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COVID-19 information received by the Peruvian population, during the first phase of the pandemic, and its association with developing psychological distress

Information about COVID-19 and distress in Peru

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Abstract

It is suspected that the information the population has about coronavirus disease 2019 (COVID-19) determines both its preventive measures and its effects on mental health. The internet and social media are the sources that have largely replaced the official and traditional channels of information. The objective of this study is to analyse the influence of the sources used by the population in Peru to obtain information on COVID-19 and its association with developing psychological distress (PD) and preventive measures against contagion.

1699 questionnaires were analysed. A previously validated instrument adapted to Peru was used. Participants were questioned about the information received regarding COVID-19, its sources, time of exposition, assessment, or beliefs about it. Mental health was measured with the Goldberg General Health Questionnaire. Descriptive and bivariate analysis were performed, developing a classification and regression tree for PD based on beliefs and information about the pandemic.

The most used source of information on COVID-19 in Peru was social media and this is associated with developing PD, both in the general population and among health professionals. The quality of the information about treatments for COVID-19 is associated with PD in the general population, whereas prognosis generates more distress among healthcare professionals. The biggest concern is transmitting the virus to family members, close persons, or patients, with more confidence in health professionals than in the health system.

The health authorities should use the social media to transmit quality information about COVID-19 and, at the same time, to gather in real time the opinions on the implemented preventive measures. For all, this it is necessary to have higher credibility in the population to increase the confidence in the health system, looking at basic aspects for compliance with prevention measures and improvement of mental health.

Abbreviations: CART = classification and regression tree, COVID-19 = coronavirus disease 2019, PD = psychological distress, SD = standard deviation.

Keywords: coronavirus disease 2019, information, internet, Peru, psychological distress, social media

1. Introduction

The coronavirus disease 2019 (COVID-19) pandemic, generated in Wuhan, China, and which led to the declaration of an international public health emergency by the World Health Organization on January 30, 2020,[1] is having unpredictable effects on the economy,[2] the social, and psychological well-being of humanity, as well as in the infrastructure of the global health care system,[3] thus generating a major public health problem.[4]

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All relevant data are available within this article and its artwork.

All data generated or analyzed during this study are included in this published article.

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The first case reported in Peru was on March 6, 2020 and on March 26, 2021, about 1.5 million cases and more than 50,000 deaths had been reported, in both cases the fourth nation in number in Latin America, having administered more than 700,000 doses of vaccines.[5]

Experts predict that the development of the pandemic will depend on vaccination programs, the emergence and spread of variants, and public responses to nonpharmaceutical interventions.[6,7]

Unlike in previous epidemics, in the current pandemic it is possible to know in real time the number of people infected or dead worldwide as there are specific institutions that update the information daily.[8,9] However, at the same time that people have access to theoretically reliable official sources of information, they also receive information from many other sources whose quality is not verified, leading to the existence of fake-news and impacting on the level of compliance with the evidenced, preventive measures.[10]

It has been detected that the acceptance of the COVID-19 vaccine is associated with the ability to detect fake news and with the knowledge about health,[11] as well as with the implication with the important role of healthcare workers.[12] With vaccination being the most effective measure to control the pandemic, the causes of its acceptance have been investigated[13] and this issue has been analysed on Twitter to identify public opinions of people who is reluctant to receiving vaccines,[14,15] identifying many reasons such as, concerns about their safety, lack of knowledge, suspicions of political or economic interests, certain messages from people with influence on social media, or the lack of legal responsibility of the vaccines manufacturers.[16] Therefore, the response to certain conspiracy theories and fake news about the pandemic should be based on calming, scientific-based messages, and taking assertive and public legal action against those who make such claims.[17]

It is unclear whether spending more time learning about pandemics increases or reduces the level of stress[18,19] but clear information does reduce it,[20] as well as the perception of risk.[21] However, frequent changes in the authorities' recommendations on preventive measures may have contributed to a noncompliance[22] and the emergence of erroneous news.[23] Social media have been analysed to determine how the interest in receiving different types of information about the disease has changed during the COVID-19 pandemic.[24] In this sense, social media has been used to measure attitudes towards mental health[25] and analysing positive and negative aspects about public perceptions regarding COVID-19, which can help address preventive interventions to reduce health-related, psychosocial, or social problems.[26]

Likewise, infoveillance is proposed as an effective and economical alternative for the surveillance of epidemic diseases, although more research is needed to understand the real usefulness of Google Trends.[27] The correlation between Google© searches related to seasonal influenza and disease incidence data, as well as the early and effective prediction of public health events, had already been observed.[28] These data obtained better predictive results than traditional methods of epidemiological surveillance, giving weight to the concept of infodemiology, which evaluates the health-related information that users upload to the internet for use in public health.[28]

It has been argued that the rapid spread of misinformation through social media platforms can also affect mental health, with cross-effects on policymakers, workers, and the general population.[29] Some authors even maintain that poor-quality research has been increased by the rush to research COVID-19,[30] hence the important role that health authorities play[31] in reducing effects on mental health.[32,33] In this context, the objectives of the study are: to describe the sources and type of information on the COVID-19 pandemic used by the population of Peru, differentiating between the general population and healthcare professionals; and to analyse their beliefs and concerns, to identify a possible association with the development of psychological distress (PD).

