

# Concerns and mental health of teachers from digitally underdeveloped countries regarding the reopening of schools after the first wave of the COVID-19 pandemic

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## Abstract.

**BACKGROUND:** Torn between the decision to return to school classrooms or continue holding online classes during COVID-19, teachers around the world feel great uncertainty.

**OBJECTIVE:** Bearing in mind that the study of mental health during the pandemic is of great importance for vulnerable categories, and given the role of teachers in society, the aim of this research is to assess teachers' concerns and anxiety before the start of the school year, and also to examine the factors related to them and propose measures in line with the results.

**METHODS:** The study was conducted as a cross-sectional study before the start of the 2020/2021 school year. The research sample consisted of 286 teachers. For the purposes of this research, a special questionnaire was constructed consisting of a general questionnaire and a Generalized Anxiety Disorder 7-item scale (GAD-7).

**RESULTS:** The strongest predictor of a teacher's answer that they were concerned about the reopening of schools was their concern for their own life and health and for the life and health of their family members, followed by the amount of information received about COVID-19, and, finally, older age. Only 2% of teachers had mild anxiety.

**CONCLUSIONS:** This research indicated that it is necessary to examine in more detail the degree of teachers' concern and its impact on their functionality and work process. It is also necessary to repeat the research on the mental health status of teachers and implement procedures in the form of a regular screening program of the mental health status of teachers or implement procedures of support in concern management.

Keywords: COVID-19, teachers, mental health, concerns, anxiety

## 1. Introduction

The situation caused by the COVID-19 pandemic is unique in the history of the world so far in terms of both the manner and speed of its occurrence, as

well as in terms of its global scope and consequences. The outbreak of the virus has dramatically impacted people's everyday lives, their family lives, political situations, and safety [1]. The pandemic has created a new crisis of human development by hitting all its constituent elements: the economy, health, education. In a situation that poses an obstacle and effects a significant change that interferes with normal work and causes another phenomenon as its consequence [2], the question of providing a minimum

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41 for the functioning of society and its institutions  
42 arises. What is certain is that the pandemic has had  
43 disproportionately greater consequences for unstable  
44 and underdeveloped countries [3], in all other areas  
45 of social policy and economics as well as in education  
46 [4, 5].

47 In situations of crises, no social institution, includ-  
48 ing the school, is spared from destruction. One of  
49 the priorities is to secure the teaching process in  
50 educational institutions with strict and mandatory  
51 protection of students, teachers and staff. The basic  
52 role of educational institutions is to ensure stability  
53 because both students and staff experience difficult  
54 situations outside the teaching context [6]. In times  
55 of social crises, educational institutions must achieve  
56 the planned goals and outcomes at least to a minimal  
57 extent. Teachers are required to model the teaching  
58 process and act beyond their traditional understand-  
59 ings of the overall teaching process organization,  
60 causing the emergence of a range of problems primar-  
61 ily related to curriculum transformation and training  
62 in the use of IT technologies [7]. Torn between the  
63 decision to return to school classrooms or continue  
64 holding online classes, teachers around the world feel  
65 great uncertainty. The former endangers health and  
66 life and the latter violates the autonomy of teach-  
67 ers. In addition to health concerns about returning to  
68 classrooms, teachers are also concerned that coron-  
69 avirus safety measures will interfere with teaching  
70 and learning [8]. Teachers feel that they are not  
71 responsible for key questions about how schools  
72 will implement sanitary and epidemiological mea-  
73 sures and how they will ensure physical and social  
74 distancing among students and prevent the further  
75 spread of the virus. A national survey of the second  
76 largest teachers' union, the American Federation of  
77 Teachers, shows that 3 out of 4 teachers said they  
78 were comfortable returning to school if certain pre-  
79 cautions were met [9]. In this pandemic context,  
80 people with jobs that put them in physical contact  
81 with others are at the greatest risk of contracting  
82 COVID-19 [10].

83 Although there are currently many observational  
84 studies from several countries, such as models or  
85 meta-analyses that allow determining the low level  
86 of virus transmission in children compared to adults  
87 [11], age differences in infectivity have not been  
88 fully investigated [12]. Findings from several stud-  
89 ies investigating contact among the infected suggest  
90 that children may be less contagious than adults [13],  
91 but the strength of this evidence is weak and some  
92 of the relevant studies were conducted when schools

were closed [12]. It was also difficult for researchers  
to initially study virus transmission in children, as  
most schools switched to online learning when many  
states launched locking measures [14]. Furthermore,  
teachers' concerns are also caused by switching to  
online learning because it means that many teachers  
spend much more energy figuring out how to work  
with new technologies and adapt their curriculum,  
instead of focusing on the content they teach [14].  
Another issue in a series of problems is that teachers  
had to prepare for both scenarios before the start of  
the school year. The fact that younger school-age chil-  
dren cannot reliably maintain physical distance and  
that teachers cannot apply distance and teach at the  
same time, and the fact that classes that require stu-  
dents to sit in one place, look straight ahead, and work  
independently violate good evidence-based teaching  
practices [12] further strengthen teachers' concern  
about reopening schools. Goldstein and Shapiro warn  
that school systems struggling to address the finan-  
cial and logistical challenges of safe reopening must  
carefully investigate and address teacher concerns  
[13].

