers and those with a higher professional degree experience higher occupational stress. The pursuit of higher academic degrees poses a challenge for professionals, and obtaining an advanced degree would imply a greater burden on teachers beyond the workplace. Similarly, working extra hours per week was associated with higher psychological stress, especially among those who used their extra hours to address student inquiries, prepare classes, and evaluate student performance (21).

Regarding self-perceived anxiety, it was the second most common disorder affecting 28.4% of the participants. A systematic review indicates that the prevalence of anxiety varies across countries (Brazil, Spain, India, the United States, and China) ranging from 10% to 49% prevalence (22). On the other hand, a study conducted in China showed an anxiety prevalence of 13.67% in secondary school teachers. It is important to note that this estimation was made during the COVID-19 pandemic, so the results may be influenced by this situation (23), as indicated by a study in Saudi Arabia, where the prevalence of anxiety was 68% (24).

Although stress and anxiety are conditions that can affect individuals simultaneously, teachers experiencing stress have shown a higher frequency of anxiety (25), with factors such as virtual teaching and ineffective communication with students identified as potential predictors. Li et al. (23)'s study also suggests that factors like rural living, female gender, and the level of concern can increase overall anxiety levels. It is important to note that the results of this study indicate that urban living is a possible factor that elevates the prevalence of anxiety. Thus, the educational context and situations that differ between Peru and China would need to be evaluated more thoroughly.

Another study also reports that a poor work environment increases not only the frequency of anxiety but also that of depression (26). To address anxiety in teachers, multidisciplinary strategies need to be implemented, and various factors, especially comfort and the work environment, should be further investigated. On the other hand, it is known that physical activity is associated with lower levels of stress, anxiety, and depression (27). However, in this study, no such association was observed. This may be because physical activity data were not measured using a question that specifies the characteristics and duration of physical activity. Therefore, it is recommended to evaluate this association using validated instruments.

The estimated global prevalence of depression is between 4% and 8% (28). This study indicates a self-perceived depression prevalence of 19.1% among preschool, elementary, and secondary school teachers, a figure above the population average. A study conducted among Mexican teachers using the PHQ-9 tool indicated that 16% had a score consistent with severe depression. Additionally, teachers residing in rural areas, consuming alcohol and tobacco, and experiencing higher levels of work-, family-, or partner-related stress showed a higher frequency of severe depression (29).

Another study conducted in Spain indicates a prevalence of 32.2% for depressive symptoms, with a marked difference between female and male genders (30). Female teachers also have a higher risk of experiencing depressive symptoms, which may be explained by vulnerability to violence or gender inequality. Moreover, pandemic-related restrictive

measures may have exacerbated these adverse situations, leading to everyday problems at home (31). Adequate screening and professional assessment during the academic year may reduce depressive symptoms among teachers, thus improving academic functioning and classroom performance.

Overall, the results indicate that female gender and health-related factors—such as having comorbidities, having a family member with COVID-19, or being responsible for a family member with comorbidities—increased the prevalence of self-perceived stress, anxiety, and depression. Another significant factor was the lack of health insurance or reliance on personal resources or asset-based loans for self-support. Faravelli et al. (32) indicate that not only gender but also age (especially around menopause) could be an important factor in presenting depression and anxiety, given its non-modifiable nature. On the other hand, the COVID-19 pandemic brought about certain modifications in preschool, elementary, and secondary education, including an abrupt shift to distance learning, which may have influenced levels of stress, anxiety, and depression (33).

The figures presented in this study suggest that teachers exhibit a high prevalence of major self-perceived mental health problems. Proper intervention in preschool, elementary, and secondary schools, as well as good initial screening, would allow for appropriate strategies to mitigate the symptoms of stress, anxiety, and depression. From another perspective, enhancing work performance could also lead to better outcomes for students (34). Intervening appropriately would lead to better professional and occupational development. Other aspects to intervene based on background and similar studies include universally providing adequate health insurance for teachers and promoting family coverage, since being responsible for a person with chronic comorbidities significantly increases stress, anxiety, and depression.

Some limitations should be considered in this study. First, the use of variables was restricted to those found in the secondary database. Second, the cross-sectional design of the study prevents the establishment of a causal relationship due to the absence of a temporal sequence. Third, health issues (stress, anxiety, and depression) were measured through self-reporting using vague or brief questions, rather than a validated questionnaire. This may introduce information or desirability bias in the responses, as they could be influenced by participants' health awareness, knowledge of mental health topics, or other demographic characteristics. Lastly, it was not possible to obtain responses from all teachers who worked in public educational institutions during the COVID-19 pandemic; however, a probabilistic sampling method was employed to generate estimates representative of the target population. Moreover, since the national survey did not include private educational institutions, the findings of this study cannot be generalized to that sector.

However, despite these limitations, this study analyzes a national survey with appropriate sampling that allows for the random selection of participants, obtaining a large and representative sample of the teaching population working in the public sector in Peru. Furthermore, this is one of the first studies to examine factors associated with self-perceived stress, anxiety, and depression among teachers during the COVID-19 pandemic, offering insights into similar situations in countries with social and economic conditions comparable to those in Peru.

