


A Longitudinal Study of the Psychological State of Teachers Before and During the COVID-19 Outbreak in Mexico

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Nadia Yanet Cortés-Álvarez 

Department of Nursing and Midwifery, Division of Natural and Exact Sciences, University of Guanajuato, Mexico

Alicia Saldívar Garduño

Autonomous Metropolitan, University-Iztapalapa, Mexico

Dalinda Isabel Sánchez-Vidaña

Department of Rehabilitation Sciences, The Hong Kong Polytechnic University, Hong Kong

Leticia Gabriela Marmolejo-Murillo

Department of Medicine and Nutrition, Division of Health Sciences, University of Guanajuato, Mexico

César Rubén Vuelvas-Olmos 

PhD Medical Sciences Program, School of Medicine, University of Colima, Mexico

Abstract

The COVID-19 outbreak significantly impacted people's lives. Within the education system, the teaching mode drastically changed to adapt to the social distancing restrictions due to the pandemic. Consequently, teachers have been facing challenges associated with remote learning in addition to those of the pandemic. The aim of the present study was to assess the psychological state among teachers at two stages: pre-pandemic (November 2019) and during the pandemic (June-July 2020 and June-July 2021).

Corresponding Author:

César Rubén Vuelvas-Olmos, PhD Medical Sciences Program, School of Medicine, University of Colima, Colima 28040, Mexico.

Email: cesar_vuelvas@ucol.mx

Information regarding demographic data, depression, anxiety, and stress (DASS-21), and burnout syndrome (MBI-ES) was collected using validated questionnaires. Results showed a significantly higher scores as well as a higher prevalence in the DASS-21 and the MBI-ES scales, on the second measurement taken during the pandemic compared to the pre-pandemic period and the first evaluation during the pandemic. During the second evaluation on pandemic stage, female teachers of ≥ 45 years of age with a college-level of education, 11 years of teaching experience, and currently teaching at preschools and primary schools were significantly associated with higher anxiety, stress, EE, and burnout scores. In addition, female teachers aged ≥ 45 years reported higher PD and PA scores. Finally, an association between burnout syndrome and depression was identified in the evaluations carried out during the pandemic considering both the total sample and the analysis per gender. The study shows that teachers' mental health has been negatively affected by the pandemic. Efforts from the education system and health authorities are crucial to design and implement strategies to improve teachers' mental health during the fight against COVID-19.

Keywords

academic staff, anxiety, burnout, COVID-19, depression, pandemic, stress

Introduction

Teaching has always been considered one of the most stressful occupations globally (Nasser-Abu Alhija, 2015; Berlanda et al., 2019; De Simone et al., 2019; Wang et al., 2015; Yang et al., 2009) due to excessive workloads, interpersonal communication problems, lack of training, low salaries, and job insecurity (Martínez-Otero Pérez, 2003; Prieto Ursúa & Bermejo Toro, 2006; Smetackova et al., 2019). Stress constitutes a state of threatened homeostasis triggered by intrinsic or extrinsic adverse forces (stressors) and involves physiological and behavioral responses to reestablish and maintain the optimal body equilibrium (Tsigos et al., 2020).

Long-term stress increases the risk of mental health issues such as anxiety, depression, and burnout (Mariotti, 2015). Anxiety is a psychological and physiologic state characterized by cognitive, somatic, emotional, and behavioral components, which acts as a protective factor against worry over a future unwanted event, or fear of an actual situation (Chand & Marwaha, 2022). Depression is a mood disorder characterized by a persistent feeling of sadness and loss of interest in activities that were previously enjoyable and pleasurable. Depressive symptoms include sadness, irritability, feelings of worthlessness, hopelessness, guilt, and suicidal ideation (Busse & Duman, 2008). Burnout syndrome is a socio-psychological phenomenon of emotional, motivational, and physical exhaustion as a result of chronic occupational stress. It is characterized by long-term emotional exhaustion, depersonalization, and diminished

personal and professional achievements (Maslach & Leiter, 2016). Previous studies have suggested a relationship between burnout syndrome, depression, and anxiety (Caballero Domínguez et al., 2015; Lopes Cardozo et al., 2012; Pereira-Lima & Loureiro, 2015). It is possible that individuals who are more prone to experiencing higher levels of anxiety (trait anxiety) are also more likely to develop burnout as well (Koutsimani et al., 2019). Also, a higher prevalence of depressive symptoms was observed in persons with burnout syndrome, contributing to the onset of depressive disorders (Vasconcelos et al., 2018).

The coronavirus disease 2019 (COVID-19) outbreak significantly changed people's lives, particularly in schools. In Mexico, the first case of COVID-19 was reported in February 2020, and the Mexican government declared a national health emergency (SEGOB, 2020a). The strategy implemented in Mexico, and many other countries to prevent and control the COVID-19 transmission, was the cessation of non-essential activities such as school activities (SEGOB, 2020b). Suspension of school activities remained throughout the 2019–2020 academic year, and it continues to date. These measures led to shifting from traditional teaching to distance learning (UNESCO, 2020).

In Mexico, distance learning continues to be a challenge for the education system. First, Mexico has no prior experience in implementing a massive and abrupt use of technology in education (Díaz-Barriga, 2020). Second, despite the efforts to improve network connectivity in the country, it continues to be a problem due to the lack of affordable country-wide access, which leads to difficulties for the students and teachers to access virtual classrooms (INEGI, 2019). To tackle the connectivity issue, some teachers have decided to travel dozens of kilometers to deliver didactic material to students who have limited or no internet access (Hernández, 2020; Reporte Irapuato, 2020; Vega, 2020). This situation has contributed to higher levels of stress among teachers. The physical, mental, and emotional stress can be substantial leading to the development of mild to severe psychiatric disorders such as depression, anxiety, stress, and burnout syndrome (Dragano & Lunau, 2020; Lizana et al., 2021). Third, despite government efforts to train and support teachers to adapt to distance learning settings, only a few teachers have the required skills to use information and communication technologies (ICTs) (Díaz-Barriga, 2020). Therefore, shifting to online teaching has been an unfamiliar and challenging task for teachers across the country.

Previous studies have found that working from home using ICTs can create feelings of tension, anxiety, exhaustion, and decreased job satisfaction (Cuervo Carabel et al., 2018). In fact, the inclusion of technology in education seems to be the focus of tension and anxiety among teachers, especially in universities with a lack of technical resources, equipment, and training. Consequently, the challenges that teachers face influencing their daily lives and impact them physically, socially, and psychologically (Fernández-Batanero et al., 2021). During the current pandemic, teachers face difficulties such as concerns for their own and their relatives' health and deal with stressors associated with distance learning. As a result, there is an increased risk of mental health issues. Even before the pandemic, a high prevalence of stress, anxiety, depression, and

burnout syndrome has been reported by teachers in Mexico (Aldrete Rodríguez et al., 2003; Rionda-Arjona & Mares-Cárdenas, 2012; Sánchez Narváez & Velazco Orozco, 2017; Sieglin & Ramos-Tovar, 2007).

The head of the Mexican Ministry of Public Education (Secretaría de Educación Pública) presented the “National Strategy for a Safe Return to School”, which is being implemented in the 2021–2022 school year (SEP, 2020). The strategy involves voluntary and gradual resumption of face-to-face classes adhering to hygiene and social distance measures to prevent the spread of COVID-19. The implementation of such measures for the safe return to school is considerably challenging due to the lack of human and financial resources, inadequate infrastructure (e.g., small classrooms that hinder the implementation of social distancing), and scarce technical equipment (Berlangua et al., 2020). Despite the difficulties that schools and universities encounter, preparations are being made using the available resources (Universidad de Colima, 2021; Universidad de Guanajuato, 2021; Universidad Nacional Autónoma de México, 2021).

It has been suggested that teachers’ coping strategies and reactions to emergencies and challenging situations are crucial. For instance, when teachers experience high levels of stress during an emergency, students could be negatively affected. This phenomenon is known as stress contagion (Oberle & Schonert-Reichl, 2016). The combination of high workload and lack of support and resources can lead to increasing levels of occupational stress. In such situations, teachers may become more reactive and use punitive classroom management strategies negatively affecting the classroom environment leaving students’ emotional needs unmet. When students exhibit troublesome behaviors, the level of stress in both students and teachers increases leading to a negative classroom environment and the risk of burnout syndrome in teachers (Jennings & Greenberg, 2009).

Promoting well-being among teachers is an ethical concern. Teachers’ well-being is in the interest of students and society since it directly affects the quality of education that they provide. The mental distress may have consequences for the teachers’ mental health causing frequent instances of sick leave, absenteeism, and poor work performance (Luceño Moreno et al., 2004). Therefore, the aim of the present study was to explore the levels of depression, anxiety, stress, and burnout syndrome among teachers before and during the COVID-19 pandemic in Mexico. We hypothesized that depression, anxiety, stress, and burnout syndrome levels increased due to COVID-19.

Material and Methods

Study Design

The longitudinal study was designed to assess the psychological state among teachers at all educational levels at two stages: pre-pandemic (one evaluation) and during the pandemic (two evaluations) as shown in Figure 1.