2. Methodology

2.1. Design and sample

Cross-sectional observational study based on questionnaires.

Nonprobabilistic sampling was carried out. The same methodology as the European study on Living, Working and COVID-19 by Eurofound[34] was chosen for sampling, as well as the nonprobabilistic sampling method: snowballing method.

The estimated sample size was 1537 and with 95% confidence level, a precision of 2.5% and a loss adjustment of 15% 1808. Finally, the loss was 6%, leaving a sample size of 1699. Data were collected using questionnaires, collected from the 25 existing departments of Peru, with a higher proportion from the departments of Lima (38.14%), Huanuco (12.77%), and Ancash (10.59%).

The following were taken as inclusion criteria: being 18 years or older, residing in Peru, being an active worker, and accepting the informed consent.

2.2. Measuring instruments

For data collection, a questionnaire created in Spain by a panel of experts was used, which has been applied as a measuring instrument in different studies on the emotional impact of the COVID-19 pandemic on the Spanish population.[35–37]

A process of cultural adaptation of the instrument to the population of Peru was carried out through a panel of experts (epidemiologists, physicians, psychologists, nurses, and public health experts). After that, a pilot study was conducted in 57 people who met the inclusion criteria to assess the understanding of the items, as well as the extension of the questionnaire. With these results, preliminary psychometric analyses were performed, obtaining a Cronbach's alpha coefficient of 0.86 and good psychometric properties. With this, the research team agreed and accepted the version of the questionnaire that was culturally adapted to the population of Peru.

The Goldberg General Health Questionnaire was used to assess mental health, which is useful for screening nonpsychotic psychiatric disorders.[38] This is a scale of 12 items, with 4 response options, an overall rating from 0 to 12; a cutoff point of 3 was established.

In addition, the following variables were also collected: sources of information used to inform about COVID-19; the amount of time spent in doing so; the number of hours a day listening, reading, or watching pandemic-related news; how the degree of veracity of the received information was assessed; and whether this contrasted with official sources (dichotomic response: YES/NO).

Questions were raised about the level of knowledge about the pandemic: possibility of becoming infected or transmitting the disease; health effects after the infection; difficulty of treatment;

and concerns about the disease. The participants assessed from 1 to 10 the degree of information regarding COVID-19 symptoms, prognosis, treatment, transmission routes, preventive measures, and information provided by their company. The accessibility, quality, quantity, and usefulness of the information received was assessed through a Likert-type scale that ranged from 1 to 5, in which 1 = very low, 2 = low, 3 = intermediate, 4 = high, and 5 = very high. One item assessed information on symptoms, prognosis, treatments, transmission pathways, and preventive measures using a 5-choice Likert-type response.

2.3. Procedure

The questionnaire was distributed online through the Qualtrics (SAP, Seattle, OR) online survey platform. It was sent to the email lists of professional groups that were invited to participate. Participants were invited to disseminate the questionnaire to their co-workers to trigger a snowball effect, and the collaboration of scientific societies and universities was requested.

Participants completed the survey from different electronic devices (tablet, personal computer, and mobile phone) with internet access. The questionnaires were received in the first phase of the pandemic, between April 2 and September 2, 2020. There were no incentives to participate in the study.

2.4. Data analysis

After data clean-up, a descriptive analysis was performed collecting frequencies, percentages, position, and dispersion measures, depending on the type of variable. From the study of normality in data distribution, the Student *t* test for independent samples and the chi-squared association test were used to execute the bivariate analyses between the study variables.

The classification and regression trees (CART) method allowed to obtain a binary tree referring to a predictive model where the algorithm is used to predict values based on several categorical or continuous input variables. Optimal cutoff points were selected to improve the overall test by minimising the value of the adjustment statistic. Thus, the cases within each node were similar to each other, and different from the cases of the other nodes. The terminal nodes showed the predominant class, the proportion of cases with PD within the node, and the percentage of node cases over the total sample.[39,40]

The analyses were carried out with the statistical software SPSS 26.0 (IBM, Armonk, NY, USA) and R version 4.0.0 (IBM, Armonk, NY).

