Factors associated with fear of COVID-19 prior to returning to in-person classes at a Peruvian medical school

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ABSTRACT

Objective: To identify the factors associated with fear of COVID-19 prior to returning to in-person classes among medical students.
Materials and methods: An observational, analytical and cross-sectional study. Through convenience sampling, a questionnaire was administered to 252 students from a medical school in Huancayo, Peru. The questionnaire consisted of a first section comprising the study information and informed consent, another one devoted to the sociodemographic characteristics and a last section which included validated questionnaires used in similar contexts, such as the Fear of COVID-19 Scale (FCV-19S), and a psychological questionnaire, i.e., the DASS-21 questionnaire, made up of three subscales that assess both the presence and level of depression, anxiety and stress. To determine the correlation between the scales, the Pearson correlation coefficient was used. In addition, crude and adjusted prevalence rates were calculated using generalized linear models. The significance was defined as a *p* value < 0.05.
Results: The average fear of COVID-19 score was 14.99 ± 6.32 points and 26.98 % of the students showed a high level of fear. The prevalence of depression, anxiety and stress was 30.95 %, 31.75 % and 28.57 %, respectively. The results of the crude regression analysis indicated that the factors associated with high fear were complete vaccination (cPR: 0.64), depression (cPR: 1.76), anxiety (cPR: 2.42) and stress (cPR: 2.22). Moreover, the results of the adjusted regression analysis revealed that complete vaccination (cPR: 0.65), trust in university policies and guidelines (aPR: 0.50), trust in government policies (aPR: 1.76) and anxiety (aPR: 2.18) were factors associated with high fear.
Conclusions: These results suggest that each educational institution should adopt measures and strategies to provide safe places that reduce the spread of COVID-19 and enable the development of an optimal educational environment.

Keywords: COVID-19; Fear; Depression; Anxiety; Stress; Students, Medical (Source: MeSH NLM).

Factores asociados al miedo a la COVID-19 previo al retorno a clases presenciales en una facultad de Medicina peruana

RESUMEN

Objetivo: Determinar los factores asociados al miedo a la COVID-19 en el retorno a clases presenciales en estudiantes de Medicina.
Materiales y métodos: Estudio de tipo observacional, analítico y transversal. Por medio de un muestreo por conveniencia, se aplicó un cuestionario a 252 estudiantes de una facultad de Medicina en Huancayo, Perú. Este estuvo conformado por una primera sección de información del estudio y consentimiento informado, luego por una sección de características sociodemográficas y una última que incluía cuestionarios validados y empleados en un contexto similar como el cuestionario de miedo a la COVID-19 (FCV-19S) y aspectos psicológicos como el cuestionario DASS-21, conformado por tres subsecciones, que valoran la depresión, ansiedad y estrés en presencia y nivel. Para determinar la correlación entre las escalas, se utilizó las pruebas de Pearson. Además, se calcularon las razones de prevalencia crudas y ajustadas por medio de modelos lineales generalizados. La significancia fue definida como un valor *p* <0,05.
Resultados: Se obtuvo una media del puntaje de miedo a la COVID-19 de 14,99 ± 6,32 puntos y un 26,98 % de los estudiantes mostraron un nivel alto de miedo. La prevalencia de depresión, ansiedad y estrés fue de 30,95 %, 31,75 % y 28,57 %, respectivamente. En el análisis de regresión crudo, se encontró que los factores asociados al alto miedo fueron la vacunación completa (RPc: 0,64), la depresión (RPc: 1,76), la ansiedad (RPc: 2,42) y el estrés (RPc: 2,22); mientras que, en el análisis de regresión ajustado, la vacunación completa (RPc: 0,65), la confianza en las medidas propuestas

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por la universidad (RPa: 0,50), la confianza en las medidas del estado (RPa: 1,76) y la ansiedad (RPa: 2,18) fueron los factores asociados al alto miedo.
Conclusiones: Estos resultados sugieren que cada institución educativa adquiera medidas y estrategias con el fin de brindar lugares seguros que reduzcan el contagio de la COVID-19 y en los que se pueda desarrollar un ambiente educativo óptimo.

