The Open Public Health Journal

Content list available at: https://openpublichealthjournal.com

RESEARCH ARTICLE

Anxiety And Fear of COVID-19 Among Shantytown Dwellers In The Megacity Of Lima

Carlos Sotomayor-Beltran[1,*], Rosa Perez-Siguas[2,3], Hernan Matta-Solis[2,4], Alberto Palacios Jimenez[3] and Hernan Matta-Perez[3]

[1]*Universidad Tecnológica del Perú, Lima, Peru*
[2]*Facultad de Ciencias de la Salud, Universidad María Auxiliadora, Lima, Peru*
[3]*Instituto Peruano de Salud Familiar, Lima, Peru*
[4]*Facultad de Ciencias de la Salud, Universidad de Ciencias y Humanidades, Lima, Peru*

Abstract:

Background:

The COVID-19 pandemic is not only having a negative impact on individuals' physical health, but also on their mental health. Particularly, people living in disadvantaged communities in the developing world have been hit the hardest by the pandemic. They live precariously and are more vulnerable to mental health issues.

Objective:

In this study, we have evaluated COVID-19-related anxiety and fear and the predictors associated with them among shantytown dwellers in the Peruvian capital.

Methods:

This is a cross-sectional study in which 816 shantytown dwellers participated. Anxiety and fear of the virus were assessed using the Corona Anxiety Scale (CAS) and the Fear of COVID-19 Scale. Also, sociodemographic data were collected.

Results:

Stable and occasional workers were more likely to show the anxiety about the virus, whereas older adults presented higher levels of fear of COVID-19. Shantytown dwellers who were single, female, unemployed, had a relative at home who was infected with COVID-19 before the fieldworker's visit, and had a relative who died of the virus were more likely to display anxiety and fear of COVID-19.

Conclusion:

Targeted interventions should be made available to slum dwellers promptly when needed, to help them cope with their mental health problems and prevent dire consequences such as domestic violence and suicidal tendencies.

Keywords: Anxiety, Fear, COVID-19, Shantytowns, Mental health issues, Physical health.

Article History	Received: May 13, 2022	Revised: August 27, 2022	Accepted: September 23, 2022

1. INTRODUCTION

The coronavirus disease (COVID-19) originated in Wuhan, China, towards the end of 2019, and by swiftly spreading across the world, in March 2020, it was declared a pandemic by the World Health Organization [1]. COVID-19 has impacted not only people's physical health but also their mental health [2 - 4]. In this respect, it has been indicated that COVID-19 has had a detrimental impact on the mental health of people worldwide [5]. Another unfortunate consequence of the pandemic is that it has prevented the provision of adequate mental health services, particularly in developing countries [6] where access to mental health resources is already limited [7].

A recurrent emotional response, due to COVID-19, among people worldwide is fear of becoming infected or infecting

* Address correspondence to this author at the Universidad Tecnológica del Perú, Lima, Peru; E-mail: carlos.sotomayor20@gmail.com

others with the virus, fear of a loved one getting it and fear of death from this [8 - 12]. For instance, a survey of 439 participants from different countries (mostly from Europe and North America) has shown that the risk of loved ones becoming infected is a good predictor of fear of the virus [13]. When fear becomes irrational and excessive, it can be a crucial factor in the development of different mental health disorders [9, 13 - 15]. Among psychiatric disorders, the most prevalent ones are anxiety disorders [16]. During the COVID-19 era, many studies have indicated increased rates of anxiety, depression, and suicidal behaviors [17 - 21].

People living in poverty in developing countries are more vulnerable to mental health disorders [22]. In megacities of the developing world, many of the poor live in shantytowns located at the cities' peripheries and, in many cases, have restricted access to public utilities. Also, residents of these deprived areas often lack proper education and have scarce employment opportunities. During the COVID-19 pandemic, literature is becoming available on the effects of the virus on the mental health of dwellers from these marginalized communities. A study carried out in two shantytowns in São Paolo, Brazil, has revealed that their residents with lower monthly income and moderate or severe food insecurity are more likely to show COVID-19 related psychological distress [23]. In Guatemala, research conducted in vulnerable communities has indicated that parents are at higher risk of showing greater levels of stress than non-parents [24]. The authors of the foregoing study have highlighted the need to implement prompt interventions considering the close relationship between parental stress and domestic violence and child abuse. Between June and July 2020, a study carried out in nine slums in Bangkok, Thailand, showed that the COVID-19-related stress of their residents was associated with their loss of income and self-quarantines [25]. In addition, some participants revealed fears of becoming infected with the virus and of being unable to maintain their already precarious livelihoods. Analysis of data from slum dwellers in Dhaka, Bangladesh, has revealed higher rates of anxiety and insomnia than pre-COVID-19 ones [26]. The Bangladeshi study has also shown that the fear of the participants of becoming infected with the virus is a strong predictor of anxiety and insomnia.

In this study, we aimed to further our understanding of the detrimental impact that COVID-19 is having on the mental health of the poor. Hence, a survey was administered to residents of households in four shantytowns in Lima, the Peruvian capital, to assess COVID-19-related anxiety and fear and their associated predictors.

2. MATERIALS AND METHODS

2.1. Study Setting and Participants

This cross-sectional study was conducted in four shantytowns (Ampliacion Belen, Belen, Vista Alegre and Las Praderas) in the district of San Juan de Lurigancho. This district is the most populated, with more than a million residents, and among the poorest ones of the Peruvian capital [27]. A report by the Ministry of Justice and Human Rights (MINJUS) has indicated that San Juan de Lurigancho is strongly marked by rampant crime and violence [28]. Households in Ampliacion Belen, Belen, Vista Alegre, and Las Praderas, located on the outskirts of San Juan the Lurigancho, have restricted access to public services such as electricity, water and sanitation and show housing of poor structural quality as well.