2.5. Ethical principles

The ethical principles set out in the Declaration of Helsinki were followed. The participants' permission was obtained through a written informed consent in which they expressed their voluntary desire to participate in the study. Data were recorded anonymously and treated confidentially. The study has been authorised by the Ethics Committee of the Universidad Científica del Sur, in Peru (Constancia No. 083-CEI-CIENTIFICA-2020), and in Spain by the Research Committee of Huelva, belonging to the Regional Ministry of Health of Andalusia (PI 036/20).

3. Results

One thousand six hundred ninety-nine data were analysed, of which 29.5% corresponded to healthcare workers and the rest to nonhealthcare workers. The mean age in the sample was 41.4 (standard deviation [SD] = 14.2). 56.2% were women, 51.7% had no partner, 85.9% had higher education, 57.4% had a child, and 55.2% had a pet.

3.1. Beliefs about the outbreak and psychological distress

Table 1 shows that the belief with the highest rating was "concern about being a carrier and transmitting the virus to family members, close persons, or patients" M = 8.54 (SD = 2.11), followed by "general concern about COVID" M = 8.47 (SD = 1.84), "degree of concern about getting infected" M = 7.85 (SD = 2.30), and "probability of surviving if infected" M = 7.37 (SD = 2.23). On the contrary, the lowest rated items were "confidence in the health system to diagnose or recognise COVID-19" M = 5.50 (SD = 2.31), "risk of getting infected" M = 5.98 (SD = 2.51), and "confidence in the health system's capacity to diagnose or recognise COVID-19" M = 6.50 (SD = 2.23).

The genesis of PD showed statistically significant association ($P < .001$) in all types of beliefs about COVID-19, both among healthcare workers and nonhealthcare workers. The only belief with no association with the level of PD among healthcare professionals was "confidence in the ability of professionals to diagnose or recognise COVID-19" (Table 1). This belief, together with "risk of getting infected" and "degree of concern about being a carrier and transmitting the virus to family members, close persons, or patients", marked the differences between healthcare and nonhealthcare professionals, offering healthcare workers the highest scores.

3.2. Classification and regression tree for the level of psychological distress based on beliefs about the pandemic

In a first node, there are 1699 cases, of which 59.68% (1014) had PD. The variable "*degree of concern about getting infected* (C_8)" gives rise to second-level nodes, with a cutoff point at 6.5. The percentage of people with PD when the degree of concern is below the cutoff point is 40.84%. However, this percentage increases to 65.99% when it exceeds that point. In the latter branch, PD cases can be classified according to *confidence in the health system* to diagnose and recognise COVID-19; a confidence of less than 6.5 points would increase PD cases to 71.66%, compared to the 55.90% of cases found when confidence in the health system is higher.

The *information believed to have about the treatment*, in the case of greater confidence in the health system, will allow to classify 62.42% of PD when assigned a score less than 7.5 points, decreasing to 43.75% when it is greater than or equal to it. Finally, when there is a belief to have more information about treatments, *prognosis information* of less than 8.5 points ranks 54.79% of PD, versus 34.48% when the level of information is higher than the cutoff point (Fig. 1).

3.3. Sources and type of information received on the pandemic, the time spent on it, and psychological distress

63% of cases claimed to consult more than 2 sources of information and 45.6%, 4 or more. The mean number of sources of information consulted per day was 3.44 (SD = 3.49); there were no significant differences between healthcare and non-healthcare workers (Table 2).

Table 1

Relationship between variables referring to beliefs about the outbreak and psychological distress, distinguishing between healthcare and nonhealthcare workers.