Palabras clave: COVID-19; Miedo; Depresión; Ansiedad; Estrés; Estudiantes de Medicina (Fuente: DeCS BIREME).

INTRODUCTION

The COVID-19 pandemic forced every country to implement measures to reduce its spread, which led to changes in the economy, society, health and education. The latter has been one of the most affected fields, as governments around the world temporarily closed educational institutions of all levels to prevent transmission. In Peru, on March 12, 2020, the cancellation and postponement of the start of classes and teaching activities in public and private institutions was announced [1]. Therefore, universities adopted strategies to allow the continuity of classes through online education. On October 11, 2021, after almost two years of online education, the Ministry of Education announced the return to in-person classes as of March 2022 [2].

Returning to in-person activities encouraged people to think and take responsibility as a society at the educational level. The repercussions of returning to educational activities in terms of physical and emotional health were unknown. An example is what happened in the United Kingdom from June to July 2021, a period in which high numbers of the Delta variant were reported in the 17–24 age group, probably due to low vaccination rates in this group and suboptimal mitigation strategies in schools and universities [3]. Similarly, the Philippines showed interest and concern for the health of young people returning to school, who were at high risk especially because the healthcare system continued to struggle with COVID-19 [4].

During the pandemic, it could be observed that the cases of anxiety and depression among university students increased significantly [5]. Similarly, an Italian study of medical students reported extreme fear in almost half of the respondents [6]. Returning to in-person activities includes certain variables that may increase this baseline condition. These consist of fear of catching COVID-19, worrying about transmitting the infection to loved ones, trust in government policies, among others.

A previous literature review showed neither studies addressing factors associated with fear of COVID-19 prior to returning to in-person classes nor the implementation of pertinent strategies to prevent and treat the students' mental health. Therefore, this study was proposed to determine the factors associated with fear of COVID-19 prior to returning to in-person classes among medical students, specifically at Universidad Peruana Los Andes in 2021.

MATERIALS AND METHODS

Study design and population

A cross-sectional and analytical study conducted with information collected through an online survey from students of the School of Human Medicine at Universidad Peruana Los Andes, from January to March, prior to the beginning of the 2022-I semester.

The unit of analysis of this study were second- to tenth-term medical students enrolled during the 2021-II semester. Those students who were to attend their first term, externship or internship in the 2022-I semester as well as those who did not sign the informed consent form were excluded from the study.

The study population consisted of 732 students. The sample size was estimated using Epidat version 4.2; a 95 % confidence level, an expected proportion of 50 % and a precision of 5 % were considered, resulting in a minimum sample size of 252 individuals. A non-probabilistic convenience sampling was used.

Variables and measurements

A self-administered survey was conducted in advance using Google Forms and was divided into three sections. The first one comprised the study main information and an informed consent form. The second section included sociodemographic data (age and gender) and medical data on COVID-19 (history of infection, close relatives with risk factors and vaccination status). A complete vaccination status consisted of having received a three-dose COVID-19 vaccination series and an incomplete status less than three doses or none at all. This section also included two dichotomous questions regarding the trust in government policies and university policies and guidelines for returning to in-person classes.

The third section evaluated the psychological characteristics. First, fear of COVID-19 was assessed. For this purpose, the FCV-19S was used, in its Peruvian version validated by Huarcaya-Victoria et al. [7], with a Cronbach's alpha of 0.83. Such scale was made up of seven items

answered with a 1–5 point Likert scale, with the score ranging from a minimum of seven and a maximum of 35 points. The higher the score, the greater the fear of COVID-19. A cutoff score of 19 or higher on this scale was suggested to identify persons with a high level of COVID-19-related fear [8].

