ORIGINAL ARTICLE

Effects of the COVID-19 pandemic on the prevalence of obsessive-compulsive symptoms among young adults in Peru

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ABSTRACT

The COVID-19 pandemic has exposed the general population to constant stressful and traumatic situations. This, added to the necessary and constant dissemination of preventive measures for COVID-19 infection, can generate an increase in the prevalence of Obsessive-Compulsive (OC) symptoms. Thus, this research aimed to evaluate the prevalence of OC symptoms and explore associated factors in young adults in Peru, the country with the highest COVID-19 death rate in the world. In this analytical cross-sectional study, an online survey distributed through social networks was used. OC symptomatology during the last week was measured by the Yale-Brown Obsessive-Compulsive Scale (Y-BOCS). Possible Generalized Anxiety Disorder (GAD) and Major Depressive Disorder (MDD) were evaluated with the General Anxiety Disorder 7-items (GAD-7) and Patient Health Questionnaire-9 (PHQ-9), respectively. 1243 young adults were evaluated. Of these, the mean age was 24.1 years, 54.3% were women, and the prevalence of OC symptoms was 50%. Participants who had experienced a traumatic event during COVID-19 pandemic had higher prevalence of OC symptoms (PR 1.54; CI 95% 1.27 – 1.85), when compared to those did not experience such events. In the same way, participants diagnosed with depression (PR 2.37; CI 95% 1.96 – 2.86) and anxiety (PR 1.11; CI 95% 1.02 – 1.21) also had a higher prevalence of OC symptoms, compared with those without depression and anxiety. In conclusion, obsessive-compulsive symptomatology has a high prevalence in young adults, and is associated with the death of a family member or close friend from the COVID-19 disease. The prevalence of possible depression and anxiety are high and are associated with higher prevalence of obsessive-compulsive symptoms. This highlights the importance of including mental health programs during the pandemic for the population who has suffered traumatic events, to be able to give them adequate follow-up and support.

Key words:
COVID-19; obsessive-compulsive symptoms; public health; mental health; mental well-being; pandemic; depression; anxiety

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INTRODUCTION

Obsessive compulsive disorder (OCD) is a mental health disorder characterized by the presence of recurring, unwanted thoughts, ideas or sensations (obsessions) that make an uncomfortable feeling to the individuals and lead them to do something repetitively as a response (compulsions)[1]. The COVID-19 pandemic represents a challenge for health systems worldwide, with a variety of issues needed to be tackled, including the direct consequences of COVID-19. Given that many of the cognitive models of obsessive-compulsive (OC) symptoms and OCD share common characteristics with the fears caused by the pandemic, rituals, and the fear of getting infected[2], one indirect consequence of COVID-19 might be the development of OC symptoms in the general population.

Modification of genes affecting the serotonergic, dopaminergic and glutamatergic systems influence the onset of OCD[3]. The etiology of OC symptoms is multifactorial. The contribution of genetic and environmental factors such as adverse perinatal events, psychological trauma and neurological trauma modify the expression of risk genes and trigger the spectrum of OC symptoms. Other factors implicated but not yet started to have causal associations are group A streptococcal infections[4], premenstrual and postpartum periods[5] and strong stress situations[6]. Currently, the prevalence rate of OCD in the general population is estimated to be 3% [7]. However, it has been estimated that the prevalence of symptoms can be much higher in the community[8]. In this way, stressors associated with isolation, social distancing, fewer interpersonal interactions[9] and the loss or infection of friends or family by COVID-19 can increase the risk. Additionally, young adults have been exposed to additional stressful situations such as increases in loneliness that increase the prevalence of mental health problems[10].

Specifically, the impact of COVID-19 represents multiple stressors that could lead to the appearance of OC symptoms. As an example, after lifting the quarantine in Wuhan, there was a prevalence of obsessions and compulsions of 17.93%[11]. In this way, preventive measures are cornerstones to confronting COVID-19 pandemic, including social distancing, hand washing, and the use of face masks that cover the nose and mouth[12]. However, these preventive measures, added to traumatic events during the pandemic, may have an association with onset of compulsive obsessive symptoms. It is known that people with pre-existing mental disorders are more prone to relapse, stress, stigma, and poor self-care[13]; but determining the impact of the pandemic on the general population is just as important as there is a misconception and a lack of knowledge and awareness about OC symptoms.