A total of 816 dwellers of the four shantytowns participated in the study, each of them belonging to independent households. The fieldworkers that applied the survey did so mainly during the weekends in view that many residents were away from home Monday through Friday because of work. Shantytown dwellers are mainly day laborers (*e.g*., street vendors, restaurant workers, construction workers and domestic workers). Since the study was conducted in the period between July and August 2021, COVID-19 health and safety protocols (*e.g*., staying 1.5 meters away from each other, using alcohol-based hand sanitizer and wearing face masks) imposed by the Peruvian government had to be followed at the moment of administering the survey. Only participants who were not infected with COVID-19 when the interviews were carried out took part in the study. By using Google Forms, an online survey was created, and the link to this was sent via WhatsApp once the fieldworker was at the participant's home. Each participant took approximately 10-15 minutes to complete the survey. Informed consent was obtained from all the participants. This study was approved by the Ethics Committee of the Universidad Maria Auxiliadora, Lima, Peru (Approval No. 018-2021).

2.2. Instrument

The survey consisted of three parts. The first part inquired about sociodemographic variables including age, gender, marital status, educational level, and employment status. The participants were also asked to indicate if a relative living in their households was infected with COVID-19 before the fieldworkers' visit and if a relative from the household had died because of the virus. The second part of the survey consisted of the Coronavirus Anxiety Scale (CAS) [29], a mental health screener that helps identify cases of dysfunctional anxiety related to COVID-19. CAS is a 5-item scale where each item is rated on a 5-point Likert-type scale (0 = not at all, 1 = rare, less than a day or two, 2 = several days, 3 = more than 7 days, and 4 = nearly every day over the last 2 weeks). A cutoff score of 9 was considered and the validated Spanish version of CAS [30] was used for the study, considering that this is the official language of Peru. Fear of COVID-19 was measured using the Fear COVID-19 Scale (FCV-19S) [31], this being the final section of the survey. The FCV-19S is a 7-item scale where participants were asked to rate the degree to which they agree or disagree with each item on a 5-point Likert-type scale (from 1 = strongly disagree to 5 = strongly agree); the higher the scores, the more fear of COVID-19. By using the overall mean score as the cutoff, levels of fear were categorized as high and low. As was the case with CAS, the Spanish version of FCV-19S [32] was used as well.

2.3. Statistical Analysis

Descriptive statistics was performed on sociodemographic data. Two levels of fear (low and high) of COVID-19 were

considered by taking the overall mean fear score level as the cutoff. Differences between sociodemographic groups were assessed using the Mann-Whitney and Kruskal-Wallis tests due to the non-parametric nature of the data. Logistic regression was used to derive one multivariate model of factors associated with anxiety and another one of factors associated with fear. Only those variables which resulted in *p*-values less or equal to 0.05 in the bivariate analyses were included in the regression models and, also to control for potential confounding. Statistical significance was set at a p-value ≤ 0.05. All statistical analyses were carried out with Python (Python Software Foundation) using the pandas, scipy and statsmodels libraries.

3. RESULTS

The participants of the study were aged between 18 and 79 years, with an average age of 38.9 ± 13.9 years. A bit more than half of the sample comprised women (53.4%) while approximately half of the respondents indicated that they were living together with a partner (48.4%). The participants' highest educational achievement level was secondary school education, with 58.1% having completed this. When asked if they had a relative at home that was infected with COVID-19 before the fieldworkers' visit or a relative at home who died of this, 40.6% and 36.4% of them responded positively, respectively. All sociodemographic characteristics of the sample can be seen in Table **1**.

The independent variables that showed significant differences in anxiety were gender, marital status, educational level, occupation, whether a relative was infected with COVID-19 before the fieldworker's visit and if a relative had died of the virus (Table **2**). The overall mean anxiety score was of 7.3 ± 4.7 and a total of 367 (44.9%) participants showed anxiety levels beyond normal ones (≥ 9). In comparison to men, females experienced more anxiety, with a mean score of 9.1 ± 4.3. Those participants who were either married, illiterate or unemployed also had to endure more anxiety, with mean scores of 9.3 ± 5.2, 9.6 ± 3.1 and 9.0 ± 4.5, respectively. The two groups that affirmatively indicated whether a relative was infected with COVID-19 before the fieldworker's visit and if a relative at home has died of the virus had the two highest mean anxiety scores, 10.1 ± 3.7 and 11.2 ± 3.5, respectively. The overall mean fear score was 19.8 ± 6.6, which was taken as the cutoff. A total of 308 (37.7%) reported high levels of fear. Table **2** also indicates that ages of the participants between 51 and 79 years, female gender, married, primary school education, unemployed, having a relative at home who was infected with COVID-19 before the fieldworker's visit and having a relative at home who died of the virus had mean fear scores that were statistically significantly higher.

Table 1. Sociodemographic characteristics of the sample (N = 816).

Variables	Frequency	Percentages (%)
Age (Years)		
18-30	286	35.0
31-50	394	48.3
51-79	136	16.7
Gender		
Male	380	46.6
Female	436	53.4
Marital Status		
Married	195	23.9
Living Together	395	48.4
Single	226	27.7
Educational Level		
Illiterate	21	2.6
Primary	321	39.3
Secondary	474	58.1
Occupation		
Stable Worker	109	13.3
Occasional	429	52.6
Student	38	4.7
Unemployed	240	29.4
Relative at Home Infected with COVID-19?		
Yes	331	40.6
No	485	59.4
Relative at Home who Died of COVID-19?		
Yes	297	36.4
No	519	63.6

Table 2. Differences in anxiety and fear between sociodemographic groups.