	Workers N=1699					Healthcare workers (n=501)					Nonhealthcare workers (n=1198)					Healthcare vs nonhealthcare	
		YES (N=1014)	NO (N=685)				YES (N=285)	NO (N=216)				YES (N=729)	NO (N=469)				
	M (SD)	M (SD)	M (SD)	Statistical	*P*	M (SD)	M (SD)	M (SD)	Statistical	*P*	M (SD)	M (SD)	M (SD)	Statistic	*P*	Statistical	*P*
Concern about COVID-19 (C_1)	8.47 (1.84)	8.74 (1.59)	8.08 (2.10)	7.031	**<.001**	8.58 (1.74)	8.83 (1.53)	8.26 (1.93)	3.585	**<.001**	8.43 (1.88)	8.71 (1.62)	7.99 (2.17)	6.114	**<.001**	1.624	.105
Probability of surviving COVID-19 if infected or gets infected (C_2)	7.37 (2.23)	7.11 (2.26)	7.74 (2.14)	−5.752	**<.001**	7.37 (2.24)	7.13 (2.29)	7.68 (2.14)	−2.725	**.007**	7.37 (2.23)	7.11 (2.26)	7.77 (2.14)	−5.094	**<.001**	.024	.981
Confidence in the capacity of healthcare professionals to diagnose or recognise COVID-19 (C_3)	6.50 (2.23)	6.27 (2.28)	6.84 (2.13)	−5.273	**<.001**	6.80 (2.06)	6.67 (2.09)	6.97 (2.01)	−1.621	.106	6.38 (2.29)	6.12 (2.33)	6.79 (2.18)	−4.966	**<.001**	3.666	**<.001**
Confidence in the health system to diagnose or recognise COVID-19 (C_4)	5.50 (2.31)	5.26 (2.28)	5.87 (2.30)	−5.380	**<.001**	5.62 (2.16)	5.38 (2.20)	5.94 (2.08)	−2.890	**.004**	5.46 (2.36)	5.21 (2.32)	5.84 (2.39)	−4.490	**<.001**	1.354	.176
Risk of getting infected with COVID-19 (C_5)	5.98 (2.51)	6.13 (2.49)	5.75 (2.52)	3.018	**.003**	6.79 (2.56)	7.04 (2.48)	6.47 (2.64)	2.464	**.014**	5.64 (2.41)	5.77 (2.41)	5.42 (2.39)	2.449	**.014**	8.652	**<.001**
Health effects after the infection (C_6)	7.21 (2.42)	7.43 (2.32)	6.89 (2.52)	4.508	**<.001**	7.08 (2.42)	7.38 (2.29)	6.68 (2.53)	3.206	**.001**	7.27 (2.42)	7.45 (2.335)	6.99 (2.51)	3.233	**.001**	-1.507	.132
Difficulty of treatment (C_7)	6.88 (2.20)	7.04 (2.15)	6.65 (2.26)	3.584	**<.001**	6.88 (2.17)	7.13 (2.03)	6.56 (2.31)	2.881	**.004**	6.88 (2.22)	7.00 (2.19)	6.68 (2.25)	2.429	**.015**	.052	.958
Degree of concern about the infection (C_8)	7.85 (2.30)	8.31 (2.04)	7.17 (2.50)	9.906	**<.001**	7.86 (2.23)	8.35 (7.20)	7.20 (2.39)	5.744	**<.001**	7.85 (2.33)	8.29 (2.07)	7.16 (2.55)	8.097	**<.001**	.060	.952
Degree of concern about being transmitter and transmitting the virus to relatives, close persons, or patients (C_9)	8.54 (2.11)	8.90 (1.76)	8.00 (2.45)	8.342	**<.001**	8.79 (1.85)	9.06 (1.59)	8.44 (2.10)	3.623	**<.001**	8.43 (2.20)	8.84 (1.82)	7.79 (2.57)	7.689	**<.001**	3.458	**.001**

Scoring from 1 to 10.
COVID-19 = coronavirus disease 2019, SD = standard deviation.

97.6% of respondents spent at least 1 hour a day watching, reading or listening to COVID-19-related news, 52% spent between 1 and 2 hours, and 32.5% spent more than 3 hours a day. The mean number of hours per day was 3.44 (SD = 3.49). This time was higher in workers with PD regarding the complete sample ($P < .001$) as well as healthcare workers ($P = .031$) and nonhealthcare workers ($P = .001$). A greater number of hours spent was also detected in healthcare workers versus nonhealthcare workers ($P = .001$).

Information on COVID-19 with the highest mean rating was regarding "preventive measures" M = 7.64 (SD = 2.26), followed by information on "transmission routes" M = 7.39 (SD = 2.29) and on "symptoms" M = 7.18 (SD = 2.30). On the contrary, the lowest rated was information on "treatment" M = 5.88 (SD = 2.37) (Table 2). It can be seen how the assessment of all types of information (symptoms, prognosis, treatment, information pathways, or preventive measures) was associated with the level of PD and showed a statistically significant difference. This was true both globally and among nonhealthcare workers. In healthcare workers, it was only observed that the level of PD is associated with information on the prognosis of the disease (Table 2).

Statistically significant differences were found between healthcare and nonhealthcare workers both regarding the number of daily hours spent consulting and the information received on symptoms, routes of transmission, and preventive measures (Table 2). There was an association between the clear and precise information provided by the companies and the level of PD ($P = .053$), but this association was not maintained when comparing healthcare and nonhealthcare workers (Table 2).

3.4. Accessibility, quantity, quality, and usefulness of media and official information channels on COVID-19 and level of psychological distress

Table 3 shows that there was a statistically significant difference ($P < .001$) between the information received through the media or through official channels regarding its accessibility, quantity, quality, and usefulness. There was an association with the development of PD only regarding the quality of information received, both for the media and official channels.