In Perú, from January 2020 to October 18th 2021, there have been 2 191 171 confirmed cases of COVID-19 with 199 928 deaths, the highest COVID-19 death rate as a proportion of population in the world[14]. In this way, the fear of COVID-19 among the general population is high[15]. In addition, the health system of Peru is precarious. The Ministry of Health provided one hundred million soles for the fight against COVID-19, and the "Villa Panamericana", built for the athletes of the Pan American Games, would be destined for COVID-19 patients. These improvised measures reflected decades of deficient investment in healthcare from the recent decades. In 2020 in Peru there were 773 ICU beds throughout the country, being one of the lowest in the Latin American region[16]. Symptoms of depression, anxiety and psychosocial reactions have increased since the beginning of the quarantine, with depressive symptoms being found in up to 60.7% of the population[17] and anxiety symptoms in up to 57%[18]. This study aims

to determine the prevalence of OC symptoms during the COVID-19 pandemic in Peru and to explore associated factors such as stressful events (the death of a family member or close friend due to the pandemic). It is known that the absence of early intervention on the clinical manifestations of these patients can lead to a chronic course of the disease with a significant deterioration in their biopsychosocial functioning. The increase in OC symptomatology during the COVID-19 pandemic has been seen in countries such as China, Turkey and Canada[19-21]. For that reason, this study aspires to provide knowledge about the mental health situation in the Peruvian population, that it has been constantly exposed to traumatic situations, and there is a knowledge gap in the impact on the mental health of this population during the pandemic. Our study aimed to serve as a basis for preventive strategies, intersectoral acts and public health policies in order to grant better management of this group of patients.

MATERIALS AND METHODS

Study design

We conducted a cross-sectional study using an online survey disseminated through social networks between July and August 2021. The survey was distributed through social networks.

Population

The target population was young adults between 18 and 39 years old at the time of the survey. Inclusion criteria included living in Peru for the last 6 months at the time of conducting the survey. On the other hand, exclusion criteria were having a previous diagnosis of OCD, expressing not wanting to participate in the study or deciding to withdraw their information from it. We used a snowball type sampling to find potential participants.

Procedures/data collection

In the same way as other studies were carried out during the pandemic, both in older adults[22] and in adolescents and young adults[23] to collect the information, we conducted an online survey using Google forms and disseminated it through social networks (Facebook and Instagram) between July and August 2021. The survey had an approximate time of 7 minutes.

An online survey was used to collect the data, evaluating both the outcome and the exposure and the other variables of the study. To measure OC symptomatology, we used the Spanish translation of the Y-BOCS (Yale-Brown Obsessive Compulsive Scale)[17], which has 10 items to define the presence and severity of the symptoms in the last week (Cronbach's alpha 0.98). For the exposure variable, the death of a family member or close friend, the following question was used: “Since March 16; That is, since the beginning of the pandemic, has a family member or close friend died from COVID-19?”.

We measured the uncertainty and intolerance using the Uncertainty Intolerance Scale (Cronbach's Alpha 0.94)[24] and fear of COVID-19 with the Spanish version of the Scale of fear of COVID-19 (Cronbach's alpha 0.84)[25]. On the other hand, we assessed the depression variable with the PHQ9 (Cronbach's alpha 0.84)[26], and anxiety using the GAD-7 (Cronbach's alpha 0.91)[26]. Both, PHQ9 and GAD-7 scales evaluate symptoms in the last two weeks.

Within the sociodemographic characteristics, sex and age were considered. Similarly, for the variables of self-perception of risk, previous COVID-19 tests, economic impact and income were adapted from Young Lives Peru questionnaire[27].

Study variables

The variable OC symptoms ("without clinical manifestations" [0 to 7 points], "With clinical manifestations" [greater than or equal to 8 points]) was measured with the Y-BOCS scale. However, it was also divided according to the severity of the symptoms (mild symptoms [8 to 15 points], moderate symptoms [16 to 23 points], severe symptoms [24 to 31 points] and extreme symptoms [32 to 40 points])[17].