To date, a large number of studies have been con-  
ducted on the emotional consequences of the pan-  
demic and its impact on the mental health of workers  
and the general population [15–21], whereas sig-  
nificantly fewer studies have been conducted with  
regard to the teacher population [22]. However, there  
is scientific evidence to suggest that mental strain is  
significant in the teacher population [23].

For elementary and secondary school teachers  
working in the distance education system imple-  
mented during the pandemic, it might also be sup-  
posed that musculoskeletal system and psychosocial  
problems may be experienced, as seen in studies con-  
ducted with people working at computers for a long  
time [24].

According to previous data from the literature, the  
factors related to psychological burdens, concern and  
anxiety are not fully known. Some studies have indi-  
cated that women, people of poorer socioeconomic  
status, from rural areas, as well as those at higher risk  
for COVID-19, have a higher prevalence of anxiety,  
but these results are not consistent in the literature  
[20].

Bearing in mind that the study of mental health  
during the pandemic is of great importance for other  
activities and vulnerable categories [25, 26], and  
given the role of teachers in society, the aim of this  
research is to assess teachers' concerns about reopen-  
ing schools and their anxiety before the start of the

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145 school year, as well as to examine the factors related  
146 to teachers' concerns and anxieties about reopening  
147 schools and to propose measures in line with the  
148 results.

## 149 2. Methods

150 The study was conducted in August 2020 as a  
151 cross-sectional study before the start of the 2020/  
152 2021 school year. According to the Law on Primary  
153 Education and Upbringing and the Law on Secondary  
154 Education and Upbringing in the Republic of Srpska,  
155 before the beginning of the school year, all teachers  
156 are obliged to report for a preventive medical exam-  
157 ination to the occupational medicine services. The  
158 research was conducted in the Institute for Occupa-  
159 tional and Sports Medicine of the Republic of Srpska  
160 (Banja Luka) and the regional centres during pre-  
161 ventive examinations. The consent of the director of  
162 the Institute for Occupational and Sports Medicine  
163 of the Republic of Srpska was obtained for conduc-  
164 ting the research.

### 165 2.1. Study population and sample

166 The aim of the research was explained to the teach-  
167 ers, and the research was conducted anonymously and  
168 voluntarily, and the teachers who participated in the  
169 research signed the informed consent for participa-  
170 tion.

171 According to the latest data from the Institute of  
172 Statistics of the Republic of Srpska, the total num-  
173 ber of teachers in the Republic of Srpska is 12078, of  
174 which 8334 (69%) are female, and 5994 (49.63%) are  
175 under the age of 40. 8134 (67.35%) are employed in  
176 primary schools, of which 5848 (71.90%) are female.  
177 The total number of teachers in primary schools under  
178 the age of 40 is 4182 (51.41%). 3944 (32.65%) teach-  
179 ers are employed in secondary schools, of which 2486  
180 (63.03%) are female. The total number of teachers  
181 under the age of 40 in secondary schools is 1821  
182 (46.17%). Classroom teaching is held by primary  
183 school teachers in lower grades I-V and the total  
184 number of teachers in these grades is 3247 (26.88%),  
185 of which 2850 (87.77%) are female. All teachers in  
186 secondary schools have subject teaching classes [27,  
187 28].

188 Due to the COVID-19 pandemic, the decision of  
189 the relevant Ministry extended the period of preven-  
190 tive examinations for teachers, so instead of reporting  
191 for examinations in September, teachers had a period

192 until the end of December 2020 to do this. Therefore,  
193 in the period in which this research was conducted, a  
194 smaller number of teachers applied for a preventive  
195 examination, and a total of 400 questionnaires were  
196 distributed, of which 286 (71.5%) were filled out in  
197 their entirety.

### 198 2.2. Material

199 For the purposes of this research, a special ques-  
200 tionnaire was constructed consisting of a general  
201 questionnaire and a standardized scale for self-ass-  
202 essment of the degree of anxiety – General Anxiety  
203 Disorder (GAD-7; Supplementary Materials). The  
204 general questionnaire consisted of standard socio-  
205 demographic data (gender, age, place of residence,  
206 type of teaching), data on the household, personal  
207 health and health status of family members. Also,  
208 the questionnaire contained questions related to the  
209 data on COVID-19, i.e., whether they or any of their  
210 family members were in contact with the infected  
211 or were infected, whether they followed the recom-  
212 mendations for control of the infection issued by  
213 the authorities, whether they followed the informa-  
214 tion, whether they were satisfied with the available  
215 information on COVID-19, and whether they had  
216 any concerns for their life and health and the life  
217 and health of their family members because of the  
218 pandemic. As a special variable, teachers' concern  
219 about the reopening of schools was examined. One  
220 of the questions referred to their opinion on how  
221 classes should take place in the upcoming school year  
222 in pandemic conditions. With the permission of the  
223 author, we used a GAD-7 scale that had already been  
224 translated into Serbian and validated. Exploratory  
225 and confirmatory factor analyses have confirmed the  
226 exceptional psychometric properties of the GAD 7-  
227 item scale [29]. The GAD-7 scale consists of seven  
228 theses expressing personal views in the last two  
229 weeks, and the answers are presented in the form of  
230 a four-point Likert scale. A score of 5 or higher indi-  
231 cates the presence of anxiety and is graded as mild  
232 [5–9], moderate [10–14], and severe anxiety (15 and  
233 higher) [30].