Variables	Anxiety (mean ± SD)	*p*-value	Fear (mean ± SD)	*p*-value
Age (Years)				
18-30	7.4 ± 3.2	0.129 [a]	17.9 ± 6.7	< 0.001[a]
31-50	7.1 ± 5.6		20.6 ± 6.5	
51-79	7.8 ± 4.2		22.1 ± 5.7	
Gender				
Male	5.3 ± 4.2	< 0.001[b]	18.5 ± 5.8	< 0.001[b]
Female	9.1 ± 4.3		20.9 ± 7.1	
Marital Status				
Married	9.3 ± 5.2	< 0.001[a]	22.7 ± 6.2	< 0.001[a]
Living Together	5.6 ± 4.2		18.2 ± 6.2	
Single	8.7 ± 3.9		20.2 ± 6.8	
Educational Level				
Illiterate	9.6 ± 3.1	0.006 [a]	15.6 ± 3.4	< 0.001[a]
Primary	7.0 ± 4.8		20.1 ± 6.5	
Secondary	7.4 ± 4.6		19.8 ± 6.8	
Occupation				
Stable Worker	8.9 ± 4.2	< 0.001[a]	20.5 ± 7.5	< 0.001[a]
Occasional	6.0 ± 4.7		18.8 ± 5.9	
Student	6.5 ± 1.9		18.9 ± 6.6	
Unemployed	9.0 ± 4.5		21.5 ± 6.9	
Relative at Home Infected with COVID-19?				
Yes	10.1 ± 3.7	< 0.001[b]	22.3 ± 6.9	< 0.001[b]
No	3.2 ± 2.4		16.2 ± 4.1	
Relative at Home who Died of COVID-19?				
Yes	11.2 ± 3.5	< 0.001[b]	23.5 ± 6.3	< 0.001[b]
No	5.1 ± 3.8		17.7 ± 5.8	

Note: [a]Kruskal-Wallis test; [b]Mann-Whitney test.

By using multiple logistic regression, the associated factors of anxiety and fear of COVID-19 are presented in Table **3**. The first multivariate model showed that female gender (OR: 5.04, $p < 0.001$), single status (OR: 3.22, $p < 0.001$), being illiterate (OR: 18.86, $p = 0.011$), being a stable worker (OR: 8.77, $p = 0.005$) and occasional worker (OR: 32.58, $p < 0.001$), being unemployed (OR: 14.11, $p < 0.001$), having a relative infected with COVID-19 (OR: 98.14, $p < 0.001$) and having a relative at home that died of the virus (OR: 7.17, $p < 0.001$) were significantly associated with anxiety of COVID-19. The second multivariate model revealed that those aged between 31 and 50 years (OR: 4.10, $p < 0.001$) and between 51 and 79 years (OR: 4.43, $p < 0.001$), female gender (OR: 1.85, $p = 0.01$), being single (OR: 2.06, $p = 0.005$), being a student (OR: 3.80, $p = 0.007$), being unemployed (OR: 1.92, $p = 0.01$), having a relative infected with COVID-19 before the fieldworker's visit (OR: 49.64, $p < 0.001$) and having a relative at home who died of the virus (OR: 1.83, $p < 0.001$) were significantly associated with fear of COVID-19.

Table 3. Logistic regression analysis of factors associated with shantytown dwellers' anxiety and fear.

Anxiety					Fear				
Factors	**OR**	**95% CI**		***p*-value**	**Factors**	**OR**	**95% CI**		***p*-value**
Female	5.04	2.80	9.08	<0.001	Age 31-50	4.10	2.40	6.99	<0.001
Single	3.22	1.72	6.02	<0.001	Age 51-79	4.43	2.50	7.83	<0.001
Illiterate	18.86	1.95	182.24	0.011	Female	1.85	1.16	2.96	0.01
Stable Worker	8.77	1.94	39.72	0.005	Single	2.06	1.24	3.43	0.005
Occasional Worker	32.58	7.62	139.27	<0.001	Student	3.80	1.44	9.99	0.007
Unemployed	14.11	3.30	60.38	<0.001	Unemployed	1.92	1.16	3.18	0.01
Relative at Home Infected with COVID-19	98.14	34.14	282.11	<0.001	Relative at Home Infected with COVID-19	49.64	22.17	111.11	<0.001
Relative at Home who Died of COVID-19	7.17	4.21	12.21	<0.001	Relative at Home who Died of COVID-19	1.83	1.22	2.75	<0.001

abbreviation OR: Odds Ratio; CI: Confidence Interval.

4. DISCUSSION

People living in marginalized communities in developing countries are at greater risk of suffering from mental health issues [33, 34]. Stressors such as low levels of education, low income and high crime rates in these poverty-stricken places have been exacerbated due to COVID-19; hence, imposing a heavy burden on the mental health of their residents. In this study, we have investigated the anxiety and fear of COVID-19 among dwellers of four Peruvian shantytowns. In our sample, we have estimated that the prevalence rates of anxiety and fear of COVID-19 were 44.9% and 37.7%, respectively. The measured prevalence rate of anxiety was considerably high when considering those observed during previous virus epidemics such as MERS-CoV and H1N1 [35]. In this regard, recent studies have also pointed out that prevalence rates of anxiety and depression have increased from before to during the COVID-19 pandemic [36 - 39].

Our findings showed that older adults (≥ 51 years) had higher levels of fear than their younger counterparts. Older adults are the most vulnerable group to COVID-19 [40], particularly those with comorbidities [41, 42]. Since the outset of the pandemic, this information has been constantly conveyed to the general population by the media; thus, making older adults more fearful of the virus. A Bangladeshi study has pointed out that older adults who are unemployed, retired, or facing financial difficulties present more fear of the virus [43]. Moreover, it has been reported that many people in developed countries have not been able to get access to medicine or care [44], a situation which is aggravated among residents living in disadvantaged communities. Hence, it is likely that an aggregate of these factors, added to feelings of loneliness and isolation, due to the social distancing and intermittent lockdowns are causing the higher levels of fear observed among older adults.