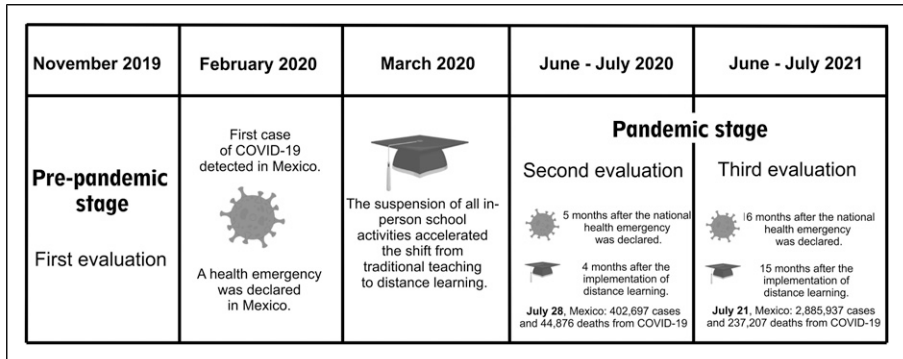


Figure 1. Timeline of the evaluations.

Participants and Recruitment Procedure

At the pre-pandemic stage, 1,152 teachers were interviewed in person in November 2019 as part of a research project coordinated by the Multidisciplinary Center for Research and Evaluation of Public Policies A.C. (*COGNOS A.C., Centro Multidisciplinario de Investigación y Evaluación de Políticas Públicas A.C.*). During the pandemic, participants were contacted via email, and those who agreed to participate in the study and meet the inclusion criteria completed an online survey in Spanish through 'Google Forms' (Google Inc., California USA). The inclusion criteria were prior participation in the research project coordinated by the COGNOS A. C. in November 2019 and having experienced the transition from face-to-face to distance teaching due to the COVID-19 outbreak. Participants with a psychiatric diagnosis or treatment with psychiatric drugs (e.g., antidepressants, anxiolytics, etc.) were excluded. Teachers who did not meet the selection criteria were those who did not respond to the invitation, or were not willing to participate were excluded ($n = 64$).

The total sample size was 1088 teachers of both genders from 16 public and private schools from all educative levels in western Mexico, including 47% from the state of Colima, 24% from Michoacán, and 29% from Jalisco participated in both evaluations and met the inclusion criteria.

The study was conducted in compliance with the Norma Oficial Mexicana-012-SSA3-2012, Declaration of Helsinki, and the Ethics Committee of Universidad José Martí (Approval number 2020-001). Participation in the survey was voluntary, all participants gave their informed consent (pre-pandemic stage, written informed consent; pandemic stage, online informed consent) prior to answering the questionnaires. The information obtained was managed in a strictly confidential manner by the researchers.

Outcome Measures

Sociodemographic data were collected through a survey, including age, marital status, teachers' education level, teaching experience, type of contract, type of school, and

teaching level. The Depression, Anxiety, and Stress Scale (DASS-21) and the Maslach Burnout Inventory-Educators survey (MBI-ES) were used to evaluate the psychological state of teachers before and during the pandemic.

The DASS-21 is a 21-item questionnaire aimed to assess the negative emotional states of depression (items 3, 5, 10, 13, 16, 17, and 21), anxiety (items 2, 4, 7, 9, 15, 19, and 20), and stress (items 1, 6, 8, 11, 12, 14, and 18) (Lovibond & Lovibond, 1995). Response options are on a 4-point scale (from 0 = did not apply to me at all to 3 = applied to me most of the time). This instrument was validated for the Mexican population (García-Rivera et al., 2014). Because the DASS-21 is a short-form version of the DASS (42 items), the total score for each subscale is multiplied by two to calculate the final scores. A higher score on the subscales indicates greater severity or frequency of negative emotional symptoms (González-Rivera et al., 2020). According to the severity rating, the total subscale score is divided into normal, mild, moderate, severe, and extremely severe (Wang et al., 2020), as shown in Table 1. In the present study, Cronbach's alpha for the DASS-21 was 0.93.

The MBI-ES is a version of the original MBI specifically developed to measure burnout syndrome among teachers (Maslach et al., 1996). The questionnaire has been previously used in the Mexican population to determine the presence of burnout syndrome (Jaik Dipp et al., 2011). The MBI-ES consists of 22 items with each item having a 7-point response scale ranging from 0 (never experienced such a feeling) to 6 (experience such feeling every day) according to the frequency the individual identifies with each statement. This instrument assesses three burnout domains: 1) emotional exhaustion (EE, items 1, 2, 3, 6, 8, 13, 14, 16, and 20), which measures feelings of being emotionally overextended and exhausted by one's work; 2) depersonalization (DP, items 5, 10, 11, 15, and 22), that measures an unfeeling and impersonal response toward recipients of one's instruction; and 3) personal accomplishment (PA, items 4, 7, 9, 12, 17, 18, 19, and 21), which measures feelings of competence and successful achievement in one's work. Each MBI-ES domain is categorized into three levels, including low, moderate, and high (Rionda-Arjona & Mares-Cárdenas, 2012) as shown in Table 2. Higher scores on the EE and DP subscales and lower scores on the PA subscale indicate a higher burnout symptom burden (Brady et al., 2020). In the present study, Cronbach's alpha for the MBI-ES was 0.791.

Table 1. DASS21 subscale severity ratings (Wang et al., 2020).

	Depression	Anxiety	Stress
Normal	0–9	0–6	0–10
Mild	10–12	7–9	11–18
Moderate	13–20	10–14	19–26
Severe	21–27	15–19	27–37
Extremely severe	28–42	20–42	35–42

Table 2. MBI-ES domain severity ratings (Rionda-Arjona & Mares-Cárdenas, 2012).

	Emotional exhaustion	Depersonalization	Personal accomplishment
Low	<18	0<5	>40
Moderate	19-26	6-9	34-39
High	≥ 27	≥10	<33

Statistical Analysis

Descriptive statistics were performed using means and standard deviations (SD) for the continuous variables and frequencies with percentages (n , %) for the categorical variables. The sociodemographic variables were compared between genders at the pre-pandemic stage and the two-time points during the pandemic. The scores of the DASS-21 scale and MBI-ES with the three burnout dimensions were assessed considering the frequency and scores between the pre-pandemic and two-time points during the pandemic between genders and between two age groups (≤ 44 years old and ≥ 45 years old). The age groups were based on age categorization according to a national health survey (Lizana et al., 2021). Specific tests were used to compare frequencies (chi-square) and means (repeated measures ANOVA) to determine whether the DASS-21 and MBI-ES scores differed significantly across time points. Associations were evaluated using Pearson correlation coefficients. Data were analyzed with SPSS v26 software for Windows, and $p < .05$ value was considered statistically significant.

Results

Sociodemographic Characteristics

Table 3 shows the sociodemographic characteristics in pre-pandemic and the time points during the pandemic. With regard to gender, 71.23% were female ($n= 775$) and 28.77% were male ($n= 313$).

Depression, anxiety, stress, and burnout syndrome

Table 4 shows the severity of the psychological state according to each subscale on the DASS-21 and the MBI-ES domains in the pre-pandemic and pandemic time points considering the total number of participants ($n = 1,088$). Briefly, the results showed a significantly higher prevalence of severe to extremely severe anxiety and stress as well as burnout syndrome indicated as low PA, high DE, and moderate to high EE on the second measurement taken during the pandemic compared to the pre-pandemic period and the first evaluation during the pandemic.

In females, the results showed significant differences in the prevalence of moderate to extremely severe anxiety, severe to extremely severe stress, and the presence of burnout syndrome (low to moderate PA and low to high EE) on the second

Table 3. Sociodemographic characteristics of teachers in Mexico before and during the COVID-19 pandemic.

Variable	Pandemic			
	Pre-pandemic		Pandemic	
	Female	Male	Female	Male
Age				
≤44	534 (68.90)	241 (77.00)	530 (69.28)	235 (72.76)
≥45	241 (31.10)	72 (23.00)	245 (31.61)	78 (24.15)
Marital status				
Single	217 (28.00)	120 (38.34)	209 (26.97)	130 (41.53)
Married/partnered	558 (72.00)	193 (61.66)	566 (73.03)	183 (58.47)
Teachers' education level				
College	367 (47.35)	188 (60.06)	359 (46.32)	163 (52.08)
Specialty	179 (23.10)	58 (18.53)	171 (22.06)	67 (21.41)
Master	154 (19.87)	50 (15.97)	167 (21.55)	58 (18.53)
Doctorate	75 (9.68)	17 (5.43)	78 (10.06)	25 (7.99)
Teaching experience				
≤10 years	473 (61.03)	162 (51.76)	462 (59.61)	155 (49.52)
≥11 years	302 (38.97)	151 (48.24)	313 (40.39)	158 (50.48)
Type of contract				
Fixed-term	517 (66.71)	231 (72.80)	519 (66.97)	234 (74.76)
Contract	258 (33.29)	82 (26.20)	256 (33.03)	79 (25.24)
Type of school				
Public	609 (78.58)	255 (81.47)	609 (78.58)	255 (81.47)
Private	166 (21.42)	58 (18.53)	166 (21.42)	58 (18.53)
Teaching level				
Preschool	78 (10.06)	55 (17.57)	78 (10.06)	55 (17.57)

(continued)

Table 3. (continued)

Variable	Pre-pandemic				Pandemic			
	First evaluation		Second evaluation		First evaluation		Second evaluation	
	Female	Male	Female	Male	Female	Male	Female	Male
Primary school	287 (37.03)	111 (35.46)	287 (37.03)	111 (35.46)	287 (37.03)	111 (35.46)	287 (37.03)	111 (35.46)
Secondary school	215 (27.74)	51 (16.29)	215 (27.74)	51 (16.29)	215 (27.74)	51 (16.29)	215 (27.74)	51 (16.29)
High school	114 (14.71)	76 (24.28)	114 (14.71)	76 (24.28)	114 (14.71)	76 (24.28)	114 (14.71)	76 (24.28)
University	69 (8.90)	12 (3.83)	66 (8.52)	9 (2.88)	65 (8.39)	7 (2.24)	65 (8.39)	7 (2.24)
Postgraduate	12 (1.55)	8 (2.56)	15 (1.94)	11 (3.51)	16 (2.06)	13 (4.15)	16 (2.06)	13 (4.15)

Data are expressed as frequency (percentage).