### 234 2.3. Statistical data analysis

235 Data were analyzed using the IBM SPSS Statistics  
236 25 software, and statistical significance was shown  
237 for  $p < 0.05$ . The methods of descriptive and infer-  
238 ential statistics were used in the article. From the  
239 methods of descriptive statistics, we used measures of

central tendency (arithmetic mean and median), measures of variability (standard deviation) and relative numbers. The Pearson Chi-square test or Fisher's test was used to assess the difference between categorical variables. Logistic regression was used in the paper to estimate the predictive value of the dichotomous categorical variable of concerns about reopening schools.

### 3. Results

286 teachers participated in the research, of which the larger fraction consisted of female teachers (71%). More than half of the teachers were aged 31–50 (65.1%). Male teachers were more often over 40 years of age (68.7%) and this is a statistically significant difference ( $p < 0.05$ ). Subject teachers (60.1%) mainly participated in the research. Female teachers more often performed the class type of teaching ( $p < 0.05$ ). Socio-demographic characteristics of teachers are shown in Table 1.

A higher percentage of teachers stated that they were healthy (89.2%) as well as their family members (88.5%). Also, a higher percentage of teachers did not have COVID-19 until the research period (95.1%). The largest number of teachers complied with all measures and recommendations for the prevention and control of COVID-19 (95.2%) and followed the information on COVID-19 (94.1%). In most cases, teachers were dissatisfied with the measures taken by the authorities to prevent and control COVID-19

(93%). Compared to the available information on COVID-19, a higher percentage of teachers reported that they were dissatisfied with the available data on COVID-19 (90.9%). A higher percentage of teachers were concerned for their life and health and for the life and health of their family members due to the COVID-19 pandemic (76.9%). Female teachers were more often concerned (84.7%) and this is a statistically significant difference ( $p < 0.001$ ). More than half of the teachers expressed concern about reopening schools (76.9%). Female teachers were more often concerned about reopening schools compared to male teachers (80.8% compared to 59%) and this is a statistically significant difference ( $p < 0.001$ ). However, the largest percentage of teachers believe that the school year should be organized in the form of regular classes (81%). However, a statistically significant difference was found in relation to gender ( $p < 0.05$ ). Male teachers compared to female teachers more often thought that classes should be organized online (7.2% compared to 3%) or combined (20.5% compared to 12.3%). Table 2 shows data on the health status of respondents and family members, satisfaction and compliance with preventive measures, available information, and satisfaction with information about COVID-19.

Table 3 shows data on the respondents' concern for their life and health and the life and health of their family members, and it also shows the respondents' concerns about reopening schools in the time of the pandemic.

Table 1  
Socio-demographic characteristics of teachers

Socio-demographic characteristics	Sex			<i>p</i>	Type of teaching		
	All	Male	Female		Classroom teaching	Subject teaching	<i>p</i>
	<i>N</i> (%)	<i>N</i> (%)	<i>N</i> (%)		<i>N</i> (%)	<i>N</i> (%)	
Sex							
Male	83 (29)	/	/		22 (19.3)	61 (35.3)	<b>.003</b>
Female	203 (71)	/	/		92 (80.7)	111 (64.5)	
Age (years)							
< 30	19 (6.6)	3 (3.6)	16 (7.9)	<b>0.040</b>	5 (4.4)	14 (8.1)	0.266
31–40	92 (32.2)	23 (27.7)	69 (34)		33 (28.9)	34.3	
41–50	94 (32.9)	24 (28.9)	70 (34.5)		44 (46.1)	29.1	
> 51	81 (28.3)	33 (39.8)	48 (23.6)		32 (28.1)	49 (28.5)	
Residence							
Rural	120 (42.0)	28 (33.7)	92 (45.3)	0.086	49 (43.0)	71 (41.3)	0.807
Urban	166 (58.0)	55 (66.3)	111 (54.7)		65 (57.0)	101 (58.7)	
Household							
Alone	21 (7.3)	8 (9.6)	13 (6.4)	0.330	6 (5.3)	15 (8.7)	0.356
With family	265 (92.7)	75 (90.4)	190 (93.6)		108 (94.7)	157 (91.3)	
Type of teaching							
Classroom teaching	114 (39.9)	22 (26.5)	92 (45.3)	<b>0.003</b>	/	/	
Subject teaching	172 (60.1)	61 (73.5)	111 (54.7)		/	/	