Many studies have revealed that women are at higher odds of showing high levels of COVID-19-related fear [45 - 47] and anxiety [48 - 50]. Our work also agrees with the female gender being significantly positively associated with COVID-19-related anxiety and fear. Women are more distressed by adverse events [51], a situation which is further exacerbated among women living in slums and shantytowns. A recent study in northern India has shown that women from marginalized groups have stressed their fears of not having enough food to bring to their tables because of the reduction of their already meager incomes or total loss of these [52]. Among women, a risk factor for anxiety is the experience of traumatic events such as physical, psychological and sexual violence [51]. In the slums of Kampala, Uganda, reports of domestic violence have increased during the COVID-19 pandemic [53]. A female participant from the foregoing study revealed that her partner beat her up because she did not have money, and thus had nothing to eat at home. Water insecurity, which is a constant occurrence among disadvantaged communities in developing countries, is known to cause domestic violence as well [54]. To avoid this, women prioritize their partners' water needs above theirs. In Peru, a national survey carried out between January and December 2020 reported that 54.8% of women aged between 15 and 49 had suffered from domestic violence [55].

The shantytown dwellers with single status in our sample were more likely to show fear and anxiety about COVID-19. Single individuals are more prone to use social media, where unfortunately, too much COVID-19-related misinformation is widespread. Misinformation added to sensationalism can trigger anxiety and fear [9]. Furthermore, among these individuals, a sense of loneliness is easier to arise, and it has been indicated that loneliness is a familiar risk factor for mental health issues such as anxiety and depression [56].

The COVID-19 pandemic has taken a heavy toll on day laborers in developing economies. For instance, millions of Bangladeshis working in the informal sector as construction workers, street vendors, transport workers or rickshaw pullers have lost their jobs due to COVID-19 [57]. In Chile, the unemployment rate among informal settlement residents has considerably increased from before to during the COVID-19 pandemic [58]. In relation to mental health issues, a Brazilian study carried out during the COVID-19 pandemic has shown that unemployed shantytown residents are at higher risk of phycological distress [23]. In our study, the unemployed shantytown dwellers were at higher odds of presenting more fear and anxiety about the virus. This is quite likely due to insecurity of being unable to find a new job, not providing enough food to their families and for themselves, and overall, of an uncertain future. It is important to consider that when not properly attended, anxiety can exacerbate suicidality in vulnerable individuals [59]. For example, a Bangladeshi auto-rickshaw driver in his 30s committed suicide because he could not make a living anymore due to a COVID-19 lockdown [60].

In the case of stable and occasional workers, our results have shown that they were more likely to present COVID-19-related anxiety. For them, there is not only a risk of infection at work but also on the way to and from work. A study in Japan revealed that commuting time, commuting distance and public transportation were positively associated with anxiety about becoming infected with COVID-19 [61]. Likewise, another study has shown that pregnant women in Israel who take public transportation presented high levels of COVID-19 related anxiety [62]. Big buses, medium-sized buses and vans (known in Peru as "combis") make up a main part of Lima's public transportation system and are usually very crowded, even during the COVID-19 era. Added to this, some people that take public transportation do not follow the protective measures imposed by the Peruvian government (*e.g.*, some do not adequately wear face masks or do not wear them at all). Therefore, it is no surprise that those shantytown dwellers who go to work daily or occasionally use public transportation are at higher odds of showing more anxiety about the virus.

Living with a relative that was infected, prior to the fieldworker's visit, with COVID-19 was shown to be a good predictor of COVID-19-related anxiety and fear. The majority of Peruvian shantytowns lack access to proper water and sanitation services. Under these circumstances, having a family member at home suffering from moderate or severe COVID-19 symptoms such as fever and shortness of breath can be a very daunting experience. For instance, if an individual has a respiratory infection, it is suggested that they stay hydrated; in places where water accessibility is problematic, this

recommendation is very difficult to meet [63]. Moreover, to care for patients with COVID-19 at home, it has been recommended to wash their bed linens, towels and dishes at least once a day [64]; once again, in marginalized communities where water is scarce, this is quite a difficult challenge. Hence, it is understandable that shantytown dwellers within our sample with a relative infected with COVID-19 are more likely to show fear of the virus. This agrees, for example, with a study in Turkey where it has been indicated that those individuals who had a relative infected with the virus were more fearful and anxious about it [65]. On the other hand, anxiety can be further intensified if a relative at home died of the virus; in this regard, families who have suffered the loss of a relative also experience great mental distress [9]. The latter agrees with our results that indicated that those individuals who had a relative at home who had died of the virus were at higher odds of showing more COVID-19-related fear and anxiety.

Recently, it has been reported that in Lima, only 12% of people with psychiatric disorders access mental health services [66]. Out of this percentage, how much represents those living in shantytowns and slums is, to the best of our knowledge, unknown; however, we suggest that it is quite low. Hence, strategies are urgently needed to address mental health issues among individuals living in these marginalized communities. A Peruvian study has indicated strategies such as telemedicine (*e.g.*, online counseling meetings) and avoiding misinformation by following only official channels (*e.g.*, Ministry of Health and local authorities) [67]. Another very important strategy is cash transfer programs, which have proven to be beneficial for the mental health of individuals living in marginalized communities in developing countries [68]. Economic support to address food security problems is an urgent need among shantytown dwellers, particularly considering that increased food insecurity may amplify psychosocial conditions that underlie anxiety [69]. Another recommendation is to stay connected with friends and family while maintaining a healthy relationship [48].