The MDD ("No" [0 to 9 points] and "Yes" [greater than or equal to 10 points]) and GAD ("No" [0 to 9 points] and "Yes" [greater than or equal to 10 points]) were measured with the PHQ-9 and GAD-7 scales, respectively[26]. On the other hand, to measure the fear of COVID-19, a score of 7 to 35 points was considered, the higher the score, the greater the fear. While tolerance to uncertainty was considered a score of 12 to 60 points, the higher the score, the lower the tolerance for uncertainty.

The other variables included were gender ("Male" and "Female"), age (in years), self-perception of risk ("No risk", "Low", "Medium", "High" and "Don't know"), COVID-19 previous test ("Yes" and "No"), economic and income impact ("No impact", "Expenses/incomes increased", "Expenses/incomes decreased" and "Don't know"), and family history of OCD ("Yes", "No" and "Don't know").

Analysis plan

We estimated the sample size considering an expected prevalence of OC symptoms of 43%[10,19], a significance level of 0.05, and a precision of 5%. We found a minimum sample size of 377 participants using the Epidat 4.2 program. The data collected was digitized by two researchers independently, to later perform a comparison of the databases to identify discordances and correct errors in the digitization.

For the descriptive analysis, we present frequencies and percentages for the categorical variables and measures of central tendency and dispersion for the quantitative variables (Table A.1). To explore the association between categorical variables and the presence of OC symptoms, we used either Pearson chi-square test or Fisher's exact test. To explore the association between a numerical variable and the presence of OC symptoms, we used Student's t-test.

Additionally, we created Poisson regression models (Table A.3) to estimate prevalence ratios (PRs) with a 95% confidence interval. First, we created crude models and then multivariate models including those variables which were found to be associated with OC symptoms.

We used the Software for Statistics and Data Science 14th version[28] to conduct the analysis with a significance level of 5%.

A total of 1791 people responded to the online survey between July and August 2021 (Figure 1). First, we excluded persons who did not accept the informed consent (n=38). Second, from the 1753 people who agreed to participate in the study, we excluded all patients who did not fulfil the inclusion and exclusion criteria at the time of the survey. People were excluded if: reported to be under 18 or over 39 years (n=323), people who reported not having lived in Peru for the last 6 months (n=119) or reported having a diagnosis of obsessive-compulsive disorder (n=68). Finally, 1243 people were included in the study.