Table 2  
Health status, preventive measures and information on COVID-19

Health condition, preventive measures and information about COVID-19	Sex				Type of teaching		
	All	Male	Female	<i>p</i>	Classroom teaching	Subject teaching	<i>p</i>
	<i>N</i> (%)	<i>N</i> (%)	<i>N</i> (%)		<i>N</i> (%)	<i>N</i> (%)	
Personal health							
Healthy	255 (89.2)	72 (86.7)	183 (90.1)	0.346	105 (92.1)	150 (87.7)	0.325
Existence of disease	25 (8.8)	9 (10.8)	16 (7.9)		9 (7.9)	21 (12.3)	
The health of the family							
Healthy	253 (88.5)	75 (90.4)	178 (87.7)	0.520	103 (90.4)	150 (87.2)	0.455
Existence of disease	33 (11.5)	8 (9.6)	25 (12.3)		11 (9.6)	22 (12.8)	
Contact with the COVID-19							
No	270 (94.4)	79 (95.2)	191 (94.1)	0.482	107 (93.9)	163 (94.8)	0.468
Yes	16 (5.6)	4 (4.8)	12 (5.9)		7 (6.1)	9 (5.2)	
Earlier COVID-19 status							
Negative	272 (95.1)	81 (97.6)	191 (94.1)	0.224	109 (95.6)	166 (96.5)	0.759
Positive	12 (4.2)	1 (1.2)	11 (5.4)		5 (1.7)	6 (3.5)	
Compliance with measures							
No	7 (2.4)	4 (4.8)	3 (1.5)	0.111	2 (1.8)	5 (1.7)	0.706
Yes	279 (95.2)	79 (95.2)	200 (98.5)		112 (98.2)	167 (97.1)	
Satisfaction with preventive measures by the authorities							
Dissatisfied	266 (93.0)	74 (89.2)	192 (94.6)	0.087	108 (94.7)	158 (91.9)	0.246
Satisfied	20 (7.0)	9 (10.8)	11 (5.4)		6 (5.3)	14 (8.1)	
Informed about COVID-19							
No	17 (5.9)	8 (9.6)	9 (4.4)	0.082	4 (3.5)	13 (7.6)	0.121
Yes	269 (94.1)	75 (90.4)	194 (95.6)		110 (96.5)	159 (92.4)	
Satisfaction with information about COVID-19							
Dissatisfied	260 (90.9)	71 (85.5)	189 (93.1)	<b>0.040</b>	108 (94.7)	152 (88.4)	<b>0.049</b>
Satisfied	26 (9.1)	12 (14.5)	14 (4.9)		6 (5.3)	20 (7.0)	
Way of teaching							
Online	12 (4.2)	6 (7.2)	6 (3.0)	<b>0.042</b>	5 (4.4)	7 (4.1)	0.645
Face-to-face	232 (81.1)	60 (72.3)	172 (84.7)		95 (83.3)	9.7	
Combined	42 (14.7)	17 (20.5)	25 (12.3)		14 (12.3)	28 (16.3)	

Table 3  
Teacher concerns

Teacher concerns	Sex				Type of teaching		
	All	Male	Female	<i>p</i>	Classroom teaching	Subject teaching	<i>p</i>
	<i>N</i> (%)	<i>N</i> (%)	<i>N</i> (%)		<i>N</i> (%)	<i>N</i> (%)	
Concerns for life and health of themselves and family members							
No	66 (23.1)	35 (42.2)	31 (15.3)	<b>0.000</b>	25 (21.9)	41 (23.8)	0.410
Yes	220 (76.9)	48 (57.8)	172 (84.7)		89 (78.1)	131 (76.2)	
Concerns for reopening schools							
No	73 (25.5)	34 (41.0)	39 (19.2)	<b>0.000</b>	28 (24.6)	45 (26.2)	0.436
Yes	213 (74.5)	49 (59.0)	164 (80.8)		86 (75.4)	127 (3.8)	

On the GAD-7 scale, the arithmetic mean of the examined population is 0.64 (SD 1.22, rank 0–9), which indicates a normal degree of anxiety in the examined population. Only 2% of teachers had mild anxiety. Moderate and severe anxiety was not reported. Table 4 shows anxiety in the study population.

Binary logistic regression was conducted to assess the impact of multiple factors on the likelihood that respondents would say that they were concerned about reopening schools during the pandemic. Following previous research, the initial variables obtained from the empirical and theoretical approach

Table 4  
Anxiety

Anxiety	Sex			<i>p</i>	Type of teaching		<i>p</i>
	All	Male	Female		Classroom teaching	Subject teaching	
	<i>N</i> (%)	<i>N</i> (%)	<i>N</i> (%)		<i>N</i> (%)	<i>N</i> (%)	
No	280 (97.9)	82 (98.8)	198 (97.5)	0.440	112 (98.2)	168 (97.7)	0.547
Low	6 (2.1)	1 (1.2)	5 (2.5)		2 (1.8)	4 (2.3)	
Moderate	0	0	0		0	0	
High	0	0	0		0	0	