Table 4. Severity of depression, anxiety, stress and burnout syndrome before and during the COVID-19 pandemic in the total sample and per gender.

Psychological state	Total sample (n= 1088)						Female (n= 775)						Male (n= 313)						
	Pre-pandemic			Pandemic			Pre-pandemic			Pandemic			Pre-pandemic			Pandemic			
	n (%)	n (%)	p	n (%)	n (%)	p	n (%)	n (%)	p	n (%)	n (%)	p	n (%)	n (%)	p	n (%)	n (%)	p	
	First evaluation	Second evaluation		First evaluation	Second evaluation		First evaluation	Second evaluation		First evaluation	Second evaluation		First evaluation	Second evaluation		First evaluation	Second evaluation		
DASS-21																			
Depression																			
Normal	470 (43.20)	327 (30.06)	272 (25.00)	327 (30.06)	272 (25.00)	p = .842	356 (45.94)	261 (33.68)	207 (26.71)	261 (33.68)	207 (26.71)	p = .051	114 (36.42)	66 (21.09)	65 (20.77)	66 (21.09)	65 (20.77)	p = .055	
Mild	235 (21.60)	321 (29.50)	349 (32.08)	321 (29.50)	349 (32.08)	p = .237	161 (20.77)	221 (28.52)	233 (30.06)	221 (28.52)	233 (30.06)	p = .056	74 (23.64)	100 (31.95)	116 (37.06)	100 (31.95)	116 (37.06)	p = .065	
Moderate	184 (16.91)	195 (17.92)	203 (18.66)	195 (17.92)	203 (18.66)	p = .324	125 (16.13)	133 (17.16)	134 (17.29)	133 (17.16)	134 (17.29)	p = .573	59 (18.85)	62 (19.81)	69 (22.04)	62 (19.81)	69 (22.04)	p = .083	
Severe	112 (10.29)	152 (13.97)	163 (14.98)	152 (13.97)	163 (14.98)	p = .211	70 (9.03)	95 (12.26)	97 (12.52)	95 (12.26)	97 (12.52)	p = .128	42 (13.42)	57 (18.21)	66 (21.09)	57 (18.21)	66 (21.09)	p = .071	
Extremely severe	87 (8.00)	93 (8.55)	101 (9.28)	93 (8.55)	101 (9.28)	p = .837	63 (8.13)	65 (8.39)	71 (9.16)	65 (8.39)	71 (9.16)	p = .722	24 (7.67)	28 (8.39)	30 (9.58)	28 (8.39)	30 (9.58)	p = .763	
Anxiety																			
Normal	275 (25.28)	251 (23.07)	175 (16.08)	251 (23.07)	175 (16.08)	p = .059	206 (26.58)	182 (23.48)	130 (16.77)	182 (23.48)	130 (16.77)	p = .052	69 (22.04)	69 (22.04)	45 (14.38)	69 (22.04)	45 (14.38)	p = .055	
Mild	240 (22.06)	233 (21.42)	255 (23.44)	233 (21.42)	255 (23.44)	p = .055	184 (23.74)	186 (24.00)	221 (28.52)	186 (24.00)	221 (28.52)	p = .051	56 (17.89) ^a	47 (15.02)	34 (10.86)	47 (15.02)	34 (10.86)	p = .041*	
Moderate	236 (21.69)	241 (22.15)	229 (21.05)	241 (22.15)	229 (21.05)	p = .053	158 (20.39)	161 (20.77) ^a	140 (18.06)	161 (20.77) ^a	140 (18.06)	p = .048*	65 (20.77)	80 (25.56)	89 (28.43) ^a	80 (25.56)	89 (28.43) ^a	p = .039*	
Severe	229 (21.05)	246 (22.61)	284 (26.10) ^a	246 (22.61)	284 (26.10) ^a	p = .048*	166 (21.42)	177 (22.84)	194 (25.03) ^a	177 (22.84)	194 (25.03) ^a	p = .039*	63 (20.13)	69 (22.04)	90 (28.75) ^a	69 (22.04)	90 (28.75) ^a	p = .021*	
Extremely severe	108 (9.93)	117 (10.75)	145 (13.33) ^a	117 (10.75)	145 (13.33) ^a	p = .041*	61 (7.87)	69 (8.90)	90 (11.61) ^a	69 (8.90)	90 (11.61) ^a	p = .045*	47 (15.02)	48 (15.34)	55 (17.57) ^a	48 (15.34)	55 (17.57) ^a	p = .033*	
Stress																			
Normal	362 (33.27)	321 (29.50)	283 (26.01)	321 (29.50)	283 (26.01)	p = .070	254 (32.77)	194 (25.03)	207 (26.71)	254 (32.77)	194 (25.03)	p = .073	108 (63.29)	127 (40.58)	76 (24.28)	127 (40.58)	76 (24.28)	p = .013*	
Mild	179 (16.45)	194 (17.83)	169 (15.53)	194 (17.83)	169 (15.53)	p = .063	121 (15.61)	146 (18.84)	121 (15.61)	146 (18.84)	121 (15.61)	p = .093	58 (18.53)	48 (15.34)	48 (15.34)	48 (15.34)	48 (15.34)	p = .039*	
Moderate	164 (15.07)	151 (13.88)	161 (14.80)	151 (13.88)	161 (14.80)	p = .051	122 (15.74)	118 (15.23)	118 (15.23)	118 (15.23)	118 (15.23)	p = .061	42 (13.42)	33 (10.54)	43 (13.74)	33 (10.54)	43 (13.74)	p = .053	
Severe	248 (22.79)	291 (26.75)	315 (28.95) ^a	291 (26.75)	315 (28.95) ^a	p = .048*	175 (22.58)	205 (26.45)	214 (27.61) ^a	175 (22.58)	205 (26.45)	p = .044*	73 (23.32)	86 (27.48)	101 (32.27) ^a	86 (27.48)	101 (32.27) ^a	p = .034*	
Extremely severe	135 (12.41)	131 (12.04)	160 (14.71) ^a	131 (12.04)	160 (14.71) ^a	p = .049*	103 (13.29)	112 (14.45)	115 (14.84) ^a	103 (13.29)	112 (14.45)	p = .049*	32 (10.22)	19 (6.07)	45 (14.38) ^a	19 (6.07)	45 (14.38) ^a	p = .047*	
MBI-ES																			
Burnout presence																			
Yes	527 (48.44)	606 (55.70)	677 (62.22)	606 (55.70)	677 (62.22)	p = .012*	374 (48.26)	442 (54.45)	476 (61.42)	374 (48.26)	442 (54.45)	p = .025*	169 (53.99)	188 (60.06)	198 (63.26)	188 (60.06)	198 (63.26)	p = .031*	
No	561 (51.56)	482 (44.40)	411 (37.78)	482 (44.40)	411 (37.78)	p = .022*	401 (51.74)	353 (45.55)	299 (38.58)	401 (51.74)	353 (45.55)	p = .041*	144 (46.01)	125 (39.94)	115 (36.74)	125 (39.94)	115 (36.74)	p = .044*	
Personal accomplishment																			
Low	395 (36.31)	372 (34.19)	340 (31.25)	372 (34.19)	340 (31.25)	p = .058	297 (38.32)	302 (38.97)	286 (36.90)	297 (38.32)	302 (38.97)	p = .093	98 (31.31)	70 (22.36)	54 (17.25)	70 (22.36)	54 (17.25)	p = .008*	
Moderate	391 (35.94)	402 (36.95)	413 (37.96) ^a	402 (36.95)	413 (37.96) ^a	p = .049*	291 (37.55) ^a	284 (36.65)	288 (37.16)	291 (37.55) ^a	284 (36.65)	p = .032*	100 (31.95)	118 (37.70)	125 (39.94) ^a	118 (37.70)	125 (39.94) ^a	p = .044*	
High	302 (27.76)	314 (28.86)	335 (30.79) ^a	302 (27.76)	335 (30.79) ^a	p = .038*	187 (24.13)	189 (24.39)	201 (25.94) ^a	187 (24.13)	189 (24.39)	p = .035*	115 (36.74)	125 (39.94)	134 (42.81) ^a	125 (39.94)	134 (42.81) ^a	p = .045*	