60.2% considered having high or very high accessibility to such information through the media, while this percentage was reduced to 48.0% through official information channels. The amount of information received through the media was considered high or very high by 63.1% and down to 44.1% regarding official channels. The percentages regarding the quality or usefulness of the information were higher for official channels than for the media. 36.2% considered that the information received through official channels was of high or very high quality, lowering this percentage to 23.1% when the information was received through the media. The usefulness of information from official channels was considered high or very high by 39.0%, while this percentage was reduced to 30.9% compared to that obtained from the media (Table 3).

3.5. Means or platforms used to receive the information

As can be seen in Figure 2, most participants used social media (WhatsApp, Facebook, Instagram, etc) to learn about COVID-19 (86.17%), followed by television (63.39%), and the websites of official bodies or scientific societies (49.97%). Although the proportion that used social media did not differ when comparing

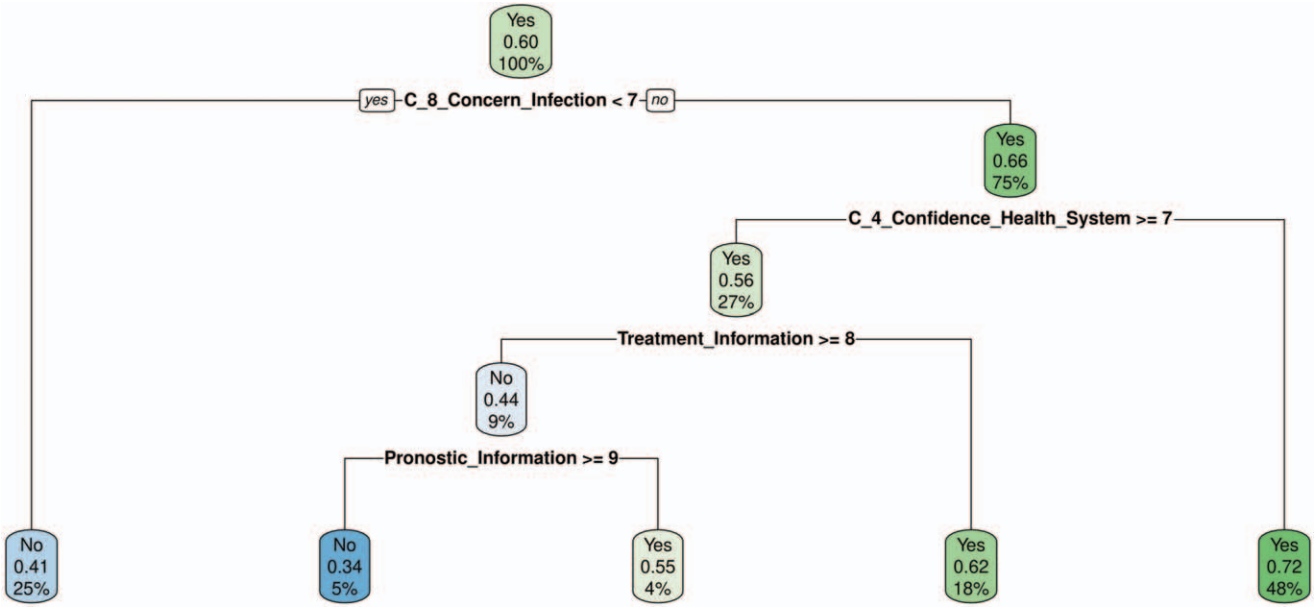

Figure 1. Regression and classification tree (CART) for psychological distress regarding confidence in the health system, information about treatments and prognostics about the COVID-19 pandemic.

healthcare professionals and other professionals, healthcare professionals made a greater use of the websites of official bodies or scientific societies and to a lesser extent, television and friends or family. Google and other search engines were used by 34.08%, and in a similar proportion by both healthcare and nonhealthcare workers. Figure 2 shows the differences between healthcare and nonhealthcare workers.

4. Discussion

The present study has described the main sources of information on COVID-19 consulted by the population of Peru and has studied the relationship with the presence of PD. Thus, although official information channels were valued as of higher quality and usefulness than the media, the most used and accessible means were the media. Among them, in line with Abdelhafiz results, social media (WhatsApp, Facebook, Instagram, etc) were the most used channel of information (86%),[41] and with a greater use than that of a similar study conducted in Spain (77.41%).[36] In addition, this proportion is similar in the subgroup of healthcare professionals. This is in line with the importance of enhancing quality information on social media and the internet, already demanded in epidemics prior to the current one.[21]