Table 5  
Variables

Variable (↑-increases probability)	Variable selection Theoretical approach (T) Empirical approach (E)	Tolerance	VIF
Sex (female)	T	0.866	1.55
Age (50 and above)	T	0.903	1.107
Residence (urban)	E	0.964	1.037
Household (with family)	E	0.914	1.094
Type of teaching (subject teaching)	E	0.937	1.067
Personal health (existence of disease)	T, E	0.936	1.068
The health of the family (existence of disease)	T, E	0.871	1.148
Contact with the COVID-19 positive (close contact)	E	0.687	1.455
Earlier COVID-19 status (negative)	T, E	0.678	1.474
Compliance with measures (yes)	E	0.681	1.469
Satisfaction with preventive measures by the authorities (dissatisfied)	E	0.681	1.468
Informed about COVID-19			
Satisfaction with information about COVID-19 (dissatisfied)	E	0.648	1.543
Concerns for life and health of themselves and family members (the existence of concerns)	E	0.755	1.325

in the previous part of this article were selected for the model. All selected variables are of the dichotomous type, with the exception of the variable 'age' and are shown in Table 5. Before being included into the model for the purpose of a more adequate interpretation of results, the variable 'age' was turned into a dichotomous variable (under the age of 50 = 0, over the age of 50 = 1).

The model contained 14 variables. Before the start of the data analysis, the correctness of the data was checked and it was determined that no data disturbed the correctness of the final result. It was also determined that there was no multicollinearity, or in other words, there were no strong intercorrelations of predictor variables. Given the fact that, in formal terms, the procedure of SPSS logistic regression did not have a collinearity test, we used collinearity diagnostics from the linear regression.

The values of the Tolerance indicator ranged from 0.65 to 0.96, and the VIF from 1.03 to 1.47, which

indicates that the variables do not have high correlations with other variables in the model. The results of the first step of logistic regression are shown in Table 6.

The whole model with all predictors was statistically significant  $\chi^2(13, N = 286) = 97.94, p < 0.001$ , which shows that the model distinguishes between respondents who did and those who did not answer that they were concerned about reopening schools. Based on the Cox and Snell R Square (.290) and Nagelkerke R Square (.472) we calculated that the model with all predictors explains between 29.0% and 42.7% of the variance and accurately classifies 83.6% of cases. The Omnibus test showed that the tested model of prediction variables gives a good explanation of the outcome variable (Sig = 0.000,  $H^2 = 92.15, df = 3$ ). In addition, the Hosmer-Lemeshow test enabled us to establish the significance of the model (Sig. = 0.921,  $H^2 = 0.492, df = 3$ ).

Table 6

Logistic regression step 1: impact of multiple factors on the likelihood that respondents would respond to concern about reopening school in a pandemic

Variables	B	S.E.	Wald	df	Sig.	EXP(B)	95% C.I.for	
							Lower	Upper
Sex (female)	0.680	0.386	3.101	1	0.078	1.974	0.926	4.206
Age (50 and above)	1.236	0.621	3.953	1	0.047	3.440	1.018	11.628
Residence (urban)	0.314	0.353	0.788	1	0.375	1.369	0.685	2.736
Type of teaching (subject teaching)	0.255	0.362	0.494	1	0.482	1.290	0.634	2.624
Household (with family)	0.693	0.621	1.245	1	0.264	2.000	0.592	6.756
Personal health (existence of disease)	0.073	0.601	0.015	1	0.903	1.076	0.331	3.497
The health of the family (existence of disease)	-0.464	0.565	0.675	1	0.411	0.629	0.208	1.902
Contact with with the COVID-19 positive (close contact)	0.702	0.950	0.545	1	0.460	2.017	0.313	12.982
Earlier COVID-19 status (negative)	-0.556	0.892	0.389	1	0.533	0.573	0.100	3.295
Compliance with measures (yes)	1.733	1.484	1.363	1	0.243	5.659	0.309	103.788
Satisfaction with preventive measures by the authorities (dissatisfied)	-0.264	0.709	0.139	1	0.709	0.768	0.191	3.081
Infotmation about COVID-19 (yes)	2.253	0.846	7.092	1	0.008	9.519	1.813	49.982
Satisfaction with information about COVID-19 (dissatisfied)	-0.533	0.636	0.702	1	0.402	0.587	0.169	2.040
Concerns for life and health of themselves and family members (the existence of concerns)	2.413	0.390	38.202	1	0.000	11.170	5.197	24.011

Table 7

Logistic regression step 11: Impact of multiple factors on the likelihood that respondents would respond to concern about reopening school in a pandemic

Variables	B	S.E.	Wald	df	Sig.	EXP(B)	95% C.I.for	
							Lower	Upper
Age (50 and above)	1.203	0.564	4.553	1	0.033	3.330	1.103	10.055
Concerns for life and health of themselves and family members (the existence of concerns)	2.601	0.351	55.040	1	0.000	13.480	6.780	26.800
Informed about COVID-19	2.315	0.746	9.621	1	0.002	10.121	2.344	43.695

Only three variables made a unique statistically significant contribution to the model (age of respondents, concerns for their life and health and the life and health of their family members, and available information on COVID-19). We further applied the stepwise analysis backward, i.e., we gradually removed the independent variables from the model. Removal was performed in 11 steps. In each step, one variable with the lowest contribution to the model was removed. Removal proceeded in the following order: personal health (sig. 903), satisfaction with preventive measures (sig. 713), previous COVID-19 status (sig. 564), contact with COVID-19 positive persons (sig. 616), workplace (sig. 490), satisfaction with information about COVID-19 sig. 540), family health (sig. 411), residence (sig. 335), compliance with measures (sig. 277), household (sig. 242), sex (sig. 104).