Similarly, the Depression, Anxiety and Stress Scales—Short Form (DASS-21), already validated in Spanish, was used to measure the symptoms of depression, anxiety and stress, with an overall Cronbach's alpha of 0.91 and the following coefficients for each of its subscales: depression (α = 0.85), anxiety (α = 0.73) and stress (α = 0.83) [9]. DASS-21 is made up of 21 items, with seven items per each subscale, and each item is scored with a four-point Likert scale ranging from 0 to 3. At the end of its administration, the item scores of each subscale are added separately and the final result is multiplied by two. Thus, it is classified into depression (normal: 0–9, mild: 10–12, moderate: 13–20, severe: 21–27, extremely severe: 28–42), anxiety (normal: 0–6, mild: 7–9, moderate: 10–14, severe 15–19, extremely severe: 20–42) and stress (normal: 0–10, mild: 11–18, moderate: 19–26, severe: 27–34, extremely severe: 35–42) [9].

Statistical analysis

The survey data was processed using a Microsoft Excel 2017 spreadsheet and the statistical analysis was performed using Stata 16. In the descriptive analysis, frequencies and percentages were calculated for the categorical variables; and the mean, standard deviation, median and interquartile range for the numerical variables, previously evaluating their distribution.

Concerning the inferential statistics, the Pearson correlation coefficient was used to determine the correlation between FCV-19S and DASS-21 subscales scores. Likewise, as for the qualitative variables, the variable *fear of COVID-19* was dichotomized, according to the recommendations of previous studies, into *low level of fear* and *high level of fear*, considering 19 or more points as cut-off point [8]. Similarly, the variables *depression*, *anxiety* and *stress* were categorized into *absence* and *presence*. This recoding was employed to use generalized models by applying logistic regression for both the crude (crude prevalence ratios [cPR]) and adjusted (adjusted prevalence ratios [aPR]) analyses; a p value < 0.05 and confidence intervals that did not include the unit were considered significant.

Ethical considerations

The Declaration of Helsinki ethical principles were followed in this study. Also, the first part of the questionnaire comprised the study information and an informed consent form. The data collected was coded to maintain confidentiality. The research project was approved by the Ethics Committee of the School of Human Medicine at Universidad Peruana Los Andes (Huancayo, Peru) with report No. 006-CEFMH-2022/UPLA.

RESULTS

A total of 252 students were surveyed. The median age was 22 [20–23] years and the female gender prevailed, with 166 (65.87 %) students. A total of 47.22 % of the students reported a history of SARS-CoV-2 infection and 62.30 % stated having the complete three-dose COVID-19 vaccination series (Table 1). The FCV-19S showed the following scores: a mean of 14.99 ± 6.32 points, a median of 14 [10–19.5] and a range of 7 to 35. When classifying this variable, a high level of fear of COVID-19 was reported in 68 (26.98 %) students.

Table 1. Sociodemographic characteristics, personal history, family history, beliefs and fear of COVID-19 among medical students (*N* = 252)

Characteristics	*N* (%)
Age (years)	22 (20-23)*
Gender	
Male	86 (34.13)
Female	166 (65.87)
History of COVID-19	
No	133 (52.78)
Yes	119 (47.22)
Close relatives with risk factors for COVID-19	
No	54 (21.43)
Yes	198 (78.57)

Characteristics	*N* (%)
COVID-19 vaccination status	
Incomplete	95 (37.70)
Complete	157 (62.30)
Do you trust in government policies for returning to in-person classes?	
No	121 (48.02)
Yes	131 (51.98)
Do you trust in university policies and guidelines for returning to in-person classes?	
No	124 (49.21)
Yes	128 (50.79)
FCV-19S score	14.99 ± 6.32**
Fear of COVID-19	
High level	68 (26.98)
Low level	184 (73.02)

*median [interquartile range] **mean ± standard deviation.

According to DASS-21, 30.95 % of the respondents had some level of depression, mostly moderate (11.51 %). Likewise, 31.75 % had some level of anxiety, mostly moderate (11.90 %). Finally, 28.57 % showed some level of stress, mostly mild (17.86 %) (Figure 1).