(continued)

Table 4. (continued)

Psychological state	Total sample (n= 1088)				Female (n= 775)				Male (n= 313)			
	Pre-pandemic		Pandemic		Pre-pandemic		Pandemic		Pre-pandemic		Pandemic	
	n (%)	p	n (%)	p	n (%)	p	n (%)	p	n (%)	p	n (%)	p
Depersonalization												
Low	416 (38.24)		390 (35.85)	358 (32.90)	286 (36.90)	297 (38.32)	280 (36.13)	124	130 (41.53) ^a	93 (29.71)	78 (24.92)	p = .003*
Moderate	394 (36.21)	p = .055	407 (37.41)	421 (38.69)	292 (37.68)	282 (36.39)	290 (37.42)	p = .234	102 (32.59)	125 (39.94)	131 (41.85) ^a	p = .017*
High	278 (25.55)	p = .040*	291 (26.75)	309 (28.40) ^a	197 (25.43)	196 (25.29)	205 (26.45)	p = .129	81 (25.88)	95 (30.35)	104 (33.23) ^a	p = .019*
Emotional exhaustion												
Low	542 (49.82) ^a		478 (43.93)	416 (38.24)	398 (51.35) ^a	353 (45.45)	299 (38.58)	p = .003*	144 (46.01) ^a	125 (39.94)	115 (36.74)	p = .020*
Moderate	295 (27.11)	p = .012*	321 (29.50)	342 (31.43) ^a	194 (25.03)	217 (28.00)	235 (30.32) ^a	p = .009*	101 (32.27)	104 (32.23)	109 (34.82) ^a	p = .047*
High	251 (23.07)	p = .009*	289 (26.56)	330 (30.33) ^a	183 (23.61)	205 (26.45)	241 (31.10) ^a	p = .023*	68 (21.73)	84 (26.84)	89 (28.43) ^a	p = .023*

Data are expressed as frequency (percentage). *p value<0.05. Significant p-values are bolded. ^aDifference between other groups with the X² test.

measurement taken during the pandemic compared to pre-pandemic time point and the first evaluation during the pandemic (Table 4). In males, the analysis indicated a statistically significant difference in the prevalence of anxiety (mild to extremely severe), stress (normal to extremely severe), and presence of burnout syndrome (low to high PA, DP, and EE) (Table 4).

Table 5 shows the differences in the DASS-21 and MBI-ES scores between the pre-pandemic and two-time points during the pandemic in each age category (≤ 44 and ≥ 45). Results showed a significantly higher prevalence of severe to extremely severe anxiety and extremely severe stress as well as a higher prevalence of burnout syndrome (low to moderate PA) on the second measurement taken during the pandemic compared to the pre-pandemic period and the first evaluation during pandemic among teachers aged ≤ 44 years. Furthermore, a statistical difference before and during the pandemic was observed in the levels of anxiety (moderate to extremely severe), stress (among all categories), and burnout syndrome (low to high PA, DP, and high EE) in teachers aged ≥ 45 years.

Table 6 shows the analysis of the DASS-21 and the MBI-ES scores before and during the pandemic time points. Teachers in the pre-pandemic period presented significantly lower scores in all subscales in comparison with the measurements taken during the pandemic. Furthermore, the gender analysis of the results shows significant differences between the pre-pandemic and pandemic periods for both males and females in all the subscales. Both female and male teachers showed higher scores during the pandemic than before the pandemic.

Table 7 shows the differences between the pre-pandemic versus pandemic DASS-21 and MBI-E scores per age category (≤ 44 and ≥ 45). Teachers in both age categories showed a significant increase in all the measured variables during the pandemic when compared to the pre-pandemic period.

Associations Between Sociodemographic Variables and Mental Health Before and During the Pandemic

The results of the associations between the psychological state and the sociodemographic variables before the pandemic are shown in Table 8. The analysis showed no factors associated with the teachers' psychological health in the pre-pandemic period.

By contrast, Table 9 shows that, during the second evaluation on pandemic stage, female teachers of ≥ 45 years of age with a college-level of education, 11 years of teaching experience, and currently teaching at preschools and primary schools were significantly associated with higher anxiety, stress, EE, and burnout scores. In addition, female teachers aged ≥ 45 years reported higher PD and PA scores.

Association Between Burnout and Depression and Anxiety

The correlation coefficients between the MBI-ES scores and the depression and anxiety subscale scores are shown in Table 10, while the correlations between men and women

Table 5. Severity of depression, anxiety, stress, and burnout syndrome before and during the COVID-19 pandemic for each age group ≤ 44 and ≥ 45 years.

Psychological state	≤ 44						≥ 45					
	Pre-pandemic			Pandemic			Pre-pandemic			Pandemic		
	First evaluation		Second evaluation	First evaluation		Second evaluation	First evaluation		Second evaluation	First evaluation		Second evaluation
	n (%)	n (%)	p	n (%)	n (%)	p	n (%)	n (%)	p	n (%)	n (%)	p
DASS-21												
Depression												
Normal	379 (48.90)	379 (48.90)	378 (48.77)	379 (48.90)	378 (48.77)	$p = .873$	104 (33.32)	99 (31.63)	92 (29.39)	92 (29.39)	$p = .124$	
Mild	126 (16.26)	119 (15.35)	111 (14.32)	119 (15.35)	111 (14.32)	$p = .282$	95 (30.35)	80 (25.56)	69 (22.04)	69 (22.04)	$p = .061$	
Moderate	140 (18.06)	141 (18.19)	143 (18.45)	141 (18.19)	143 (18.45)	$p = .438$	59 (18.85)	66 (21.09)	72 (23.00)	72 (23.00)	$p = .064$	
Severe	60 (7.74)	64 (8.26)	69 (8.90)	64 (8.26)	69 (8.90)	$p = .326$	45 (14.38)	52 (16.61)	55 (17.57)	55 (17.57)	$p = .185$	
Extremely severe	70 (9.03)	72 (9.29)	74 (9.55)	72 (9.29)	74 (9.55)	$p = .872$	10 (3.19)	16 (5.11)	25 (7.99)	25 (7.99)	$p = .079$	
Anxiety												
Normal	411 (53.03)	402 (51.87)	441 (56.90)	402 (51.87)	441 (56.90)	$p = .162$	91 (29.07)	74 (23.64)	60 (19.17)	60 (19.17)	$p = .068$	
Mild	116 (14.97)	105 (13.55)	60 (7.74)	105 (13.55)	60 (7.74)	$p = .052$	85 (27.16)	79 (25.24)	59 (18.85)	59 (18.85)	$p = .054$	
Moderate	107 (13.81)	102 (13.16)	78 (10.06)	102 (13.16)	78 (10.06)	$p = .073$	69 (22.04)	78 (24.92) ^a	53 (16.93)	53 (16.93)	$p = .044^*$	
Severe	60 (7.74)	75 (9.68)	98 (12.65) ^a	75 (9.68)	98 (12.65) ^a	$p = .048^*$	49 (15.65)	52 (16.61)	80 (25.56) ^a	80 (25.56) ^a	$p = .032^*$	
Extremely severe	81 (10.45)	91 (11.74)	98 (12.65) ^a	91 (11.74)	98 (12.65) ^a	$p = .049^*$	19 (6.07)	30 (9.58)	61 (19.49) ^a	61 (19.49) ^a	$p = .021^*$	
Stress												
Normal	351 (45.29)	341 (44.00)	336 (43.35)	341 (44.00)	336 (43.35)	$p = .628$	88 (28.12) ^a	71 (22.68)	54 (17.25)	54 (17.25)	$p = .049^*$	
Mild	123 (15.87)	126 (16.26)	86 (11.10)	126 (16.26)	86 (11.10)	$p = .058$	81 (25.88) ^a	49 (15.65)	45 (14.38)	45 (14.38)	$p = .031^*$	
Moderate	121 (15.61)	123 (15.87)	120 (15.48)	123 (15.87)	120 (15.48)	$p = .183$	61 (19.49)	74 (23.64) ^a	61 (19.49)	61 (19.49)	$p = .040^*$	
Severe	104 (13.42)	105 (13.55)	123 (15.87)	105 (13.55)	123 (15.87)	$p = .087$	47 (15.02)	68 (21.73)	78 (24.92) ^a	78 (24.92) ^a	$p = .010^*$	
Extremely severe	76 (9.81)	80 (10.32)	110 (14.19) ^a	80 (10.32)	110 (14.19) ^a	$p = .009^*$	36 (11.50)	51 (16.29)	75 (23.96) ^a	75 (23.96) ^a	$p = .008^*$	

(continued)

Table 5. (continued)