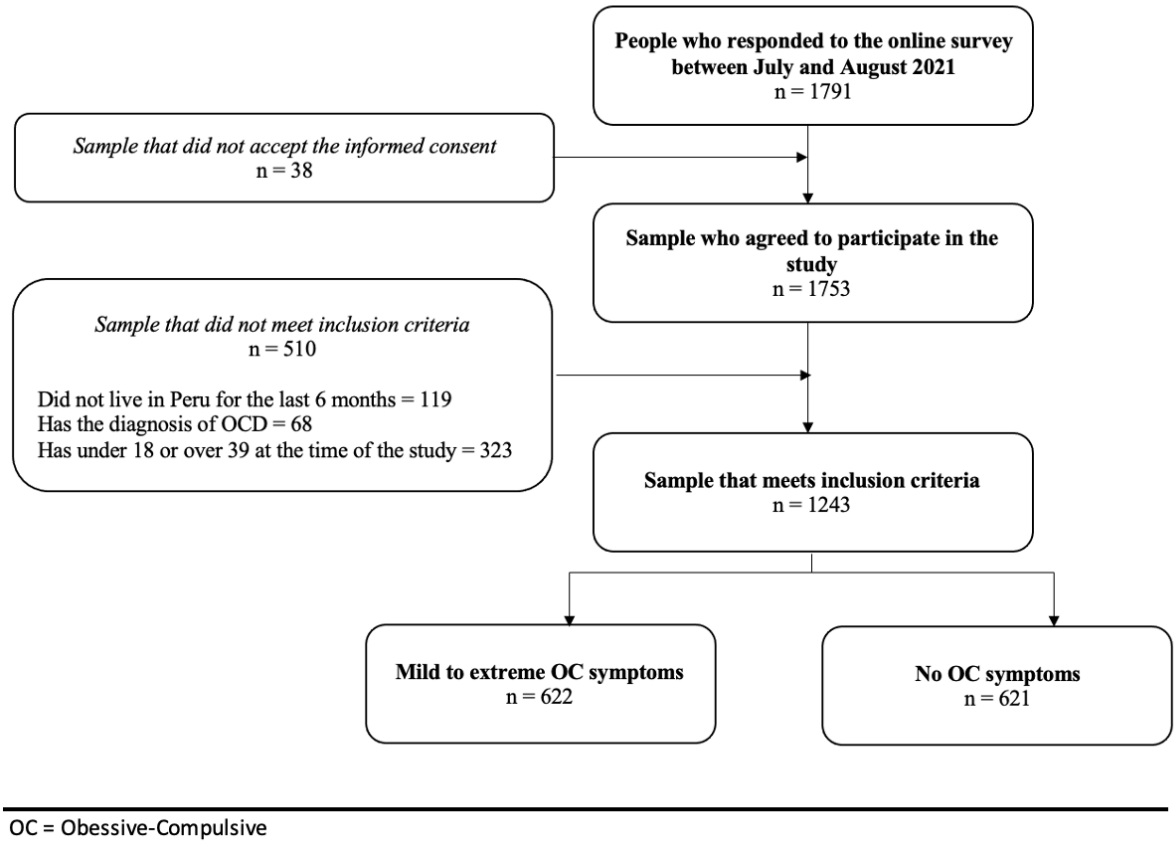

Figure 1 Flow chart

Ethics

Before the data collection, the investigation protocol was presented and approved by the ethics committee from the Peruvian University of Applied Sciences (UPC). Before conducting the online survey, informed consent was collected from the participants. The personal data were replaced by codes to ensure confidentiality at the time of digitization. Only the researchers had access to the database.

RESULTS

Of the final sample of 1243 participants (Table 1), 568 (45.7%) were men and the mean age of the group was 24.1 (4.8) years. Most of the participants showed a low (30.2%) and medium (46.8%) risk self-perception. Regarding the economic situation of the people surveyed, 67.7% mentioned an increase in their expenses and 56.4% indicated a decrease in their income during the COVID-19 pandemic. On the other hand, 46.5% of the participants were diagnosed with depression, and 25% were diagnosed with anxiety. Finally, only 446 (35.9%) had a positive family history of OCD.

Poisson regression was used for the multiple variable analysis (table 3). After adjusting our results to multiple variables, we found that those who had experienced a traumatic event during the COVID-19 pandemic showed 1.54 (CI 95% 1.27 – 1.85) times the prevalence ratio of developing OC symptoms than those who did not. On the other hand, participants who were diagnosed with depression showed 2.4 (CI 95% 1.96 – 2.86) times the prevalence ratio of developing OC symptoms than

those without depression. Likewise, those diagnosed with anxiety had 1.1 (CI 95% 1.02 – 1.21) times the prevalence ratio of showing OC symptoms than those without it. Finally, the results showed that people without a family history of OC had 1.4 (CI 95% 1.23 - 1.67) times the prevalence ratio of developing OC symptoms than those with a positive outcome.

Table 1 General characteristics of the participants

Variables	n(%)
Sex	
Male	568 (45.7)
Female	675 (54.3)
Age (years)*	24.1 ± 4.8
Self-risk perception	
No risk	24 (1.9)
Low	375 (30.2)
Medium	581 (46.8)
High	244 (19.6)
Don't know	19 (1.5)
Previous COVID-19 test	
Yes	961 (77.3)
No	282 (22.7)
Economic impact during the COVID-19 pandemic	
No impact	246 (19.8)
Expenses increased	841 (67.6)
Expenses decreased	125 (10.1)
Don't know	31 (2.5)
Income impact during the COVID-19 pandemic	
No impact	160 (12.9)
Incomes increased	337 (27.1)
Incomes decreased	701 (56.4)
Don't know	45 (3.6)
Family history of OCD	
Yes	446 (35.9)
No	615 (49.5)
Don't know	182 (14.6)
Depression	
No	665 (53.5)
Yes	578 (46.5)
Anxiety	
No	932 (75.0)
Yes	311 (25.0)