CONCLUSION

Stress was the main self-reported mental health problem among teachers during the COVID-19 pandemic. Common factors associated with self-perceived stress, anxiety, and depression included female gender, having at least one comorbidity, and being responsible for a vulnerable person. Self-perceived stress and anxiety were associated with residing in urban areas. Furthermore, residing in the Peruvian highlands was associated with higher self-perceived stress, while being between 54 and 65 years old was associated with higher self-perceived anxiety. Therefore, screening strategies should be implemented to detect mental health problems and provide appropriate treatment to mitigate symptoms, considering that teachers' health status directly affects their job performance and students' education.

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REFERENCES

1. Kariou A, Koutsimani P, Montgomery A, et al. Emotional labor and burnout among teachers: a systematic review. Int J Environ Res Public Health. 2021;18(23):12760. doi:10.3390/ijerph182312760

2. Ramberg J, Låftman SB, Nilbrink J, et al. Job strain and sense of coherence: associations with stress-related outcomes among teachers. Scand J Public Health. 2022;50(5):565–74. doi:10.1177/14034948211011812
3. Agyapong B, Obuobi-Donkor G, Burback L, et al. Stress, burnout, anxiety and depression among teachers: a scoping review. Int J Environ Res Public Health. 2022;19(17):10706. doi:10.3390/ijerph191710706
4. Shah SM, Mohammad D, Qureshi MF, et al. Prevalence, psychological responses and associated correlates of depression, anxiety and stress in a global population, during the coronavirus disease (COVID-19) pandemic. Community Ment Health J. 2021;57(1):101–10. doi:10.1007/s10597-020-00728-y
5. UNICEF. COVID-19: más de 635 millones de estudiantes siguen afectados por el cierre de escuelas. UNICEF; 2022, 24 Jan (accessed 21 December 2023). https://www.unicef.org/peru/comunicados-prensa/covid-19-mas-de-635-millones-de-estudiantes-mundo-siguen-afectados-por-el-cierre-de-escuelas
6. Babinčáková M, Bernard P. Online experimentation during COVID-19 secondary school closures: teaching methods and student perceptions. J Chem Educ. 2020;97:3295–300. doi:10.1021/acs.jchemed.0c00748
7. Santiago IS, dos Santos EP, da Silva JA, et al. The impact of the COVID-19 pandemic on the mental health of teachers and its possible risk factors: a systematic review. Int J Environ Res Public Health. 2023;20(3):1747. doi:10.3390/ijerph20031747
8. Ozamiz-Etxebarria N, Idoiaga Mondragon N, Bueno-Notivol J, et al. Prevalence of anxiety, depression, and stress among teachers during the COVID-19 pandemic: a rapid systematic review with meta-analysis. Brain Sci. 2021;11(9):1172. doi:10.3390/brainsci11091172
9. Ma K, Liang L, Chutiyami M, et al. COVID-19 pandemic-related anxiety, stress, and depression among teachers: a systematic review and meta-analysis. Work. 2022;73(1):3–27. doi:10.3233/wor-220062
10. Mendoza A. Educación y tecnología en tiempos de COVID-19. UNICEF; 2021, Nov 8 (accessed 21 December 2023). https://www.unicef.org/peru/historias/educacion-tecnologia-en-tiempos-covid19
11. Alarcón-Llontop LR, Torres-Mirez K, Pasapera-Ramirez S, et al. La radio y la televisión en "Aprendo en casa": hallazgos por codificación abierta. Contratexto. 2021;(36):119–47. doi:10.26439/contratexto2021.n036.5231
12. Estrada-Araoz EG, Gallegos-Ramos NA, Paredes-Valverde Y, et al. Relación entre carga de trabajo y capital psicológico en una muestra de docentes de educación básica peruanos. Salud Cienc Tecnol. 2024;4:864. doi:10.56294/saludcyt2024864
13. Quiñones-Laveriano DM, Cervera-Ocaña MS, Porro-Diaz LV, et al. Correlation between stress and lifestyle in teachers at some schools in Lima, Peru, during telework in 2020. Work. 2022;72(2):409–19. doi:10.3233/wor-211224
14. Ministerio de Educación (PE). Ley de Reforma Magisterial. MINEDU; [s. f.] (accessed 21 December 2023). http://www.minedu.gob.pe/reforma-magisterial/
15. Lizana PA, Lera L. Depression, anxiety, and stress among teachers during the second COVID-19 wave. Int J Environ Res Public Health. 2022;19(10):5968. doi:10.3390/ijerph19105968
16. Jakubowski TD, Sitko-Dominik MM. Teachers' mental health during the first two waves of the COVID-19 pandemic in Poland. PLoS One. 2021;16(9):e0257252. doi:10.1371/journal.pone.0257252
17. Desouky D, Allam H. Occupational stress, anxiety and depression among Egyptian teachers. J Epidemiol Glob Health. 2017;7(3):191–8. doi:10.1016/j.jegh.2017.06.002
18. Necho M, Tsehay M, Birkie M, et al. Prevalence of anxiety, depression, and psychological distress among the general population during the COVID-19 pandemic: a systematic review and meta-analysis. Int J Soc Psychiatry. 2021;67(7):892–906. doi:10.1177/00207640211003121
19. Salari N, Khazaie H, Hosseinian-Far A, et al. The prevalence of stress, anxiety and depression within front-line healthcare workers caring for COVID-19 patients: a systematic review and meta-regression. Hum Resour Health. 2020;18(1):100. doi:10.1186/s12960-020-00544-1
20. Ji Y, Wang D, Riedl M. Analysis of the correlation between occupational stress and mental health of primary and secondary school teachers. Work. 2021;69(2):599–611. doi:10.3233/wor-213502
21. Furihata R, Kuwabara M, Oba K, et al. Association between working overtime and psychological stress reactions in elementary and junior high school teachers in Japan: a large-scale cross-sectional study. Ind Health. 2022;60(2):133–45. doi:10.2486/indhealth.2021-0069