Psychological state	≤44				≥45			
	Pre-pandemic		Pandemic		Pre-pandemic		Pandemic	
	n (%)	Second evaluation n (%)	p	First evaluation n (%)	n (%)	Second evaluation n (%)	p	
MBI-ES								
Burnout presence								
Yes	393 (50.71)	406 (52.39)	p = .045*	440 (56.77) ^a	147 (46.96)	196 (62.62) ^a	p = .003*	
No	382 (49.29)	369 (47.61)	p = .043*	335 (43.23) ^a	166 (53.04)	117 (37.38) ^a	p = .011*	
Personal accomplishment								
Low	386 (49.81)	380 (49.03)	<i>p = .121</i>	340 (43.87)	154 (49.20) ^a	79 (25.24)	p = .005*	
Moderate	195 (25.16)	203 (26.19)	p = .041*	219 (28.26) ^a	115 (36.74)	159 (50.80) ^a	p = .004*	
High	194 (25.03)	206 (26.58)	p = .039*	216 (27.87) ^a	44 (14.06)	75 (23.96) ^a	p = .003*	
Depersonalization								
Low	427 (55.10) ^a	419 (54.06)	p = .049*	388 (50.06)	179 (57.19) ^a	117 (37.38)	p = .020*	
Moderate	190 (24.52)	196 (25.29)	p = .033*	213 (27.48) ^a	95 (30.35)	129 (41.21) ^a	p = .034*	
High	158 (20.39)	160 (20.65)	p = .045*	174 (22.45) ^a	39 (12.46)	67 (21.41) ^a	p = .003*	
Emotional exhaustion								
Low	382 (49.29)*	369 (47.61)	p = .044*	335 (45.81)	170 (54.31) ^a	117 (37.38)	p = .012*	
Moderate	212 (27.35)	221 (28.52)	p = .021*	241 (31.10) ^a	105 (33.51)	136 (43.45) ^a	p = .023*	
High	181 (23.35)	185 (23.87)	p = .038*	199 (25.68) ^a	38 (12.14)	60 (19.17) ^a	p = .037*	

Data are expressed as frequency (percentage). *p value<0.05. Significant p-values are bolded. ^aDifference between other groups with the X² test.

Table 6. Depression, anxiety, stress, and burnout syndrome before and during the COVID-19 pandemic in the total sample and per gender.

Psychological state	Total sample (n = 1088)						Female (n = 775)						Male (n = 313)					
	Pandemic			Pandemic			Pandemic			Pandemic			Pandemic			Pandemic		
	Pre-pandemic Mean ± SD	First evaluation Mean ± SD	Second evaluation Mean ± SD	Post hoc Tukey comparisons p	Repeated measures ANOVA	P	Pre-pandemic Mean ± SD	First evaluation Mean ± SD	Second evaluation Mean ± SD	Post hoc Tukey comparisons p	Repeated measures ANOVA	P	Pre-pandemic Mean ± SD	First evaluation Mean ± SD	Second evaluation Mean ± SD	Post hoc Tukey comparisons p	Repeated measures ANOVA	P
DASS-21- Depression	9.23 ± 3.04	14.03 ± 2.42	16.83 ± 3.35	F(2,3262)=3.235 P = 0.039*	0.001	11.52 ± 3.41	16.20 ± 3.73	19.39 ± 4.02	F(2,3232)=6.733 P = 0.01*	0.018	10.23 ± 3.04	14.03 ± 2.42	16.83 ± 3.35	F(2,937)=1.983 P = 0.04*	0.05	0.033		
DASS-21-Anxiety	10.54 ± 2.88	14.71 ± 3.51	18.91 ± 3.05	F(2,3262)=4.125 P = 0.02*	0.001	10.71 ± 2.44	16.92 ± 3.71	19.53 ± 4.52	F(2,3232)=3.022 P = 0.011	0.033	10.09 ± 2.81	14.33 ± 3.22	17.48 ± 3.99	F(2,937)=2.328 P = 0.031*	0.08	0.042		
DASS-21-Stress	12.07 ± 3.04	17.51 ± 3.43	20.83 ± 4.26	F(2,3262)=7.083 P = 0.004*	0.001	13.08 ± 3.54	18.63 ± 4.61	23.72 ± 5.24	F(2,3232)=6.126 P = 0.01*	0.008	12.73 ± 3.72	17.04 ± 3.83	20.14 ± 3.77	F(2,937)=3.874 P = 0.019*	0.09	0.045		
MBI-ES- Burnout	9.32 ± 2.42	13.43 ± 2.89	17.91 ± 3.24	F(2,3262)=7.751 P = 0.01*	0.005	11.46 ± 3.05	14.61 ± 3.80	19.22 ± 3.71	F(2,3232)=6.873 P = 0.003*	0.004	10.83 ± 2.73	13.88 ± 3.52	18.91 ± 3.42	F(2,937)=2.732 P = 0.02*	0.023	0.043		
MBI-ES-Personal accomplishment	25.02 ± 5.83	32.25 ± 6.71	39.23 ± 7.32	F(2,3262)=6.352 P = 0.009*	0.001	25.02 ± 5.12	32.14 ± 4.60	39.58 ± 6.19	F(2,3232)=7.105 P = 0.009*	0.001	24.34 ± 5.15	31.04 ± 5.18	38.61 ± 5.12	F(2,937)=4.436 P = 0.009*	0.001	0.07		
MBI-ES- Depersonalization	5.03 ± 1.14	7.31 ± 1.28	9.35 ± 2.34	F(2,3262)=6.284 P = 0.002*	0.012	5.72 ± 2.04	8.95 ± 3.02	11.34 ± 3.57	F(2,3232)=4.713 P = 0.024*	0.006	5.24 ± 2.34	7.03 ± 2.34	10.34 ± 3.56	F(2,937)=3.931 P = 0.01*	0.003	0.046		
MBI-ES-Emotional exhaustion	19.35 ± 4.71	24.23 ± 4.32	26.34 ± 5.01	F(2,3262)=6.704 P = 0.004*	0.008	19.21 ± 4.41	25.73 ± 4.71	28.39 ± 5.33	F(2,3232)=3.132 P = 0.031*	0.001	17.22 ± 4.30	24.63 ± 4.92	26.92 ± 4.88	F(2,937)=5.236 P = 0.004*	0.001	0.005		

Data are expressed as mean and standard deviation. Significant differences using a repeated measures ANOVA and post hoc Tukey comparisons.

*p value < .05. Significant p-values are bolded.

^aDifference between second and pre-pandemic evaluation.

^bDifference between second and first evaluation.

^cDifference between first and pre-pandemic evaluation.

Table 7. Depression, anxiety, stress, and burnout syndrome between pre-pandemic and pandemic timeframes for each age group ≤ 44 and ≥ 45 years.

Psychological state	≤ 44 ($n = 775$)										≥ 45 ($n = 313$)																	
	Pre-pandemic					Pandemic					Pre-pandemic					Pandemic												
	Mean \pm SD		First evaluation		Second evaluation		Mean \pm SD		First evaluation		Second evaluation		Mean \pm SD		First evaluation		Second evaluation		Mean \pm SD		First evaluation		Second evaluation					
	Mean \pm SD	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD				
DASS-21 Depression	10.02	3.20	14.83	3.52	18.24	4.11	10.03	—	12.15	3.41	15.66	3.83	19.51	4.02	F(2,2323)=2.024	$p = .045^*$	0.003	—	12.15	3.41	15.66	3.83	19.51	4.02	F(2,937)=2.473	$p = .018^*$	0.004	—
DASS-21-Anxiety	11.34	3.74	15.01	3.71	18.99	3.81	0.008	—	11.09	3.03	15.90	4.54	19.69	4.23	F(2,2323)=2.436	$p = .038^*$	0.008	—	11.09	3.03	15.90	4.54	19.69	4.23	F(2,937)=2.843	$p = .041^*$	0.002	—
DASS-21-Stress	11.76	3.62	16.25	4.53	21.34	4.66	0.001	—	13.22	4.16	17.82	4.33	23.14	5.30	F(2,2323)=6.353	$p = .004^*$	0.001	—	13.22	4.16	17.82	4.33	23.14	5.30	F(2,937)=5.252	$p = .009^*$	0.001	—
MBI-ES- Burnout	10.22	3.54	14.24	3.71	19.35	4.60	0.001	—	11.62	3.39	15.13	4.22	20.34	4.51	F(2,2323)=4.234	$p = .010^*$	0.001	—	11.62	3.39	15.13	4.22	20.34	4.51	F(2,937)=6.164	$p = .005^*$	0.002	—
MBI-ES-Personal accomplishment	25.42	5.12	36.32	5.83	40.12	7.61	0.001	—	23.02	4.91	30.23	5.81	39.84	6.51	F(2,2323)=4.123	$p = .008^*$	0.001	—	23.02	4.91	30.23	5.81	39.84	6.51	F(2,937)=5.982	$p = .006^*$	0.001	—
MBI-ES-Depersonalization	4.61	2.12	7.24	3.55	10.31	3.47	0.005	—	5.24	2.68	7.46	3.12	11.03	3.20	F(2,2323)=3.342	$p = .029^*$	0.005	—	5.24	2.68	7.46	3.12	11.03	3.20	F(2,937)=3.787	$p = .029^*$	0.005	—
MBI-ES-Emotional exhaustion	17.88	4.68	22.31	5.16	27.62	5.70	0.001	—	19.12	4.77	24.64	5.17	29.05	6.11	F(2,2323)=3.934	$p = .006^*$	0.001	—	19.12	4.77	24.64	5.17	29.05	6.11	F(2,937)=5.125	$p = .008^*$	0.001	—

Data are expressed as mean and standard deviation. * p value $< .05$. Significant p -values are bolded.

^aDifference between second and pre-pandemic evaluation.