This study had three main limitations. One of them was its cross-sectional nature, which prevented us from establishing cause-and-effect relationships. Another one was that this study was carried out during the weekends. Finally, households with at least one member infected with COVID-19 during the period when the study was conducted were not considered due to safety measures.

CONCLUSION

Our study has revealed the associated predictors of anxiety and fear of COVID-19 among shantytown dwellers in Lima city. Those who were single, female, unemployed, with a relative at home who was infected with COVID-19 before the fieldworker's visit and who had a relative who died of the virus were more likely to show COVID-19 related anxiety and fear. Also, stable and occasional workers are at higher odds of presenting anxiety about the virus. Severe consequences such as domestic violence and suicidality may arise within these vulnerable groups. Hence, there is an urgent need to provide targeted strategies to address mental health issues among them.

AUTHORS' CONTRIBUTIONS

C.S.-B contributed to conceptualization, methodology, software, draft preparation and editing. R.P.-S contributed to conceptualization, data curation and draft preparation. H.M.-S contributed to methodology, draft preparation and editing. A.P.J. contributed to methodology, data curation and software H.M.-P contributed to software and draft preparation. All authors have read and approved the final version of the manuscript.

ETHICS APPROVAL AND CONSENT TO PARTICIPATE

The study was approved by the Ethics Committee of the Universidad Maria Auxiliadora, Lima, Peru (Approval No. 018-2021).

HUMAN AND ANIMAL RIGHTS

No animals were used for studies that are the basis of this research. All the humans were used in accordance with the ethical standards of the committee responsible for human experimentation (institutional and national), and with the Helsinki Declaration of 1975, as revised in 2013 (http://ethics.iit.edu/ecodes/node/3931).

CONSENT FOR PUBLICATION

Informed consent was obtained from all the participants.

STANDARDS OF REPORTING

STROBE guidelines were followed.

AVAILABILITY OF DATA AND MATERIALS

The data used to support the findings of this study are available at https://github.com/coto20/COVID-19_anxiety_fear

FUNDING

None.

CONFLICT OF INTEREST

The authors have no conflicts of interest relevant to this article.

ACKNOWLEDGEMENTS

Declared none.

REFERENCES

[1] Cucinotta D, Vanelli M. WHO declares COVID-19 a pandemic. Acta Biomed 2020; 91(1): 157-60. [http://dx.doi.org/10.23750/abm.v91i1.9397] [PMID: 32191675]

[2] Grover S, Dua D, Sahoo S, Mehra A, Nehra R, Chakrabarti S. Why all COVID-19 hospitals should have mental health professionals: The importance of mental health in a worldwide crisis! Asian J Psychiatr 2020; 51: 102147. [http://dx.doi.org/10.1016/j.ajp.2020.102147] [PMID: 32473537]

[3] Hossain MM, Tasnim S, Sultana A, *et al.* Epidemiology of mental health problems in COVID-19: A review. F1000 Res 2020; 9: 636. [http://dx.doi.org/10.12688/f1000research.24457.1] [PMID: 33093946]

[4] Fiorillo A, Gorwood P. The consequences of the COVID-19 pandemic on mental health and implications for clinical practice. Eur Psychiatr 2020; 63(1): e32.

[http://dx.doi.org/10.1192/j.eurpsy.2020.35] [PMID: 32234102]

[5] Czeisler MÉ, Howard ME, Rajaratnam SMW. Mental health during the COVID-19 pandemic: Challenges, populations at risk, implications, and opportunities. Am J Health Promot 2021; 35(2): 301-11. [http://dx.doi.org/10.1177/0890117120983982b] [PMID: 33554624]

[6] Kola L. Global mental health and COVID-19. Lancet Psychiatry 2020; 7(8): 655-7. [http://dx.doi.org/10.1016/S2215-0366(20)30235-2] [PMID: 32502468]

[7] Rathod S, Pinninti N, Irfan M, *et al.* Mental health service provision in low and middle-income countries. Health Serv Insights 2017; 10: 1178632917694350. [http://dx.doi.org/10.1177/1178632917694350] [PMID: 28469456]

[8] Usher K, Durkin J, Bhullar N. The COVID-19 pandemic and mental health impacts. Int J Ment Health Nurs 2020; 29(3): 315-8. [http://dx.doi.org/10.1111/inm.12726] [PMID: 32277578]

[9] Khan KS, Mamun MA, Griffiths MD, Ullah I. The mental health impact of the COVID-19 pandemic across different cohorts. Int J Ment Health Addict 2022; 20(1): 380-6. [http://dx.doi.org/10.1007/s11469-020-00367-0] [PMID: 32837440]

[10] Sher L. Psychiatric disorders and suicide in the COVID-19 era. QJM 2020; 113(8): 527-8. [http://dx.doi.org/10.1093/qjmed/hcaa204] [PMID: 32569376]

[11] Thakur V, Jain A. COVID 2019-suicides: A global psychological pandemic. Brain Behav Immun 2020; 88: 952-3. [http://dx.doi.org/10.1016/j.bbi.2020.04.062] [PMID: 32335196]

[12] Arora A, Jha AK, Alat P, Das SS. Understanding coronaphobia. Asian J Psychiatr 2020; 54: 102384. [http://dx.doi.org/10.1016/j.ajp.2020.102384] [PMID: 33271693]

[13] Mertens G, Gerritsen L, Duijndam S, Salemink E, Engelhard IM. Fear of the Coronavirus (COVID-19): Predictors in an online study conducted in March 2020. J Anxiety Disord 2020; 74: 102258. [http://dx.doi.org/10.1016/j.janxdis.2020.102258] [PMID: 32569905]