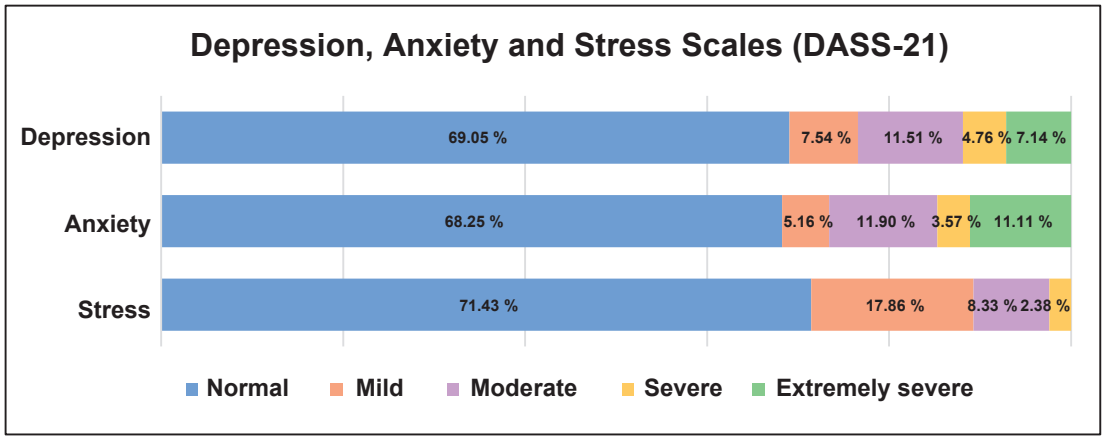

Figure 1. Frequency of depression, anxiety and stress (DASS-21) in the study population

Table 2 shows a statistically significant positive correlation between the DASS-21 subscales (depression, anxiety and stress) individual scores and the FCV-19S total score (< 0.001, < 0.001, < 0.001, respectively).

Table 2. Correlation between DASS-21 subscales (depression, anxiety and stress) individual scores and FCV-19S total score

Subscale	FCV-19S	
	Correlation coefficient (*r*)	*p* value
Depression	0.3007	< 0.001
Anxiety	0.4213	< 0.001
Stress	0.3967	< 0.001

The bivariate analysis showed that those students with a complete COVID-19 vaccination schedule were 0.64 (cPR: 0.64; 95 % CI: 0.43–0.96) less likely to have a high level of fear of COVID-19 compared to those with an incomplete vaccination schedule. On the other hand, those who suffered from some level of depression, anxiety or stress were 1.76 (cPR: 1.76; 95 % CI: 1.18–2.62), 2.42 (cPR: 2.42; 95 % CI: 1.63–3.59) and 2.22 (cPR: 2.22; 95 % CI: 1.50–3.28) more likely to have a high level of fear of COVID-19 than those who did not suffer from these conditions.

Finally, in the multivariate analysis, the variables were adjusted, thus determining that the participants who had a complete vaccination schedule or trust in university policies and guidelines were 65 % (aPR: 0.65; 95 % CI: 0.43–0.99) and 50 % (aPR: 0.50; 95 % CI: 0.29–0.87) less likely to have a high level of fear of COVID-19. On the contrary, those who had trust in government policies (aPR: 1.76; 95 % CI: 1.01–3.09) and anxiety (aPR: 2.18; 95 % CI: 1.16–4.10) were more likely to show high levels of fear (Table 3).