^bDifference between second and first evaluation.

^cDifference between first and pre-pandemic evaluation.

Table 8. Associations between sociodemographic variables, MBI-ES, and DASS-21 in pre-pandemic period.

	DASS-21						Pre-pandemic stage						MBI-ES					
	Depression		Anxiety		Stress		Burnout		Personal accomplishment		Depersonalization		Emotional exhaustion					
	β (95% CI)	p	β (95% CI)	p	β (95% CI)	p	β (95% CI)	p	β (95% CI)	p	β (95% CI)	p	β (95% CI)	p				
Sex	Reference																	
Male	0.32 (0.12–2.67)	0.325	0.60 (0.18–0.83)	0.125	0.61 (0.20–0.75)	0.217	0.55 (0.11–0.68)	0.405	Reference	Reference	0.71 (0.20–0.66)	0.125	0.63 (0.13–0.81)	0.124				
Female																		
Age	Reference																	
≤44	0.61 (0.21–0.55)	0.416	0.83 (0.19–0.95)	0.103	0.71 (0.15–0.91)	0.170	0.73 (0.21–0.88)	0.129	Reference	Reference	0.59 (0.23–0.71)	0.620	0.81 (0.17–1.02)	0.079				
≥45																		
Marital status	Reference																	
Single	0.34 (0.10–0.42)	0.782	0.72 (0.09–0.84)	0.098	0.87 (0.10–0.73)	0.076	0.44 (0.42–0.77)	0.133	Reference	Reference	0.34 (0.19–0.74)	0.628	0.58 (0.23–0.87)	0.093				
Married																		
Teachers' education level	Reference																	
College	0.23 (0.11–0.61)	0.782	0.81 (0.17–0.93)	0.060	0.71 (0.16–0.88)	0.093	0.71 (0.18–0.78)	0.113	Reference	Reference	0.83 (0.20–0.89)	0.074	0.82 (0.18–0.92)	0.071				
Specialty	0.41 (0.15–0.55)	0.782	0.80 (0.34–1.02)	0.059	0.72 (0.10–0.83)	0.199	0.63 (0.19–0.39)	0.342	Reference	Reference	0.72 (0.10–0.83)	0.213	0.34 (0.12–0.74)	0.144				
Master	0.46 (0.18–0.70)	0.782	0.66 (0.10–0.87)	0.113	0.69 (0.18–0.67)	0.249	0.44 (0.18–0.70)	0.183	Reference	Reference	0.69 (0.18–0.67)	0.385	0.29 (0.10–0.61)	0.356				
Doctorate																		
Teaching experience	Reference																	
≤10	0.23 (0.11–0.61)	0.782	0.71 (0.11–0.89)	0.070	0.71 (0.12–0.81)	0.123	0.92 (0.11–0.99)	0.070	Reference	Reference	0.83 (0.20–0.89)	0.074	0.81 (0.18–0.96)	0.087				
≥11																		
Type of contract	Reference																	
Fixed-term	0.44 (0.18–0.50)	0.893	0.73 (0.22–0.82)	0.873	0.67 (0.29–0.82)	0.253	0.63 (0.21–0.84)	0.173	Reference	Reference	0.61 (0.16–0.71)	0.247	0.89 (0.13–0.98)	0.078				
Contract																		
Teaching level	Reference																	
Preschool	0.67 (0.17–0.83)	0.072	0.91 (0.29–0.94)	0.063	0.88 (0.13–0.93)	0.094	0.98 (0.11–0.77)	0.071	Reference	Reference	0.82 (0.22–0.98)	0.092	0.91 (0.19–0.94)	0.054				
Primary school	0.71 (0.21–0.92)	0.098	0.81 (0.22–0.93)	0.093	0.76 (0.13–0.82)	0.089	0.70 (0.15–0.81)	0.088	Reference	Reference	0.88 (0.21–0.79)	0.123	0.77 (0.20–0.85)	0.061				
Secondary school	0.53 (0.11–0.50)	0.233	0.41 (0.15–0.84)	0.284	0.73 (0.09–0.66)	0.582	0.42 (0.19–0.53)	0.214	Reference	Reference	0.61 (0.19–0.73)	0.820	0.64 (0.31–0.83)	<				
High school	0.49 (0.15–0.50)	0.128	0.32 (0.19–0.72)	0.271	0.56 (0.12–0.70)	0.461	0.38 (0.10–0.69)	0.831	Reference	Reference	0.59 (0.16–0.79)	0.703	0.71 (0.24–0.88)	0.112				
College	0.28 (0.13–0.50)	0.723	0.18 (0.17–0.66)	0.532	0.48 (0.16–0.82)	0.732	0.33 (0.08–0.62)	0.678	Reference	Reference	0.55 (0.11–0.70)	0.628	0.39 (0.11–0.93)	0.124				
Postgrad.																		

β : beta coefficient; CI: Confidence Interval; p: p-values. Significant p-values are bolded.

Table 9. Associations between sociodemographic variables, MBI-ES, and DASS-21 in the second pandemic evaluation.

	DASS-21						Panic stage						MBI-ES								
	Depression		Anxiety		Stress		Burnout		Personal accomplishment		Depersonalization		Emotional exhaustion								
	β	(95% CI)	p	β	(95% CI)	p	β	(95% CI)	p	β	(95% CI)	p	β	(95% CI)	p						
Sex	Reference																				
Male	0.44	(0.15-0.71)	0.221	2.41	(0.37-3.60)	0.020*	4.41	(0.28-4.91)	0.001*	1.65	(0.28-2.56)	0.009*	-1.73	(-2.94-1.10)	0.010*	2.18	(0.30-2.82)	0.023*	4.35	(0.35-5.07)	0.002*
Female	Reference																				
Age	Reference																				
≤44	0.63	(0.26-0.87)	0.203	3.25	(0.43-4.65)	0.013*	5.70	(0.31-6.51)	0.014*	2.41	(0.31-3.93)	0.008*	-1.25	(-2.18-1.27)	0.022*	1.45	(0.43-1.71)	0.005*	2.18	(0.29-2.69)	0.003*
≥45	Reference																				
Marital status	Reference																				
Single	0.34	(0.10-0.42)	0.782	0.72	(0.09-0.84)	0.098	0.87	(0.10-0.73)	0.076	0.44	(0.42-0.77)	0.133	-0.52	(-1.65-0.55)	0.345	0.34	(0.19-0.74)	0.628	0.58	(0.23-0.87)	0.093
Married	Reference																				
Level of teacher education	Reference																				
College	0.41	(0.31-0.81)	0.371	1.41	(0.53-1.84)	0.041*	1.33	(0.47-1.93)	0.021*	1.30	(0.36-1.55)	0.009*	-0.89	(-1.20-0.91)	0.066	0.88	(0.23-0.97)	0.057	1.25	(0.23-1.71)	0.004*
University	0.38	(0.27-0.78)	0.224	0.80	(0.34-1.13)	0.051	0.81	(0.29-0.88)	0.108	0.83	(0.14-0.79)	0.121	-0.71	(-1.94-0.35)	0.236	0.80	(0.27-0.95)	0.172	0.72	(0.19-0.82)	0.083
Specialty	Reference																				
Master	0.46	(0.25-0.98)	0.105	0.66	(0.10-0.87)	0.087	0.74	(0.24-0.83)	0.191	0.75	(0.22-0.81)	0.098	-0.83	(-1.26-0.52)	0.055	0.75	(0.31-0.83)	0.183	0.65	(0.17-0.88)	0.097
Doctorate	Reference																				
Teaching experience	Reference																				
≤10	0.41	(0.18-0.72)	0.173	1.12	(0.23-1.42)	0.041*	2.20	(0.31-3.46)	0.030*	1.24	(0.31-1.29)	0.021*	-0.49	(-1.11-0.83)	0.124	0.83	(0.20-0.89)	0.074	3.13	(0.22-4.36)	0.018*
≥11	Reference																				
Type of contract	Reference																				
Fixed-term	0.61	(0.22-0.81)	0.125	0.60	(0.21-0.73)	<0.409	0.91	(0.33-0.96)	0.104	0.70	(0.21-0.88)	0.085	-0.66	(-1.31-0.23)	0.232	0.72	(0.22-0.89)	0.123	0.91	(0.34-1.02)	0.053
Contract	Reference																				
Teaching level	Reference																				
Preschool	0.70	(0.25-0.91)	0.065	2.10	(0.29-3.24)	0.043*	1.18	(0.23-1.30)	0.014*	1.08	(0.21-2.17)	0.042*	-0.75	(0.31-0.85)	0.128	0.89	(0.29-1.01)	0.061	2.24	(0.49-3.66)	0.009*
Primary school	0.75	(0.31-0.88)	0.073	2.21	(0.25-4.33)	0.039*	3.16	(0.26-4.23)	0.009*	2.11	(0.21-2.92)	0.033*	-0.88	(-1.18-0.33)	0.055	0.91	(0.28-0.79)	0.090	2.33	(0.44-2.98)	0.012*
Secondary school	0.61	(0.21-0.74)	0.115	0.53	(0.19-0.88)	0.173	0.77	(0.14-0.85)	0.223	0.51	(0.25-0.81)	0.123	-0.74	(-1.19-0.81)	0.129	0.70	(0.25-0.73)	0.249	0.82	(0.35-0.91)	0.084
High school	0.53	(0.19-0.77)	0.084	0.44	(0.21-0.77)	0.114	0.61	(0.19-0.82)	0.143	0.43	(0.23-0.70)	0.126	-0.65	(-1.26-0.62)	0.082	0.63	(0.22-0.79)	0.364	0.73	(0.29-0.95)	0.103
College	0.43	(0.18-0.98)	0.125	0.37	(0.24-0.91)	0.105	0.58	(0.21-0.79)	0.305	0.71	(0.19-0.92)	0.106	-0.49	(-1.23-0.68)	0.112	0.74	(0.19-0.70)	0.205	0.69	(0.22-0.88)	0.098
Postgrad.	Reference																				

β : beta coefficient; CI: Confidence Interval; p : p-values. Significant p-values are bolded.