OCD = Obsessive-Compulsive Disorder
**Mean ± SD*

Table 2 Severity of obsessive-compulsive symptomatology* and death of a close friend or family member

Death of a close friend or family member due to COVID-19	No symptomatology	Mild symptomatology	Moderate symptomatology	Severe symptomatology	Extreme symptomatology^
	n (%)	n (%)	n (%)	n (%)	n (%)
Yes	393 (63.3)	305 (85.4)	206 (91.2)	37 (94.9)	0
No	228 (36.7)	52 (14.6)	20 (8.8)	2 (5.1)	0

**Measured by Yale-Brown Obsessive-Compulsive Scale*
^There was no case of extreme symptomatology

Table 3. Obsessive-compulsive symptoms during the COVID-19 pandemic in young adults in Peru according to associated factors and multivariate analysis by Poisson regression

Variable	Obsessive-compulsive symptoms n (%)	Without obsessive-compulsive symptoms n (%)	p value	PRc	CI 95%	p value	PRa	CI 95%	p value
Death of a close friend or family member due to COVID-19									
No	74 (24.5)	228 (75.5)	< 0.001	ref			ref		
Yes	548 (58.2)	393 (41.8)		2.38	1.94 - 2.92	< 0.001	1.54	1.27 - 1.85	< 0.001
Sex									
Male	205 (36.1)	363 (63.9)	< 0.001	ref			ref		
Female	417 (61.2)	258 (38.2)		1.71	1.51 - 1.93	< 0.001	1.07	0.97 - 1.17	0.149
Risk self-perception									
No risk	5 (20.8)	19 (79.2)	< 0.001	ref					

Variable	Obsessive-compulsive symptoms n (%)	Without obsessive-compulsive symptoms n (%)	p value	PRc	CI 95%	p value	PRa	CI 95%	p value
Low	72 (19.2)	303 (80.8)		0.92	0.41 - 2.07	0.843			
Medium	344 (59.2)	237 (40.8)		2.84	1.30 - 6.22	0.009			
High	193 (79.1)	51 (20.9)		3.79	1.74 - 8.31	0.001			
Don't know	8 (42.1)	11 (57.9)		2.02	0.79 - 5.18	0.143			
Economic impact during the COVID-19 pandemic									
No impact	50 (20.3)	196 (79.7)		ref					
Expenses increased	482 (57.3)	359 (42.7)	< 0.001	2.82	2.18 - 3.64	< 0.001			
Expenses decreased	81 (64.8)	44 (35.2)		3.19	2.41 - 4.21	< 0.001			
Don't know	9 (29.0)	22 (71.0)		1.42	0.78 - 2.61	0.247			
Income impact during the COVID-19 pandemic									
No impact	43 (26.9)	117 (73.1)		ref					
Incomes increased	98 (29.1)	239 (70.1)	< 0.001	1.08	0.80 - 1.47	0.613			
Incomes decreased	464 (66.2)	237 (33.8)		2.46	1.90 - 3.20	< 0.001			
Don't know	17 (37.8)	28 (62.2)		1.41	0.89 - 2.21	0.142			
Family history of OCD									
Yes	111 (24.9)	335 (75.1)		ref			ref		
No	412 (67.0)	203 (33.0)	< 0.001	2.69	2.27 - 3.19	< 0.001	1.43	1.23 - 1.67	< 0.001
Don't know	99 (54.4)	83 (45.6)		2.18	1.77 - 2.69	< 0.001	1.48	1.21 - 1.81	< 0.001
Depression									
No	134 (20.2)	531 (79.8)	< 0.001	ref			ref		
Yes	488 (84.4)	90 (15.6)		4.19	3.59 - 4.89	< 0.001	2.37	1.96 - 2.86	< 0.001
Anxiety									
No	361 (38.8)	571 (61.2)	< 0.001	ref			ref		