The final model with three predictors was statistically significant  $c^2(3, N=286) = 89.53, p < 0.001$ . Based on the Cox and Snell R Square (.269) and

Nagelkerke R Square (.396), we calculated that the model as a whole explains between 26.9% and 39.6% of the variance and accurately classifies 83.2% of the cases. The final model with three predictors, which was checked with the Omnibus test, was statistically significant (Sig. = 0.000,  $H^2 = 89.53$ , df-3), and it was also checked with the Hosmer-Lemeshow test (Sig. = 0.661,  $H^2 = 0.829$ , df-2). The strongest predictor of a teacher's answer that they were concerned about the reopening of schools was their concern for their own life and health and for the life and health of their family members, followed by the amount of information received about COVID-19, and, finally, older age (50 and above).

#### 4. Discussion

This is the first study in the Republic of Srpska to assess the mental health of teachers during a

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388 pandemic. The study was conducted as a cross-  
389 sectional study in August before the start of the  
390 school year 2020/2021. Having in mind the COVID-  
391 19 pandemic, due to which the working conditions  
392 of teachers have changed, and bearing in mind that,  
393 during their work, teachers are inevitably exposed to  
394 contact with a large number of people, from children  
395 to colleagues and even parents, thus being at a higher  
396 risk of infection, it was assumed that they would be  
397 worried about the beginning of the new school year,  
398 that is, that they would show a higher degree of anx-  
399 iety. Therefore, a survey was conducted before the  
400 beginning of the school year to assess the concerns  
401 and anxiety of teachers, as well as to suggest further  
402 measures to preserve and improve the mental health  
403 of this vulnerable population.

404 Female teachers participated in the research more  
405 often (71%) (Table 1), which corresponds to the pop-  
406 ulation count of teachers in the Republic of Srpska  
407 (Institute of Statistics of the Republic of Srpska,  
408 2020a, 2020b). A slight difference was observed in  
409 relation to the age and type of teaching of teachers in  
410 the sample and in the teacher population in the Repub-  
411 lic of Srpska. Teachers over the age of 40 participated  
412 more often in the survey (56.7%) (Table 1), while  
413 according to the Institute of Statistics of the Republic  
414 of Srpska, the percentage of teachers over the age of  
415 40 is 49.63% (Institute of Statistics of the Republic  
416 of Srpska, 2020a, 2020b). 60% of subject teachers  
417 participated in the research (Table 1), and in the pop-  
418 ulation of subject teachers in the Republic of Srpska  
419 they had a slightly higher percentage (73.12%) (Insti-  
420 tute of Statistics of the Republic of Srpska, 2020a,  
421 2020b). The reasons why a higher percentage of older  
422 teachers accepted the invitation to participate in the  
423 research are unknown. The results of this research  
424 indicate that teachers older than 40 were more likely  
425 to report that they were concerned about their life and  
426 health and the life and health of their family members  
427 (61.2%), and the same percentage of teachers showed  
428 concern about reopening schools. It is possible that a  
429 higher percentage of them underwent the preventive  
430 examination precisely because they were concerned  
431 for their own life and health.

432 A substantial number of teachers reported that they  
433 were concerned about reopening schools during the  
434 pandemic (74.5%), with female teachers reporting  
435 concern more often (80.8%), which is a statistically  
436 significant difference ( $p < 0.001$ ) (Table 3). A statis-  
437 tically significant difference was not found in the  
438 concerns of teachers relating to the type of teaching  
439 they were engaged in (Table 3). We did not find

440 data from other countries to compare these results  
441 with, while studies in the general population showed  
442 a moderate degree of concerns in the studied pop-  
443 ulations, and they also showed that women are  
444 more prone to concerns, their concerns being mainly  
445 related to the possibility of getting infected, their  
446 loved ones dying, becoming isolated, or being dis-  
447 criminated against (31–33). Female teachers were  
448 statistically significantly more dissatisfied with the  
449 information (Table 2) from the media about COVID-  
450 19, which may be the result of differences in concerns  
451 between the sexes, or simply because females are  
452 more prone to emotional reactions. Similar results  
453 revealing that females are more prone to anxiety as  
454 well as stress and other mental disorders can be found  
455 in other items of literature [20, 34, 35], and therefore,  
456 in the following period, it follows naturally that spe-  
457 cial attention should be paid to the mental health of  
458 this sensitive group.