Table 10. Correlation between anxiety and depression scores and burnout scores in three stages pandemic evaluation in the total sample.

Psychological state	Total sample (n = 1088)					
	Pre-pandemic		First evaluation		Second evaluation	
	Burnout (MBI-ES)		Burnout (MBI-ES)		Burnout (MBI-ES)	
	r	p	r	p	r	p
DASS-21-Anxiety	0.19	0.525	0.47	0.031*	0.49	0.013*
DASS-21-Depression	0.08	0.782	0.37	0.035*	0.41	0.029*

r = Pearson's correlation coefficient. Significant p-values are bolded.

are shown in [Tables 11](#) and [12](#), respectively. The correlation analysis shows low correlation among the variables and no significant difference before the pandemic in both the population and gender analyses. However, a statistically significant difference and higher correlation among the variables are observed in both the first and second evaluation during the pandemic in the total sample population and the gender analysis. The data show that as the pandemic progressed, a stronger association between burnout syndrome and anxiety and depression was observed.

Discussion

In this longitudinal study, the psychological state of teachers in Mexico was examined from before the pandemic throughout the pandemic period considering two-time points during the pandemic. As the COVID-19 pandemic progressed, teachers experienced a clear deterioration of their mental health and reported higher levels of burnout syndrome. In both age groups, an increase in moderate, severe, and extremely severe levels in DASS-21 scores was observed. Furthermore, the reports of burnout syndrome were higher during the pandemic and significantly more pronounced in the ≤ 45 -years old group. Interestingly, a higher level of PA during the pandemic was reported by teachers in both age categories. Both female and male teachers experienced moderate levels of depression, severe anxiety, moderate stress, medium levels of PA, high DP and EE after 16 months of the pandemic. It is important to notice the sample size difference per gender in which a larger number of female teachers (71.23%, $n= 775$) compared to the number of male teachers (28.77%, $n= 313$) was observed. However, such difference reflects the recent statistics of the population of teachers in Mexico. According to the National Survey of Occupation and Work conducted in 2020, 69.9% of the teachers in Mexico are female while 30.1% are male ([INEGI, 2021](#)). Even though the sample is a fair representation of the teacher's population in the country, for the purpose of critically analyzing the findings per gender, the sample size difference in the male and female groups should be kept into consideration. Therefore, the interpretation of the

Table 11. Correlation between DASS-21 subscales scores and MBI-ES scores in three stages pandemic evaluation in female sample

Psychological state	Female (n = 775)					
	Pre-pandemic		First evaluation		Second evaluation	
	Burnout (MBI-ES)		Burnout (MBI-ES)		Burnout (MBI-ES)	
	r	p value	r	p value	r	p value
DASS-21-Anxiety	0.12	0.351	0.49	0.025*	0.56	0.009*
DASS-21-Depression	0.09	0.815	0.41	0.033*	0.44	0.027*

r = Pearson's correlation coefficient. Significant p-values are bolded.

Table 12. Correlation between DASS-21 subscales scores and MBI-ES scores in three stages pandemic evaluation in male sample.

Psychological state	Male (n = 313)					
	Pre-pandemic		First evaluation		Second evaluation	
	Burnout (MBI-ES)		Burnout (MBI-ES)		Burnout (MBI-ES)	
	r	p value	r	p value	r	p value
DASS-21-Anxiety	0.11	0.604	0.41	0.026*	0.47	0.021*
DASS-21-Depression	0.07	0.882	0.34	0.038*	0.40	0.028*

r = Pearson's correlation coefficient. Significant p-values are bolded.

gender analysis should be cautiously done as the findings per gender observed could be due to the sample size difference. A larger sample size in the group of male teachers would be needed to have a better understanding of the impact of the pandemic per gender.

The association between sociodemographic factors and stress, anxiety, and burnout in groups of teachers has been studied before considering age, marital status, years of experience in teaching, educational level, and teaching level (Ortiz-Hernández et al., 2007; Sieglin & Ramos-Tovar, 2007). In the present study, the sociodemographic variables did not have any relationship with the psychological state prior to the pandemic. However, the educational level, years of teaching experience, and teaching level showed a clear relationship with anxiety, stress, burnout, and EE in a previous study (Contreras-Ibáñez et al., 2020).

Detrimental Mental Health and Increased Burnout Syndrome

The COVID-19 pandemic caused changes in teachers' daily lives (Smith & Lim, 2020) bringing great uncertainty (Cáceres de Gill et al., 2020), and increased work overloads.

The results of the present study show serious effects of the COVID-19 outbreak on the teachers' mental health, including depression, anxiety, stress, and burnout syndrome.

One of the most frequently reported stressors affecting teachers in Mexico includes the challenge to contact and reach their students (Escárzaga et al., 2020). Teachers have made a colossal effort to reach students and make sure that they receive the school activities as some students have no access or limited internet access (López Corral & Acuña, 2020). Not being able to contact the students is a source of emotional distress for teachers because they do not know what is happening in the students' lives at these difficult times of the pandemic (Escárzaga et al., 2020; Martínez Barradas, 2021). Also, the low assignment completion rate (<60%) (Escárzaga et al., 2020) and the need for keeping students engaged (Romo Rojas & Mora, 2020) contribute to the deterioration of the teachers' psychological state.

To a large extent, the detrimental mental health state has been the result of an increased effort that teachers put into the implementation of a novel teaching approach, which requires adjusting the teaching methodologies, designing didactic materials, diversifying the teaching format and delivery method, and adapt to new ways of working (CEPAL-UNESCO, 2020). In Mexico, teachers were used to conventional teaching methods, and they were not ready to introduce ICTs as the main mode of instruction (Escárzaga et al., 2020). The lack of resources and minimal training to keep up with the growing demands during the pandemic have added more pressure, which jeopardizes teachers' physical and mental health (CEPAL-UNESCO, 2020).

In this study, the prevalence of depression, anxiety, stress, and burnout syndrome was significant 16 months after a national health emergency was declared in Mexico. Undoubtedly, the transition from conventional to ICT-based teaching contributed to the negative effect of teachers' mental health and increased burnout syndrome. In addition to their pivotal role in education and students' support, teachers have had more responsibilities during the pandemic (CEPAL-UNESCO, 2020). They often find themselves in a 'sandwich' situation between personal and professional roles causing an increase in the workload. For example, teachers have provided crucial emotional support to students and their families during these difficult times (CEPAL-UNESCO, 2020). Teachers are crucial mediators of educational, social, and emotional conflicts (Escárzaga et al., 2020). During the COVID-19 outbreak, teachers have experienced an overwhelming environment full of worries and feelings of all kinds, and they face the need for finding new strategies to tackle conflicts and provide the appropriate support to students and their families (Escárzaga et al., 2020; Rodríguez Ayala & López Galván, 2021).

Longitudinal studies on the impact of COVID-19 on teachers' mental health are scarce. Nonetheless, a nationwide Canadian study in teachers carried out between April and June 2020 with a follow-up assessment in May 2020 reported increasing burnout syndrome and negative thoughts and feelings among Canadian teachers (Sokal et al., 2020). A longitudinal study conducted in Chile to understand the impact of the pandemic on teachers showed a significant decrease in the quality-of-life scores, particularly among females and teachers under 45 years (Lizana et al., 2021). Chinese

university teachers experienced low to medium levels of burnout syndrome (Chen et al., 2020), which is in agreement with the findings of the present study.

In Mexico, high levels of stress were reported by teachers in the state of Tamaulipas, Mexico (Cortés Rojas, 2021). During the COVID-19 outbreak, it was not surprising to find higher stress levels in teachers in Mexico compared to levels before the pandemic. Other studies found that teachers, particularly those from private schools, were affected by a salary reduction as well as the difficulties associated with the shift to online teaching due to the COVID-19 pandemic (Diario Portal, 2020; Gatica, 2020). When workers experience insufficient financial compensation for their work, the feeling of devaluation might appear, and it could contribute to the stress experienced at work (Stanks, 2015).

Previous studies have discussed the difference in burnout profiles between males and females (Purvanova & Muros, 2010). For instance, a meta-analysis reported that women experienced more EE than men whereas men reported more DP than women (Purvanova & Muros, 2010). Our results show that both female and male teachers exhibited a similar burnout profile; that is, high DP and EE, and low PA. The difference between our results and the findings of the meta-analysis may be due to the sample size difference between the female and male groups in our study (71.23% female teachers and 28.77% male teachers). In addition, Purvanova and Muros (2010) reported that the difference in the burnout profile between men and women was small. Therefore, the unequal sample size and the low sample size of the male group may explain why no difference in the burnout profile between female and male teachers was observed.