22. Silva DF, Cobucci RN, Lima SC, et al. Prevalence of anxiety, depression, and stress among teachers during the COVID-19 pandemic. Medicine (Baltimore). 2021;100(44):e27684. doi:10.1097/md.0000000000027684
23. Li Q, Miao Y, Zeng X, et al. Prevalence and factors for anxiety during the coronavirus disease 2019 (COVID-19) epidemic among the teachers in China. J Affect Disord. 2020;277:153–8. doi:10.1016/j.jad.2020.08.017
24. Alshammari SA, Alenzi SM, Alsanad LA, et al. Prevalence of depression and anxiety among high school teachers during the COVID-19 pandemic in Riyadh, Saudi Arabia. Cureus. 2023;15(12):e51338. doi:10.7759/cureus.51338
25. Pressley T, Ha C, Learn E. Teacher stress and anxiety during COVID-19: an empirical study. Sch Psychol. 2021;36:367–76. doi:10.1037/spq0000468
26. Peele M, Wolf S. Predictors of anxiety and depressive symptoms among teachers in Ghana: evidence from a randomized controlled trial. Soc Sci Med. 2020;253:112957. doi:10.1016/j.socscimed.2020.112957
27. Biernat E, Piątkowska M, Rozpara M. Is the prevalence of low physical activity among teachers associated with depression, anxiety, and stress? Int J Environ Res Public Health. 2022;19(14):8868. doi:10.3390/ijerph19148868
28. COVID-19 Mental Disorders Collaborators. Global prevalence and burden of depressive and anxiety disorders in 204 countries and territories in 2020 due to the COVID-19 pandemic. Lancet. 2021;398(10312):1700–12. doi:10.1016/s0140-6736(21)02143-7
29. Soria-Saucedo R, Lopez-Ridaura R, Lajous M, et al. The prevalence and correlates of severe depression in a cohort of Mexican teachers. J Affect Disord. 2018;234:109–116. doi:10.1016/j.jad.2018.02.036
30. Ozamiz-Etxebarria N, Dosil M, Idoiaga N, et al. [Emotional state of school and university teachers in northern Spain in the face of COVID-19]. Rev Esp Salud Publica. 2021;95:e202102030. PMID:33583941. Spanish.
31. Sánchez-Pujalte L, Gómez T, Etchezahar E, et al. Teachers at risk: depressive symptoms, emotional intelligence, and burnout during COVID-19. Front Public Health. 2023;11:1092839. doi:10.3389/fpubh.2023.1092839
32. Faravelli C, Scarpato MA, Castellini G, et al. Gender differences in depression and anxiety: the role of age. Psychiatry Res. 2013;210:1301–3. doi:10.1016/j.psychres.2013.09.027
33. Shayo EH, Mubyazi G, Barongo V, et al. Experiences of teachers and students on school closures and its consequences during the COVID-19 pandemic in Nyarugusu refugee camp, Tanzania. PLOS Glob Public Health. 2024;4(3):e0002917. doi:10.1371/journal.pgph.0002917
34. Dudovitz RN, Nelson BB, Coker TR, et al. Long-term health implications of school quality. Soc Sci Med. 2016;158:1–7. doi:10.1016/j.socscimed.2016.04.009

Supplementary material 1. General characteristics of teachers working in public educational services in Peru, excluded due to incomplete or implausible data in the variables of interest (n = 2,310).

Characteristics	n	%
Age	-	-
Gender (n = 9)		
Male	4	44.4
Female	5	55.6
Residence area		
Rural	1,451	62.8
Urban	859	37.2
Residence region		
Lima Metropolitan	206	8.9
Coast	490	21.2
Highlands	747	32.3
Jungle	867	37.5
Laboral condition (n = 9)		
Contract teacher	6	8.9
Appointed teacher	3	21.2
Level teacher		
Preschool	634	27.4
Elementary	1,058	45.8
Secondary	618	26.8
Additional occupation	-	-
Economic debts	-	-
Comorbidities	-	-
Oversees an elderly person	-	-
Oversees a person whit comorbidity	-	-
Oversees a person whit COVID-19	-	-
Who supports your health expenses?		
Property loan	-	-
Has emotional or psychological support	-	-
Do physical activity	-	-