Variable	Obsessive-compulsive symptoms n (%)	Without obsessive-compulsive symptoms n (%)	p value	PRc	CI 95%	p value	PRa	CI 95%	p value
Yes	261 (83.9)	50 (16.1)		2.16	1.97 - 2.38	< 0.001	1.11	1.02 - 1.20	0.01
Tolerance for uncertainty*	38.22 ± 9.35	28.87	<0.001	1.05	1.05 - 1.06	< 0.001	1.01	1.01 - 1.02	< 0.001
Fear of COVID-19*	15.67 ± 5.44	20.75	<0.001	1.09	1.08 - 1.10	< 0.001	1.03	1.02 - 1.05	< 0.001

OCD = Obsessive-compulsive disorder
**Mean ± SD*

DISCUSSION

We found that patients who reported the death of a close friend or family member due to COVID-19 during the pandemic had a higher prevalence of obsessive-compulsive symptomatology. At the same time, we found several variables associated with the development of obsessive-compulsive symptoms, depression diagnosed by the PHQ9 was associated with a higher prevalence of OC symptoms, while anxiety diagnosed by GAD-7, was associated with a lower prevalence of OC symptoms. Additionally, we found that participants without a family history of OCD had more prevalence ratio of developing the outcome. It is important to mention that a large part of the population showed obsessive-compulsive symptoms. However, the vast majority of these reported mild symptoms; while none of them showed extreme symptoms.

We found a high prevalence of OC symptoms during the COVID-19 pandemic. These results are similar to what other studies have found. A study published in Canada at the beginning of the pandemic reported that 60% developed obsessive-compulsive symptoms and 53.8% had handwashing compulsion[19]. Similarly, another study published in Turkey detected an increase of 54.1% in the frequency of washing obsessions and compulsions, which was significantly greater than before the pandemic[20]. An study published in China on young adults, made in February 2020, found that 11.3% had a possible diagnosis of OC during the pandemic[21]. Added to the fact that due to the asymptomatic nature of the disorder, it may increase the risk of developing obsessive-compulsive symptomatology. It is worth mentioning that most of the studies were conducted at the beginning of the pandemic, while this study was conducted 16 months after the lockdown in Peru began. Despite this, the prevalence of OC symptoms found in our study is similar to the study carried out in Canada but higher than that carried out in China, which is possibly associated with a greater number of traumatic events and prolonged preventive measures during the pandemic due to COVID-19. In all the aforementioned studies, the obsessions and compulsions that were studied were cleaning types, being the most associated with preventive measures promoted worldwide to control the disease by COVID-19.

On the other hand, results show that 75.7% of the population reported that a family member or close friend had died during the COVID-19 pandemic. We found that this experience was associated with OC symptoms. Life events or traumatic experiences are known to have an impact on the onset of obsessive-compulsive disorder[21]. Similarly, the death of a person belonging to the social circle due to COVID-19 can generate a greater fear of negative effects, which influences the increase in both obsessive-compulsive symptoms and other psychiatric diseases[29], as well as the association of negative emotions with the onset of obsessive-compulsive symptoms[30].

Aggravating factors that may also influence the development of OC symptoms are those related to the economic impact of the pandemic. Results showed that 67.7% of our study population, reported an increase in expenses since the beginning of the quarantine and 56.4% reported a decrease in family income due to the pandemic. Peru has been one of the countries more affected economically, due to the high labour informality and poverty that exists in the country. This, added to the economic and social instability, exposed the Peruvian population to multiple stressors on a daily basis since the beginning of the pandemic.

Many times, the traumatic origin is not related to the obsessive or compulsive symptoms shown by the person but being able to understand these traumatic events is

important both to prevent and to understand the mental health of the population. The increased prevalence of compulsive obsessive symptoms may be a reflection of the risk generated by infection during the pandemic. For this reason, it is possible that when this risk decreases with the advancement of the vaccination process or when the pandemic ends, a part of the population that reported having obsessive-compulsive symptoms may not mention having them.

The high percentage of mental disorders such as depression and anxiety found in our study are consistent with the literature. In the first place, we found that 46.5% of our participants were diagnosed with depression and 25% were diagnosed with anxiety. Similarly, a systematic review and meta-analysis of articles that have focused on mental disorders prevalence during the COVID-19 pandemic, found that the prevalence of depression in fourteen studies was 33.7%. Likewise, the same study found a prevalence of anxiety of 31,9%[31]. Other studies have also found that the prevalence of anxiety and depression increased during the COVID-19 pandemic[32].