Impact on the Psychological State per Age Category

The pandemic had a different effect on the mental health of young teachers and teachers over the age of 45. This was observed in previous studies in which younger people (between 18 and 25 years old) reported higher levels of stress, anxiety, and depression than those over 60 years old (Ozamiz-Etxebarria et al., 2020). In another study, Spanish medical personnel over the age of 36 experienced higher levels of stress, anxiety, insomnia, and depression when compared with younger people (Dosil Santamaría et al., 2021). The correlation between age and stress was assessed in the general population in Mexico and revealed that higher age resulted in less perceived stress (Contreras-Ibáñez et al., 2020). Furthermore, high levels of psychological distress were observed in two age groups, people between 18- and 30-years old and people over 60-years (Lozano-Vargas, 2020). A study with school and university teachers ($n = 1663$) reported high levels of depression (32.2%), anxiety (49.4%), and stress (50.6%) (Ozamiz-Etxebarria et al., 2021). In another study, age was negatively correlated with the perceived stress scores, which indicated that younger teachers showed higher levels of stress, psychological distress, and less life satisfaction than older teachers (Hidalgo-Andrade et al., 2021).

Although there is inconsistency in the findings with populations from different countries where a greater impact on the psychological state of younger teachers is more

pronounced than in older groups, the results of our study show that teachers over 45 experienced the greatest effects on their mental health and wellbeing. This trend could be related to the pandemic-driven drastic change in the work dynamics and the inclusion of technologies, which teachers were not familiar with. The new work settings forced teachers to spend considerable time sitting while teaching and adapting their activities and materials to virtual platforms. An international study conducted between March and May 2020 with 173,426 people showed that the high levels of stress experienced by the participants were associated with the participant's age, preference to be alone, and the experience of drastic changes in their lifestyle (Contreras-Ibáñez et al., 2020; Pérez-Gay Juárez et al., 2020; Yamada et al., 2021).

Practical Implications of the Study

The findings of the longitudinal study demonstrate the detrimental effect of the COVID-19 pandemic on mental health and increased the prevalence of burnout syndrome in teachers in Mexico as the pandemic progresses. The new body of knowledge presented in our study opens the door to future research on mental health and can be used to create a call to action targeting this vulnerable population. For instance, the findings of our study could be used as a foundation 1) to design interventions aiming at improving mental health and preventing burnout syndrome in teachers and 2) to open a dialog with the government and the education system authorities to create awareness on the problem and to provide support and training to teachers across the country. As teachers' mental health state has suffered a significant decline during the pandemic, universities, psychologists, government and education system authorities should join efforts to provide psychological, technical, and educational support to reduce mental health problems and burnout syndrome in teachers.

Recommendations for Future Directions

Our results highlight the need for interventions to improve teachers' mental health. From the research point of view, future studies should be focused on assessing the effectiveness of mental health interventions that could be implemented under the special circumstances of the COVID-19 pandemic (e.g., social distancing measures). Exploring suitable intervention options such as remotely-delivered, self-administered, and digital interventions (Strudwick et al., 2021; Gorenko et al., 2021; Budhwani et al., 2021) that could mitigate the negative effects of the pandemic on teachers' mental health is recommended as the next step to tackle the problem that our study presented. From the policy-making point of view, the government and education system authorities should join efforts to provide self-care strategies, resources, equipment, and training to reduce the stress that teachers experience due to the challenging shift to distance learning. Finally, teachers' mental health should be closely monitored to take action (e.g., referral to professionals, recommending taking sick leave, etc.) and prevent further deterioration of their mental health.

Limitations

Mexico is a very heterogeneous country where the socioeconomic environment and work conditions at schools and universities vary throughout the country. Therefore, one of the limitations of the present study is that it only included teachers from some central regions and the west coast of the country. Samples from different states could provide a wider picture of the mental health state among teachers at a national level. Another limitation of the study is that no questionnaire was used to collect information about the sources of emotional distress. Asking teachers about the stressors they are facing during the pandemic would have given a clearer picture of the problem and insight to take immediate actions to diminish the negative impact of the stressors. Finally, the difference in sample size between the female and male groups of teachers is another limitation of the study. A larger sample size in the group of male teachers would be needed to have a better understanding of the impact of the pandemic per gender.

Conclusions

The COVID-19 outbreak has affected people's lives considerably and has brought drastic changes to the way people interact, work, and engage in school activities. Teachers play a crucial role in society due to their commitment to teaching and close contact with students and parents. The results of this study showed the precarious situation in which teachers are working in Mexico, and the challenges they are facing during the COVID-19 pandemic. Considering the teachers' working conditions is pivotal to understand the reports of high levels of stress, anxiety, depression, DP, EE, and low PA during the COVID-19 outbreak. As the pandemic progressed, teachers experienced a pronounced deterioration of their mental health and reported higher levels of burnout syndrome.

Mental health is a priority issue to be addressed by the education system and health authorities in Mexico. Teachers have had a very intense life experience during the pandemic, and they need support to handle the challenges brought by the COVID-19 outbreak. Support is also needed to get teachers prepared for the return to face-to-face classes or hybrid mode as this new mode of teaching represents another stressor due to the risk of infection. Taking care of the mental health and wellbeing of teachers will bring benefits to their school communities as well as to their own families. Furthermore, tackling the mental health issues that teachers experience would prevent the development of more serious mental disorders. The findings of the study support the urgent need to develop strategies to support teachers during the challenging times of the COVID-19 outbreak to avoid the progression of mental health issues.

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ORCID iDs

Nadia Yanet Cortés-Álvarez  <https://orcid.org/0000-0002-0596-9107>

César Rubén Vuelvas-Olmos  <https://orcid.org/0000-0003-3212-4166>

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Author Biographies

Nadia Yanet Cortés-Álvarez is a full-time professor at Department of Nursing and Midwifery, Division of Natural and Exact Sciences, University of Guanajuato, Mexico. She has a bachelor's degree in nursing, a master and PhD in medical sciences, mainly in basic research on the field of developmental neuroscience and its impact on behavior. She participates in multidisciplinary work with areas as psychology, chemistry, and medicine.

César Rubén Vuelvas-Olmos, has a bachelor's degree in Psychology, he has Medical Sciences MSc and currently is enrolled in PhD program in Medical Sciences in University of Colima, his current research areas are the cognitive function assessment in sports related concussions.

Leticia Gabriela Marmolejo-Murillo has a master's and PhD degrees in Physiological Sciences. In addition to a specialization in distance education. She has taught and tutored high school and undergraduate students in Human Medicine and Physiotherapy. PhD Marmolejo-Murillo has explored the physiology and pharmacology of ion channels.

Alicia Saldívar Garduño Professor and researcher in the Department of Sociology of the Universidad Autónoma Metropolitana in Mexico since 1999, and currently Associate Defender of University Rights at the same university. She has a bachelor's, master's and doctorate in psychology, with a specialty in social psychology. Member of the National System of Researchers, with publications and research on social psychology of health, attitudes, sexual and reproductive health, culture of self-care in health, early detection of breast cancer, gender-based violence, identity, mental health, diversity, and inclusion in university spaces.

Dalida Isabel Sanchez-Vidaña is a biomedical scientist with international research experience in both academia and the pharmaceutical industry (Crucell, now Janssen Vaccines and Prevention, in The Netherlands and AstraZeneca in Sweden). She received her bachelor's degree in pharmaceutical industrial chemistry from the ENCB-IPN in Mexico. As an Utrecht Excellence Scholarship awardee, she completed her master's degree in biomedical sciences at Utrecht University in The Netherlands. She received her PhD degree in biological sciences from The Hong Kong Polytechnic University and is currently working as a Research Assistant Professor at the Department of Rehabilitation Sciences at the same institution. Dr Sanchez has participated in a wide variety of research projects, including those on depression, mental health, renal medicine, and viral vaccine development. As a postdoctoral fellow, she studied the crosstalk molecular mechanisms of receptor tyrosine kinases relevant to kidney pathologies in a collaborative project between the University of Gothenburg and AstraZeneca in Sweden. As a project leader, she has coordinated projects on mental health and developed digital mental health interventions in collaboration with universities in Switzerland, Hong Kong, and the Philippines. Dr Sanchez is particularly interested in understanding the underlying molecular mechanisms of psychiatric and neurological disorders as well as the therapeutic effect of complementary and alternative medicine (CAM). Her research focuses on neurogenesis, a plasticity mechanism associated with the pathophysiology of neurological and affective disorders, and the effect of CAM on neurogenesis using animal models. She has participated in projects evaluating the effect of single drugs, hormones, aromatherapy, traditional Chinese medicine, and social isolation on neurogenesis and its role in mood and affective disorders. She has presented her work at international conferences and published in peer-reviewed journals such as *Neuroscience*, *Frontiers in Neuroscience*, *Frontiers in Behavioral Neuroscience*, *Evidence-Based Complementary and Alternative Medicine*, and successfully obtained funding to conduct research on renal medicine and mental health.