We have seen how the greatest concern is to transmit the disease to relatives or patients, as in previous studies,[42] and the concern about this infection is the variable that most conditions the level of PD, which is in turn conditioned by confidence in the health system. The information transmitted through social media about the health system and its capacity to respond to COVID-19, as this is the main source of information, has a special impact on the level of PD that the population will develop; herein lies the great need that this information be of quality.[23] In the present study, greater confidence is observed in healthcare professionals than in the health system, as in a similar study carried out in Spain, although with lower values than in Spain.[37]

The information available on treatment or diagnosis are variables that have proved to greatly condition the development of PD in the present study. Both aspects are a priority target of the fake news that spreads through social media such as the ones that state only older people can become infected, that the ingestion of bleach can kill the virus, or that the virus is the product of a laboratory.[11] Hence the importance for public health bodies and scientific societies to not only make scientific evidence accessible on their official websites or scientific publications, but to also not forget to transmit it through the media in general, social media in particular, using an easy-to-understand language.

Regarding the important role played by healthcare professionals when transmitting information to the population, the danger has been considered when these professionals transmit information contrary to scientific evidence, as they usually have enough credibility among the population. The differences of opinion between experts, something logical, should be resolved by following the procedures marked by the code of ethics.[12]

The number of hours spent consulting about COVID-19 daily, with a mean of 3.44 hours a day, is lower than that observed in Spain.[43] Although in previous studies this association has not always been found,[18,19] in the present study, the time spent obtaining information on COVID-19 and the level of PD have been associated, both in the general population and in the subgroup of healthcare workers, although this association follows logic and is higher in nonhealthcare workers. As regards the general population, the search for information on all issues related to the pandemic is associated with generating PD, while among healthcare workers, only the search for information on the prognosis is associated with developing more or less PD, something that can be understood due to the level of knowledge of these professionals. From this, it is possible to infer that, although both the general population and healthcare professionals use social media as the main source to obtain information, the type of information acts in a differentiated way when it comes to causing PD in both groups.

Table 2

Information on the pandemic and psychological distress, distinguishing between healthcare and nonhealthcare workers.

	Workers N=1699					Healthcare workers (n=501)					Nonhealthcare workers (n=1198)					Healthcare vs nonhealthcare	
		GHQ12					GHQ12					GHQ12					
	M (SD)	YES (N=1014)	NO (N=685)	Statistical	P	M (SD)	YES (N=285)	NO (N=216)	Statistical	P	M (SD)	YES (N=729)	NO (N=469)	Statistical	P	Statistical	P
No. of sources	3.44 (2.04)	3.42 (2.04)	3.48 (2.04)	−.640	.522	3.56 (2.06)	3.54 (2.00)	3.57 (2.13)	−.163	.871	3.40 (2.03)	3.37 (2.06)	3.44 (1.99)	−.595	.552	1.486	.137
No. of hours spent daily	3.44 (3.49)	3.70 (3.59)	3.06 (3.30)	3.837	**<.001**	3.88 (3.85)	4.20 (4.09)	3.47 (3.46)	2.163	**.031**	3.26 (3.31)	3.51 (3.35)	2.86 (3.21)	3.340	**.001**	3.213	**.001**
Information on COVID-19*																	
Symptoms	7.18 (2.30)	7.06 (2.29)	7.35 (2.30)	−2.522	**.012**	7.41 (2.23)	7.33 (2.24)	7.52 (2.22)	−.939	.348	7.08 (2.32)	6.95 (2.30)	7.27 (2.34)	−2.277	**.023**	2.743	**.006**
Prognosis	6.44 (2.31)	6.25 (2.31)	6.72 (2.30)	−4.084	**<.001**	6.56 (2.25)	6.33 (2.30)	6.87 (2.13)	−2.689	**.008**	6.39 (2.34)	6.23 (2.31)	6.65 (2.37)	−3.085	**.002**	1.346	.178
Treatment	5.88 (2.37)	5.64 (2.32)	6.23 (2.40)	−5.095	**<.001**	5.88 (2.32)	5.79 (2.26)	6.00 (2.40)	−1.011	.312	5.87 (2.39)	5.57 (2.35)	6.33 (2.39)	−5.413	**<.001**	.101	.919
Transmission routes	7.39 (2.29)	7.26 (2.33)	7.59 (2.21)	−2.874	**.004**	7.59 (2.16)	7.57 (2.18)	7.63 (2.14)	−.272	.785	7.31 (2.34)	7.14 (2.38)	7.57 (2.25)	−3.107	**.002**	2.430	**.015**
Preventive measures	7.64 (2.26)	7.51 (2.29)	7.84 (2.21)	−2.962	**.003**	7.88 (2.12)	7.83 (2.16)	7.95 (2.07)	−.614	.539	7.54 (2.31)	7.38 (2.32)	7.78 (2.27)	−2.954	**.003**	2.975	**.003**
Provided by department, service, unit or company is clear and precise	6.15 (2.65)	6.01 (2.59)	6.32 (2.72)	−1.934	.053	6.30 (2.68)	6.11 (2.67)	6.51 (2.68)	−1.437	.151	6.07 (2.64)	5.96 (2.55)	6.22 (2.74)	−1.316	.186	1.319	.188

COVID-19 = coronavirus disease 2019, GHQ-12 = Goldberg General Health Questionnaire, SD = standard deviation.
* Scoring from 1 to 10.