459 Bearing in mind that a significant number of teach-  
460 ers reported that they were concerned about their life  
461 and health and the life and health of their families  
462 (76.9%) (Table 3), we assume that the reported con-  
463 cern about reopening schools is the result of concerns  
464 about the possibility of getting infected and their  
465 loved ones dying. However, despite that, a higher  
466 percentage of teachers gave the information that they  
467 wanted classes to be held regularly (84.7%) (Table 2).  
468 Similar results were obtained by the authors in a sur-  
469 vey conducted in the population of teachers in high  
470 schools, where more than half of teachers expressed a  
471 desire to return to work [22]. Stachteas and Stachteas,  
472 for instance, provided such results, which is expected  
473 given that online teaching requires teachers to act  
474 beyond their traditional understandings of the teach-  
475 ing process, and further questioned the ability to use  
476 IT technology [7].

477 According to the results, 93% of teachers are dis-  
478 satisfied with the measures taken by the authorities  
479 in order to combat the pandemic (Table 2), while  
480 the concerns for life and health proved to be a  
481 significant variable associated with concerns about  
482 reopening schools (Table 6). Research in the fol-  
483 lowing period should be conducted on measures and  
484 available means of protection in schools; i.e., in accor-  
485 dance with the results, protection measures should  
486 be improved, which would inevitably reduce the  
487 level of teachers' concerns and their psychological  
488 burden.

489 Another variable in this study, which had a statisti-  
490 cally significant contribution to the outcome variable  
491 of concerns about reopening schools, is also exposure



492 to information from the media about COVID-19  
493 (Table 6). The results of this research showed that  
494 the largest percentage of teachers followed the infor-  
495 mation on COVID-19 (94%) (Table 2). They were  
496 generally dissatisfied with the available information  
497 (90.9%), with female teachers (93%) and primary  
498 school teachers (94.7%) stating that they were more  
499 dissatisfied than male and subject teachers ( $p < 0.05$ )  
500 (Table 2). Regarding the type of teaching, this result  
501 is probably related to the percentage share of the  
502 female teacher population in the number of primary  
503 school teachers in the examined sample (80.7%),  
504 since women teachers were significantly more dissatis-  
505 fied (Table 2). According to these results, research  
506 on the impact of the media should be conducted in  
507 the future, and if these results are confirmed, it is nec-  
508 essary to take measures to reduce media exposure to  
509 COVID-19.

510 Teacher age (>50 years) is a variable that also  
511 had a statistically significant contribution to the con-  
512 cerns about reopening schools (Table 6). This can be  
513 explained by the fact that mortality from COVID-19  
514 is higher in the elderly population, although data from  
515 other studies have indicated that younger people are  
516 more worried. The authors explained this by possibly  
517 better emotional regulation and coping mechanisms  
518 in the elderly population [32].

519 Given that there is evidence that concerns are asso-  
520 ciated with consequences in the form of increased  
521 risk of cardiovascular disease, poorer physical health,  
522 decline in learning and memory [32], depressive  
523 symptoms [36] and other negative effects on mental  
524 health [35], and that a significant predictor of concern  
525 is the existence of dysfunctional coping mechanisms  
526 [31], and that the study indicated a significant preva-  
527 lence of concerns in the teacher population, it follows  
528 naturally that additional research on concern-related  
529 factors in this population is needed. Results of this  
530 research indicate that teachers need more support  
531 in concern management. One of the interventions  
532 could be to provide online psychological support to  
533 teachers.

534 However, a study is worth mentioning which indi-  
535 cated that the concern is related to the protective  
536 tendency of citizens to respect preventive measures  
537 and thus protect themselves and the environment [33,  
538 37], and therefore it is also necessary to examine in  
539 more detail the degree of concern in teachers and its  
540 impact on their functionality, life and work. That is,  
541 it is necessary to implement procedures that would  
542 regularly monitor the mental health of teachers, for a  
543 timely preventive response.

544 In the examined sample, teachers did not show  
545 anxiety; only 2% of teachers had a mild degree of  
546 anxiety. We found one study conducted in China that  
547 examined anxiety in a large population of teachers  
548 and the prevalence of anxiety was about 13% [38].  
549 However, the results cannot be compared because,  
550 by the research period, China had already been sig-  
551 nificantly affected by the pandemic. The results of  
552 the research showed that mental disorders during the  
553 pandemic were related to the measures taken, loss  
554 of control, and the number of the infected and dead  
555 [39]. Bearing in mind that, by the research period,  
556 the spread of infection in the Republic of Srpska  
557 had been partially under control, one of the assump-  
558 tions is that because of this, teachers showed a lower  
559 degree of anxiety. The results of this study are in  
560 line with this assumption: only 5.6% of teachers and  
561 their family members had contact with COVID-19  
562 positive persons, and 4.2% were positive (Table 2).  
563 Also, the difference in mentality between the pop-  
564 ulations should be taken into account. However, it  
565 should be mentioned that the results of the study  
566 in the Republic of Srpska are contradictory to the  
567 results of the study in the general population. Accord-  
568 ing to the data, the prevalence of anxiety associated  
569 with COVID-19 in the general population is 15%,  
570 which is a significant difference compared to the  
571 general population under normal conditions (3.6%)  
572 [39]. The results of the second meta-analysis showed  
573 that the prevalence of anxiety in the general popula-  
574 tion is as high as about 28–39% [20]. However, the  
575 results of this research should be taken with caution.