Table 3. Bivariate and multivariate analysis of factors associated with high levels of fear of COVID-19 among medical students (*N* = 252)

Variables	cPR	95 % CI	*p*	aPR	95 % CI	*p*
Age	0.97	0.90-1.04	0.336	0.98	0.92-1.05	0.652
Gender						
Male	Ref.					
Female	0.92	0.60-1.43	0.720	0.99	0.64-1.53	0.960
History of COVID-19						
No	Ref.					
Yes	1.18	0.79-1.78	0.413	0.98	0.66-1.45	0.917
History of risk factors for COVID-19 among close relatives						
No	Ref.					
Yes	0.94	0.56-1.58	0.828	1.08	0.65-1.79	0.772
COVID-19 vaccination status						
Incomplete	Ref.			Ref.		
Complete	0.64	0.43-0.96	0.031	0.65	0.43-0.99	0.046
Do you trust in government policies for returning to in-person classes?						
No	Ref.			Ref.		
Yes	0.82	0.55-1.23	0.343	1.76	1.01-3.09	0.047
Do you trust in university policies and guidelines for returning to in-person classes?						
No	Ref.			Ref.		
Yes	0.68	0.45-1.03	0.067	0.50	0.29-0.87	0.014
Depression						
No	Ref.			Ref.		
Yes	1.76	1.18-2.62	0.005	0.59	0.30-1.13	0.112
Anxiety						
No	Ref.			Ref.		
Yes	2.42	1.63-3.59	< 0.001	2.18	1.16-4.10	0.016
Stress						
No	Ref.			Ref.		
Yes	2.22	1.50-3.28	< 0.001	1.68	0.89-3.20	0.112

95 % CI: 95 % confidence interval; cPR: crude prevalence ratio; aPR: adjusted prevalence ratio.

DISCUSSION

The mean fear of COVID-19 score was 14.99 ± 6.32 points. This result is similar to that found by Yeni et al. [10] in a group of medical students, with a mean of 15.57 ± 5.99, and different from that described by Nguyen et al. [11] in medical students from Vietnam, with a mean score of 16.7 ± 5.3. During the pandemic, "coronaphobia" affected a large number of medical students, mainly concerning the risk of transmission. In the present study, another factor was added: the return to in-person classes after a long period of online education, so there would be greater exposure to the coronavirus. Despite this, the figures found in this study were lower than those previously reported. This could be due to the fact that the population is adapting, leaving aside or downplaying coronavirus. Thus, it is important that each student has the necessary information to correctly follow health protocols such as mask wearing, social distancing and handwashing. Similarly, each institution should take the pertinent safety measures such as improving ventilation in its facilities; implementing an area of occupational medicine; controlling the spread of the virus through testing, detection and tracking of positive cases, with subsequent isolation to prevent transmission.

As for depression, similar results were observed. A total of 30.95 % of the surveyed students reported having depression. This finding is similar to that described by Shofler et al. [12], who found that 34.7 % of the medical students showed depressive symptoms. This similarity occurred despite the fact that both studies used different instruments and contexts to assess depression. On the other hand, medical students from China [13] showed a prevalence of 57.5 % and medical students from Spain [14] a prevalence of 41 %. It was previously described that the high prevalence of depression among medical students is common due to overloaded schedules, academic stress and family conditioning. Furthermore, as demonstrated by the current study, the pandemic could be a possible conditioning factor for depression since, according to Pérez-Abreu et al. [15], COVID-19, like other diseases, emotionally affects those who are exposed to or suffer from it.

It was also observed that the prevalence of anxiety in the study participants was 31.75 %, which is similar to the prevalence of 34.1 % among Turkish medical students described by Karagöl et al. [16], and different from the prevalence of 75.4 % among medical students from a private university in Lima according to Saravia-Bartra et al. [17] This difference could be explained by the fact that, during the course of the study, the city of Lima had the highest number of infections and deaths. However, at present, the number of cases, deaths and hospitalizations due to COVID-19 has decreased [18]. In this regard, although the risk factors for the increase of these disorders have been reduced, it should be taken into account that COVID-19 prevalence is still significant and could increase due to the relaxation of restrictions.

Out of the respondents, 28.57 % had stress, representing the least frequent disorder. This figure is well below that reported by O'Bryne et al. [19], with 90.9 %. In Peru, Sandoval et al. [20] found that 23.90 % of medical students from Ayacucho suffered from stress during the COVID-19 pandemic. The difference between these figures could be due to the different current situations of each country. The studies that reported a higher prevalence of anxiety were from Ireland and Saudi Arabia. In addition, these studies were conducted during the lockdown and online classes, which differs from the present study, which was conducted in the period prior to returning to in-person classes. The Peruvian study carried out with medical students from Ayacucho showed similar figures to this study's, demonstrating that there is no significant change due to this exposure.