The perception of lower-quality COVID-19 information, both in the media and in the official channels of information, has proven to generate more PD, although the low quality of this information is popularly associated to be found on the internet.[43,44] Notwithstanding, there are also studies that have found the internet to be more reliable providing information than traditional means.[45] On the contrary, neither accessibility to information nor perception of its quantity or usefulness is associated with PD. So, to reduce PD, there is no need for more information, but there is for it to have more quality, something that is in line with the request that quality official information should be enhanced with internet access.[46]

International public bodies,[9,47] universities,[8] and journal publishers have strengthened their websites to make useful and up-to-date information on the pandemic accessible and free of charge. The problem is that this information is not always found on social media, which is the most used source of information by the population and also widely used by healthcare professionals. It may be surprising to know that, although healthcare professionals use websites of official bodies or scientific societies to obtain information on COVID-19 in a high percentage (63.3%), the use of social media is higher (86.0%) and in a similar proportion to the rest of the population (86.2%). It may also be striking the low percentage of information consulted from professional associations or companies, especially among the healthcare community. In the present study, an association between having obtained clear and accurate information from companies and the level of PD has been observed, justifying the role that a companies' specialists in occupational medicine and nursing could play by providing useful and quality information to the companies' workers,[48] complementing health authorities and countering fake news from social media.

But, if there is 1 key thing in a pandemic, this is that information must flow quickly in the dual track of health authority – population. The usefulness of analysing social media to have continuous information throughout the pandemic regarding the predisposition of the population to maintain the preventive measures ordered by the Health Authorities has been assessed.[24] In the study at hand, the proportion of participants that considers that information from the media is of high or very high quality (23.1%) is lower than the proportion that considers the information from official channels of high quality (36.2%). However, this is a low percentage and may mean a degree of public distrust in official information. Previous studies have shown how important trusting the government is for the population to comply with preventive measures in the face of the pandemic and the effectiveness of maintaining a permanent surveillance of the perception of the population on these issues.[49] Therefore, it is not only necessary for official information to reach the population, but it is also to improve credibility on the part of the authorities, as can be seen with the higher percentage that uses social media to obtain information.

Differences between the subgroups that conform the present study have been found, and this may suppose a consideration for participation bias, as the information was obtained by analysing large-scale Twitter data mining, thus confirming that it is necessary to track the evolution of each population group during the pandemic to implement differentiated public health interventions.[50]

A limitation of the study is the difficulty to participating of the population with less income and a lower educational level, as they required Internet access to answer the questionnaire. We know

Table 3

Association between information provided about the pandemic and psychological distress.

			Media					Official channels				Media vs official channels	
			% GHQ					% GHQ					
		N (%)	YES (N = 1014)	NO (N = 685)	χ^2	*P*	N (%)	YES (N = 1014)	NO (N = 685)	χ^2	*P*	χ^2	*P*
Accessibility	Very low	29 (1.7)	65.5	34.5	1.344	.854	51 (3.0)	51.0	49.0	6.968	.138	973.040	<**.001**
	Low	86 (5.1)	57.0	43.0			167 (9.8)	64.7	35.3				
	Intermediate	562 (33.1)	58.4	41.6			666 (39.2)	61.9	38.1				
	Alta	689 (40.6)	60.5	39.5			645 (38.0)	56.7	43.3				
	Very high	333 (19.6)	60.4	39.6			170 (10.0)	60.0	40.0				
Quantity	Very low	23 (1.4)	65.2	34.8	1.320	.858	49 (2.9)	57.1	42.9	3.110	.540	917.371	<**.001**
	Low	101 (5.9)	60.4	39.6			178 (10.5)	61.2	38.8				
	Intermediate	504 (29.7)	59.7	40.3			723 (42.6)	61.7	38.3				
	High	657 (38.7)	58,3	41.7			615 (36.2)	57.9	42.1				
	Very high	414 (24.4)	61.4	38.6			134 (7.9)	56.0	44.0				
Quality	Very low	99 (5.8)	59.6	40.4	12.925	**.012**	77 (4.5)	50.6	49.4	15.535	**.004**	1060.125	<**.001**
	Low	314 (18.5)	55.1	44.9			247 (14.5)	53.0	47.0				
	Intermediate	893 (52.6)	63.6	36.4			760 (44.7)	63.7	36.3				
	High	338 (19.9)	54.4	45.6			520 (30.6)	60.0	40.0				
	Very high	55 (3.2)	54.5	45.5			95 (5.6)	50.5	49.5				
Usefulness	Very low	87 (5.1)	63.2	36.8	4.018	.404	74 (4.4)	56.8	43.2	2.965	.564	1379.942	<.001
	Low	247 (14.5)	56.7	43.3			208 (12.2)	56.7	43.3				
	Intermediate	840 (49.4)	61.3	38.7			755 (44.4)	61.3	38.7				
	High	449 (26.4)	58.8	41.2			549 (32.3)	59.9	40.1				
	Very high	76 (4.5)	52.6	47.4			113 (6.7)	54.9	45.1				