[14] Ornell F, Schuch JB, Sordi AO, Kessler FHP. "Pandemic fear" and COVID-19: Mental health burden and strategies. Br J Psychiatr 2020; 42(3): 232-5. [http://dx.doi.org/10.1590/1516-4446-2020-0008] [PMID: 32267343]

[15] Shin LM, Liberzon I. The neurocircuitry of fear, stress, and anxiety disorders. Neuropsychopharmacology 2010; 35(1): 169-91. [http://dx.doi.org/10.1038/npp.2009.83] [PMID: 19625997]

[16] Bandelow B, Michaelis S. Epidemiology of anxiety disorders in the 21st century. Dialogues Clin Neurosci 2015; 17(3): 327-35. [http://dx.doi.org/10.31887/DCNS.2015.17.3/bbandelow] [PMID: 26487813]

[17] Santomauro DF, Mantilla HAM, Shadid J, *et al.* Global prevalence and burden of depressive and anxiety disorders in 204 countries and territories in 2020 due to the COVID-19 pandemic. Lancet 2021; 398(10312): 1700-12. [http://dx.doi.org/10.1016/S0140-6736(21)02143-7] [PMID: 34634250]

[18] Fountoulakis KN, Apostolidou MK, Atsiova MB, *et al.* Self-reported changes in anxiety, depression and suicidality during the COVID-19 lockdown in Greece. J Affect Disord 2021; 279: 624-9. [http://dx.doi.org/10.1016/j.jad.2020.10.061] [PMID: 33190113]

[19] Vrublevska J, Sibalova A, Aleskere I, *et al.* Factors related to depression, distress, and self-reported changes in anxiety, depression, and suicidal thoughts during the COVID-19 state of emergency in Latvia. Nord J Psychiatr 2021; 75(8): 614-23. [http://dx.doi.org/10.1080/08039488.2021.1919200] [PMID: 33969800]

[20] McLafferty M, Brown N, McHugh R, *et al.* Depression, anxiety and suicidal behaviour among college students: Comparisons pre-COVID-19 and during the pandemic. Psychiatr Res Commun 2021; 1(2): 100012. [http://dx.doi.org/10.1016/j.psycom.2021.100012] [PMID: 34977911]

[21] López SLC, Dutto FMA, Leyes CA, Fong SB, Rigalli A, Godoy JC. Levels and predictors of depression, anxiety, and suicidal risk during COVID-19 pandemic in Argentina: The impacts of quarantine extensions on mental health state. Psychol Health Med 2022; 27(1): 13-29. [http://dx.doi.org/10.1080/13548506.2020.1867318] [PMID: 33356541]

[22] Patel V, Kleinman A. Poverty and common mental disorders in developing countries. Bull World Health Organ 2003; 81(8): 609-15. [PMID: 14576893]

[23] Santana CLA, Manfrinato CV, Souza PRP, *et al.* Psychological distress, low-income, and socio-economic vulnerability in the COVID-19 pandemic. Public Health 2021; 199: 42-5. [http://dx.doi.org/10.1016/j.puhe.2021.08.016] [PMID: 34537575]

[24] Alonzo D, Popescu M, Ioannides P. Mental health impact of the COVID-19 pandemic on parents in high-risk, low income communities. Int J Soc Psychiatr 2022; 68(3): 575-81. [http://dx.doi.org/10.1177/0020764021991896] [PMID: 33517821]

[25] Pongutta S, Kantamaturapoj K, Phakdeesettakun K, Phonsuk P. The social impact of the COVID-19 outbreak on urban slums and the response of civil society organisations: A case study in Bangkok, Thailand. Heliyon 2021; 7(5): e07161. [http://dx.doi.org/10.1016/j.heliyon.2021.e07161] [PMID: 34136704]

[26] Koly KN, Khanam MI, Islam MS, *et al.* Anxiety and insomnia among urban slum dwellers in Bangladesh: The role of COVID-19 and its associated factors. Front Psychiatr 2021; 12: 769048. [http://dx.doi.org/10.3389/fpsyt.2021.769048] [PMID: 34925097]

[27] National Institute of Statistics and Informatics (INEI). Provincial and district monetary poverty map 2018. Available from: https://www.inei.gob.pe/media/MenuRecursivo/publicaciones_digitales/Est/Lib1718/Libro.pdf

[28] Ministry of Justice and Human Rights (MINJUS). Investigation: patrimonial crimes. 2021. Available from: https://www.gob.pe/institucion/minjus/informes-publicaciones/1734606-crimenes-patrimoniales

[29] Lee SA. Coronavirus anxiety scale: A brief mental health screener for COVID-19 related anxiety. Death Stud 2020; 44(7): 393-401. [http://dx.doi.org/10.1080/07481187.2020.1748481] [PMID: 32299304]

[30] Caycho RT, Vilca LW, Carbajal LC, *et al.* Coronavirus anxiety scale: New psychometric evidence for the Spanish version based on CFA and IRT models in a Peruvian sample. Death Stud 2022; 46(5): 1090-9. [http://dx.doi.org/10.1080/07481187.2020.1865480] [PMID: 33427098]

[31] Ahorsu DK, Lin CY, Imani V, Saffari M, Griffiths MD, Pakpour AH. The fear of COVID-19 scale: Development and initial validation. Int J Ment Health Addict 2022; 20(3): 1537-45. [http://dx.doi.org/10.1007/s11469-020-00270-8] [PMID: 32226353]

[32] Huarcaya VJ, Villarreal ZD, Podestà A, Luna-Cuadros MA. Psycometric properties of a Spanish version of the fear of COVID-19 scale in general population of Lima, Peru. Int J Ment Health Addict 2022; 20(1): 249-62. [http://dx.doi.org/10.1007/s11469-020-00354-5] [PMID: 32837434]