It is known that a widespread crisis arose from fear of and anxiety about the COVID-19 outbreak. The potential risk of rapid transmission, severity and death from COVID-19 increased the psychological stress on healthcare professionals [21]. With the announcement of the vaccine development and the initiation of vaccination, this level of fear was markedly reduced. Karayürek et al. [22] found that 76 % of odontologists experienced fear and anxiety before vaccination and, on the contrary, 35.6 % stated that fear and anxiety decreased in the post-vaccination period. In the bivariate and multivariate regression analysis carried out in this study, vaccination was considered a protective factor for high fear of COVID-19. For this reason, promoting vaccination among medical students prior to returning to in-person classes is recommended since this would not only reduce transmission but also create a sense of psychological security.

In this study, trust in government policies was considered a risk factor for high fear of COVID-19. This result was similar to that of Krishnaratne et al. [23], who also found negative effects when trusting in government policies in the school setting, thus increasing the level of fear, especially in social, economic and ecological research studies. Different results were found in the study by Talic et al. [24], who described a reduction in the number of infections and fear of COVID-19 when trusting in the implemented measures such as handwashing, mask wearing and physical distancing. It would be believed that trust in government policies would reduce the level of fear among students; however, throughout the pandemic, a great deal of distrust in government policies was described. This would be mainly related to the fact that the effectiveness of the restrictive measures was not uniform across all countries, even more in Latin America, where the spread of the virus and the number of deaths remained high [25].

On the other hand, trust in university policies and guidelines was considered a protective factor for high fear of COVID-19. This result was similar to the one found in the study by Nussbaumer-Streit et al. [26], where protective effects for fear of COVID-19 were shown by trusting in non-pharmacological and public health measures. This similarity of results is due to students' trust in the ability of entities to implement these measures and also in the efficacy of these strategies in reducing transmission. It is important that both the university and students adopt these measures rigorously to avoid undesirable outcomes.

In the study, a significant positive correlation was found between the FCV-19S and DASS-21 subscales scores. Additionally, in the univariate regression analysis, these subscales were a risk factor for high fear of COVID-19. Similar results were reported by Khalaf et al. [27] and Rodríguez-Hidalgo et al. [28], who also found a positive correlation between the subscales and fear. Likewise, Caycho-Rodríguez et al. [29], by means of a structural equation, identified that fear of COVID-19 positively predicted anxiety and depressive symptoms. This could explain why elevated levels of fear of infecting family members or close relatives with SARS-CoV-2 generate increased levels of stress. Therefore, if stress levels are not controlled, they can lead to anxiety and depression, as shown by the study of COVID-19 survivors by Mazza et al. [30], where a close relationship between high levels of fear of COVID-19 and the subscales *anxiety* and *depression* was described.

One of the main limitations of this study was using a non-probabilistic convenience sampling. On the other hand, all the factors that can influence fear of COVID-19 were not considered. Data collection was carried out by means of a self-administered survey, which could imply information bias. Since this was a cross-sectional study, it was not possible to determine causality between variables.

In conclusion, the present study demonstrated that there are different factors that could be associated with fear of COVID-19 among medical students in the context of the return to in-person classes. It was shown that more than one third of the students had a high level of fear of COVID-19, depressive symptoms, anxiety and stress. It was also determined that it is important to take into account protective factors such as trust in each institution's health protocols, as well as having a complete COVID-19 vaccination schedule. These results suggest that each educational institution should adopt the necessary measures and strategies to provide safe places that reduce the transmission of COVID-19 and enable students to academically perform well. Likewise, they can provide programs that help students to adequately cope with situations that may affect their mental health. In this way, the increase of depression, anxiety and stress that medical students usually present could also be avoided.

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