576 It can be assumed that teachers who have impaired  
577 mental health refused to participate in the research  
578 because the response rate was 71.5%. Also, having  
579 in mind that the period of preventive examinations  
580 was extended until December, it can be assumed that  
581 anxious teachers did not report immediately for the  
582 examination, avoiding contact with the health ser-  
583 vice, and that they were therefore not included in this  
584 research. Also, it should be emphasized that teach-  
585 ers are university-educated people and that they are  
586 therefore capable of recognizing socially “desirable”  
587 answers, which is why it can be assumed that the  
588 tendency to write socially desirable answers could  
589 also influence the result of anxiety self-assessment.  
590 Teachers who are healthy (89.2%) and whose fam-  
591 ily members are healthy (88.5%) participated in the  
592 research, and it can be assumed that this could have  
593 had an impact on the research results, given that  
594 they are not a vulnerable category for COVID-19.  
595 It is possible that teachers who are ill or whose

596 family members are ill did not participate in this  
 597 research, because they prolonged their attendance at  
 598 the periodic examination. Also, a higher percentage  
 599 of teachers before the research did not have contact  
 600 with a patient or someone tested positive for COVID-  
 601 19 (94.4%) and were not ill. Due to the low prevalence  
 602 of anxiety in the examined sample, we did not con-  
 603 duct statistical tests to examine the correlation of the  
 604 examined variables with anxiety. Bearing in mind that  
 605 the peak of the epidemic in the Republic of Srpska  
 606 was during the autumn months, when there was a sud-  
 607 den interruption in online learning, which resulted in  
 608 protests by teachers and parents, there is a need to  
 609 repeat this research as soon as possible and compare  
 610 the results.

## 611 5. Limitations

612 The results of this study should be interpreted fol-  
 613 lowing the methodological limitations of the study.  
 614 One of the limitations of this research is the design of  
 615 the study – a cross-sectional study that prevents the  
 616 formation of a cause-and-effect relationship. There-  
 617 fore, future research should be longitudinal. Also, a  
 618 weakness of this research is the number of teach-  
 619 ers who participated in the research, that is, 2.37%  
 620 of the teacher population. A significant limitation of  
 621 this research is the use of self-reported measures, and  
 622 more objective measures should be used in future  
 623 studies to minimize bias. Also, the initial variable  
 624 of concern about reopening schools was measured  
 625 using only one question, so in the next research a  
 626 standardized scale should be used.

627 Despite these limitations, given that the number  
 628 of studies in the teacher population has been limited  
 629 so far, the results of this study offer some input to  
 630 researchers in understanding the psychological and  
 631 mental health status of teachers at the time of the  
 632 pandemic. This research primarily indicated the high  
 633 prevalence of concern due to work in pandemic con-  
 634 ditions, and following the results of other research, it  
 635 suggested the importance of timely and regular mon-  
 636 itoring of the mental health status of this population.  
 637 It partially indicated factors associated with a high  
 638 prevalence of concern, such as exposure to media  
 639 information, and the results could be used in plan-  
 640 ning further research and interventions. Also, one of  
 641 the strengths of this research is an adequate response  
 642 rate, over 70%, as well as the use of a standardized and  
 validated companion to assess the degree of anxiety.

## 643 6. Conclusion

644 Having in mind the high prevalence (74.5%) of  
 645 teacher concern about reopening schools, this res-  
 646 earch indicated that in the following period it would  
 647 be necessary to examine in more detail the degree of  
 648 teachers' concern and its impact on their function-  
 649 ality and work process. It is also necessary to repeat  
 650 the study on the mental health status of teachers and  
 651 possibly, due to the results of other studies, to repeat  
 652 the study on the impact of the pandemic on mental  
 653 health in order to be able to implement procedures  
 654 in the form of a regular screening program of teach-  
 655 ers' mental health, for a timely preventive response.  
 656 Screening could be carried out by the psychological  
 657 and social services of schools, which would regularly  
 658 monitor the mental health of teachers, for example, at  
 659 least at the beginning and at the end of each semester  
 660 over the course of the epidemic, or it would be pos-  
 661 sible to introduce anonymous online psychological  
 662 support, which would be available all the time.

663 In accordance with the results stating that 93% of  
 664 teachers are dissatisfied with the measures taken by  
 665 the authorities in order to combat the pandemic, and  
 666 given the fact that teachers' concern for their life and  
 667 health and for the life and health of their family mem-  
 668 bers has proven to be a significant variable related to  
 669 concerns about reopening schools, a survey on mea-  
 670 sures and available means of protection in schools  
 671 is needed, and once the survey results are obtained,  
 672 it is necessary to increase the safety and satisfaction  
 673 of teachers, which would reduce their psychological  
 674 burden.

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## 685 Conflict of interest

686 No potential conflict of interest was reported by  
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## Supplementary data

The questionnaire is available from <https://dx.doi.org/10.3233/WOR-210885>.

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