[33] Campo AA, De Mendieta CT. Social determinants of mental health and the COVID-19 pandemic in low-income and middle-income countries. Lancet Glob Health 2021; 9(8): e1029-30. [http://dx.doi.org/10.1016/S2214-109X(21)00253-9] [PMID: 34175004]

[34] Lakhan R, Sharma M. Depression in women migrants living in slums in north India. J Neurosci Rural Pract 2021; 12(2): 223. [http://dx.doi.org/10.1055/s-0041-1726624] [PMID: 33927512]

[35] Zürcher SJ, Kerksieck P, Adamus C, *et al.* Prevalence of mental health problems during virus epidemics in the general public, health care workers and survivors: A rapid review of the evidence. Front Public Health 2020; 8: 560389. [http://dx.doi.org/10.3389/fpubh.2020.560389] [PMID: 33262966]

[36] Schafer KM, Lieberman A, Sever AC, Joiner T. Prevalence rates of anxiety, depressive, and eating pathology symptoms between the pre- and peri-COVID-19 eras: A meta-analysis. J Affect Disord 2022; 298(Pt A): 364-72. [http://dx.doi.org/10.1016/j.jad.2021.10.115] [PMID: 34740748]

[37] Passos L, Prazeres F, Teixeira A, Martins C. Impact on mental health due to COVID-19 pandemic: Cross-sectional study in Portugal and Brazil. Int J Environ Res Public Health 2020; 17(18): 6794. [http://dx.doi.org/10.3390/ijerph17186794] [PMID: 32957702]

[38] Perzow SED, Hennessey EMP, Hoffman MC, Grote NK, Davis EP, Hankin BL. Mental health of pregnant and postpartum women in response to the COVID-19 pandemic. J Affect Disord Rep 2021; 4: 100123. [http://dx.doi.org/10.1016/j.jadr.2021.100123] [PMID: 33649750]

[39] Ettman CK, Abdalla SM, Cohen GH, Sampson L, Vivier PM, Galea S. Prevalence of depression symptoms in US adults before and during the COVID-19 pandemic. JAMA Netw Open 2020; 3(9): e2019686. [http://dx.doi.org/10.1001/jamanetworkopen.2020.19686] [PMID: 32876685]

[40] Powell T, Bellin E, Ehrlich AR. Older Adults and COVID-19: The most vulnerable, the hardest hit. Hastings Cent Rep 2020; 50(3): 61-3. [http://dx.doi.org/10.1002/hast.1136] [PMID: 32596888]

[41] Gyasi RM. Fighting COVID-19: Fear and internal conflict among older adults in Ghana. J Gerontol Soc Work 2020; 63(6-7): 688-90. [http://dx.doi.org/10.1080/01634372.2020.1766630] [PMID: 32558630]

[42] Chen LK. Older adults and COVID-19 pandemic: Resilience matters. Arch Gerontol Geriatr 2020; 89: 104124. [http://dx.doi.org/10.1016/j.archger.2020.104124] [PMID: 32474351]

[43] Mistry SK, Ali ARMM, Akther F, Yadav UN, Harris MF. Exploring fear of COVID-19 and its correlates among older adults in Bangladesh. Global Health 2021; 17(1): 47. [http://dx.doi.org/10.1186/s12992-021-00698-0] [PMID: 33853616]

[44] Yadav UN, Rayamajhee B, Mistry SK, Parsekar SS, Mishra SK. A syndemic perspective on the management of non-communicable diseases amid the COVID-19 pandemic in low- and middle-income countries. Front Public Health 2020; 8: 508. [http://dx.doi.org/10.3389/fpubh.2020.00508] [PMID: 33102414]

[45] Hossain MA, Jahid MIK, Hossain KMA, *et al.* Knowledge, attitudes, and fear of COVID-19 during the rapid rise period in Bangladesh. PLoS One 2020; 15(9): e0239646. [http://dx.doi.org/10.1371/journal.pone.0239646] [PMID: 32970769]

[46] Doshi D, Karunakar P, Sukhabogi JR, Prasanna JS, Mahajan SV. Assessing coronavirus fear in Indian population using the fear of COVID-19 scale. Int J Ment Health Addict 2021; 19(6): 2383-91. [http://dx.doi.org/10.1007/s11469-020-00332-x] [PMID: 32837422]

[47] Al-Rahimi JS, Nass NM, Hassoubah SA, Wazqar DY, Alamoudi SA. Levels and predictors of fear and health anxiety during the current outbreak of COVID-19 in immunocompromised and chronic disease patients in Saudi Arabia: A cross-sectional correlational study. PLoS One 2021; 16(4): e0250554. [http://dx.doi.org/10.1371/journal.pone.0250554] [PMID: 33901260]

[48] Yasmin F, Dapke K, Khalid MR, *et al.* Generalized anxiety disorder and depressive symptoms among Pakistani population during the second wave of the COVID-19 pandemic: A regression analysis. Am J Trop Med Hyg 2021; 105(4): 915-23. [http://dx.doi.org/10.4269/ajtmh.21-0380] [PMID: 34460417]

[49] Dagne H, Atnafu A, Alemu K, *et al.* Anxiety and associated factors among Ethiopian health professionals at early stage of COVID-19 pandemic in Ethiopia. PLoS One 2021; 16(6): e0252664. [http://dx.doi.org/10.1371/journal.pone.0252664] [PMID: 34101757]

[50] Özdin S, Bayrak ÖŞ. Levels and predictors of anxiety, depression and health anxiety during COVID-19 pandemic in Turkish society: The importance of gender. Int J Soc Psychiatry 2020; 66(5): 504-11. [http://dx.doi.org/10.1177/0020764020927051] [PMID: 32380879]