We found an association of a higher risk of developing obsessive-compulsive symptoms with depression and anxiety, which is consistent with the literature review. It is common for the development of obsessive-compulsive symptoms to coexist with other mental conditions, such as depression and anxiety[33]. The severity of depression has been positively correlated with obsessive and compulsive symptoms[34]. Similarly, depression and anxiety can both act as triggers for obsessive-compulsive disorder and be factors of poor prognosis[35].

Moreover, COVID-19 can act as a trigger for generalized anxiety disorder[36] and even worse obsessive-compulsive symptoms[19], especially when associated with traumatic events. In this way, we see that the pandemic has a positive correlation with the onset of obsessive-compulsive symptoms, as well as high percentages of depression and anxiety in young adults, possibly associated with stressful and traumatic situations that occurred during the COVID-19 pandemic, being consistent with theoretical criteria and similar studies.

To our knowledge, this is the first study that evaluates the prevalence of obsessive-compulsive symptoms during the COVID-19 pandemic in the general population of Latin America and the Caribbean region. Due to the high levels of mortality associated with mental disorders[37], it has become a matter of concern in several countries[38]. This is why we consider it as important to keep investigating and carrying out studies with a higher level of evidence that allows us to confirm or reject the results found in the present paper.

LIMITATIONS

The present study has limitations. Due to the multifactorial nature of OC symptoms, there is a causal limitation between the death of a close friend or family member and the outcome of OC symptoms. There is a selection bias since, when the online survey is distributed through social networks, all the participants included are those who have electronic devices to participate in the study. However, by 2021, 83.9% of the adult population had access to the internet and social networks in Peru[39]. There is a possible social desirability bias; however, we consider that using an online and anonymous survey might have reduced this bias. In addition, we used validated scales with-pre-specified cut-off points when assessing OCD, MDD and GAD. However, it is worth mentioning that this research does not constitute a clinical evaluation, but rather an evaluation of symptoms possibly

associated with mental health problems. For this reason, a detailed clinical evaluation performed by trained health personnel is needed to achieve an adequate diagnosis.

IMPLICATIONS FOR PRACTICE

According to the results of the present study, the COVID-19 pandemic may be associated with the development of mental health problems. Due to the growing importance of communication media such as social networks to disseminate prevention measures, our data can be used to provide evidence-based support in the inclusion of mental well-being policies such as the specialized mental health program "Allin Kawsay", which aim to provide tools to the general population to improve their mental health[40]. The results of the study highlight the importance of including mental health programs during the pandemic for the general population, especially for those who have been exposed to stressful situations such as the loss of a family member or close friend due to COVID-19, giving them an appropriate follow-up and support, while emphasizing the importance of continuing promoting prevention measures for COVID-19.

As we have indicated, the objective of the study was not to demonstrate the impact of the COVID-19 pandemic on the population diagnosed with OCD, but to evaluate the increase in obsessive compulsive symptoms during the pandemic. Thus, monitoring OC patients during the pandemic and its true impact on this population represents an interesting area for future research.

CONCLUSIONS AND RECOMMENDATIONS

Through our study we found in out a worrying increase in obsessive-compulsive symptoms in young adults, and we found an important association with the death report of a family member or a close friend due to COVID-19, which constitutes a traumatic event. The mean age of the samples was 24.1 years at the time of answering the survey. In addition, we found a high prevalence of anxiety and depression in the general population, which were also significantly associated with obsessive-compulsive symptoms. Further studies are needed to explore the duration of the OCD symptoms, especially after the pandemic or when the risk of infection is lower.

The Peruvian population has been constantly exposed to stressful situations, which is why it is important to continue promoting prevention measures for COVID-19 infection, while including interventions to protect mental health. This study can serve as an example to promote innovative policies whose main objective is to protect the mental health of a population at risk of suffering from obsessive-compulsive symptoms, as well as a population exposed to especially stressful situations that may act as a trigger for the development of OCD, MDD or TAG.

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