[51] McLean CP, Anderson ER. Brave men and timid women? A review of the gender differences in fear and anxiety. Clin Psychol Rev 2009; 29(6): 496-505. [http://dx.doi.org/10.1016/j.cpr.2009.05.003] [PMID: 19541399]

[52] Mathias K, Rawat M, Philip S, Grills N. "We've got through hard times before" : Acute mental distress and coping among disadvantaged groups during COVID-19 lockdown in North India - A qualitative study. Int J Equity Health 2020; 19(1): 224. [http://dx.doi.org/10.1186/s12939-020-01345-7] [PMID: 33334344]

[53] Nuwematsiko R, Nabiryo M, Bomboka JB, *et al.* Unintended socio-economic and health consequences of COVID-19 among slum dwellers in Kampala, Uganda. BMC Public Health 2022; 22(1): 88. [http://dx.doi.org/10.1186/s12889-021-12453-6] [PMID: 35027023]

[54] Adams EA, Adams YJ, Koki C. Water, Sanitation, and Hygiene (WASH) insecurity will exacerbate the toll of COVID-19 on women and girls in low-income countries. Sustainability 2021; 17(1): 85-9. [http://dx.doi.org/10.1080/15487733.2021.1875682]

[55] National Institute of Statistics and Informatics (INEI). Peru: demographic and family health survey ENDES 2020. Available from: https://www.inei.gob.pe/media/MenuRecursivo/publicaciones_digitales/Est/Lib1795/

[56] Yildirim H, Işik K, Aylaz R. The effect of anxiety levels of elderly people in quarantine on depression during COVID-19 pandemic. Soc Work Public Health 2021; 36(2): 194-204. [http://dx.doi.org/10.1080/19371918.2020.1868372] [PMID: 33413035]

[57] Hossain MI. COVID-19 impacts on employment and livelihood of marginal people in Bangladesh: Lessons learned and way forward. S Asian Surv 2021; 28(1): 57-71. [http://dx.doi.org/10.1177/0971523121995072]

[58] Gil D, Domínguez P, Undurraga EA, Valenzuela E. Employment loss in informal settlements during the COVID-19 pandemic: Evidence from Chile. J Urban Health 2021; 98(5): 622-34. [http://dx.doi.org/10.1007/s11524-021-00575-6] [PMID: 34664186]

[59] Sher L. The impact of the COVID-19 pandemic on suicide rates. QJM 2020; 113(10): 707-12. [http://dx.doi.org/10.1093/qjmed/hcaa202] [PMID: 32539153]

[60] Bhuiyan AKMI, Sakib N, Pakpour AH, Griffiths MD, Mamun MA. COVID-19-related suicides in Bangladesh due to lockdown and economic factors: Case study evidence from media reports. Int J Ment Health Addict 2021; 19(6): 2110-5. [http://dx.doi.org/10.1007/s11469-020-00307-y] [PMID: 32427168]

[61] Ando H, Ikegami K, Nagata T, *et al.* Effect of commuting on the risk of COVID-19 and COVID-19-induced anxiety in Japan, December 2020. Arch Public Health 2021; 79(1): 222. [http://dx.doi.org/10.1186/s13690-021-00751-9] [PMID: 34879866]

[62] Taubman BAO, Chasson M, Abu SS, Weiss E. Distress and anxiety associated with COVID-19 among Jewish and Arab pregnant women in Israel. J Reprod Infant Psychol 2020; 38(3): 340-8. [http://dx.doi.org/10.1080/02646838.2020.1786037] [PMID: 32573258]

[63] Stoler J, Miller JD, Brewis A, *et al.* Household water insecurity will complicate the ongoing COVID-19 response: Evidence from 29 sites in 23 low- and middle-income countries. Int J Hyg Environ Health 2021; 234: 113715. [http://dx.doi.org/10.1016/j.ijheh.2021.113715] [PMID: 33735823]

[64] World Health Organization (WHO). Considerations for quarantine of individuals in the context of containment for coronavirus disease (COVID-19). 2020. Available from: https://apps.who.int/iris/bitstream/handle/10665/331497/WHO-2019-nCoV-IHR_Quarantine-2020.2-eng.pdf?sequence=1

[65] Koçak O, Koçak ÖE, Younis MZ. The psychological consequences of COVID-19 fear and the moderator effects of individuals' underlaying illness and witnessing infected friends and family. Int J Environ Res Public Health 2021; 18(4): 1836. [http://dx.doi.org/10.3390/ijerph18041836] [PMID: 33668655]

[66] National Institute of Mental Health (INSM). The pandemic severely affects access to mental health services. 2021. Available from: http://www.insm.gob.pe/oficinas/comunicaciones/notasdeprensa/2021/040.html

[67] Sotomayor BC, Matta SH, Perez SR, Matta SE, Matta ZL. Fear of COVID-19 among Peruvian people living in disadvantaged communities: A cross sectional study. Clin Pract Epidemiol Ment Health 2021; 17(1): 19-25. [http://dx.doi.org/10.2174/1745017902117010019] [PMID: 34040650]

[68] Kola L, Kohrt BA, Hanlon C, *et al.* COVID-19 mental health impact and responses in low-income and middle-income countries: Reimagining global mental health. Lancet Psychiatry 2021; 8(6): 535-50. [http://dx.doi.org/10.1016/S2215-0366(21)00025-0] [PMID: 33639109]

[69] Jones AD. Food insecurity and mental health status: A global analysis of 149 countries. Am J Prev Med 2017; 53(2): 264-73. [http://dx.doi.org/10.1016/j.amepre.2017.04.008] [PMID: 28457747]