GHQ = Goldberg General Health Questionnaire.

that this population, with a lower percentage in our study and a lower social class, has a higher risk of COVID-19 contagion. The "snowball" methodology itself, used in our study, has limitations, but it was adopted because of the needs of time to obtaining data in the first phase of the pandemic. It is the same methodology adopted in the European study on Living, Working, and COVID-19 by Eurofound.[34] Similarly, the CART for the level of PD based on beliefs about the pandemic in our study classifies 65.86% and not the total population studied. Despite robustness check has not been performed, the CART method has demonstrated its strength to outliers, the invariance in the structure of its classification trees to monotonous transforma-

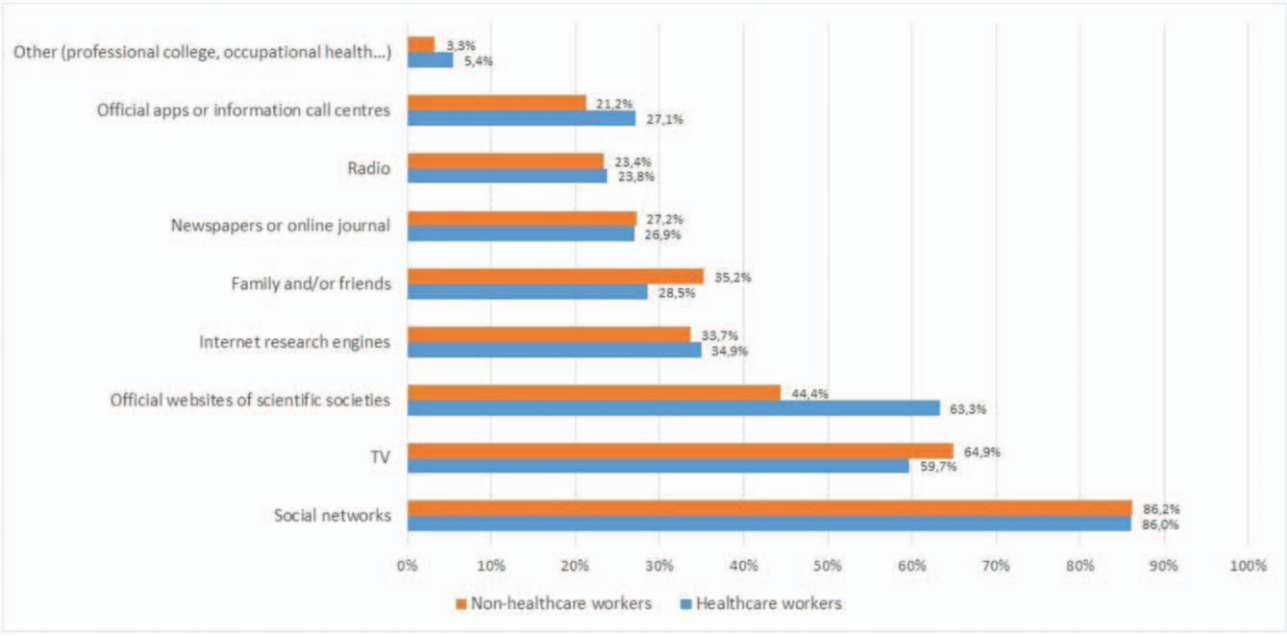

Figure 2. Social networks and other platforms through which information about COVID-19 has been made available for healthcare and nonhealthcare workers.

tions of the independent variables, and above all, its interpretability.

5. Conclusions

The most widely used source of information on COVID-19 in Peru is social media, both by the general population and by healthcare professionals, and it is associated with developing PD. Greater concern and less information on COVID-19 contributes to developing higher levels of PD, where the perception of quality of information has a special weight. In this line, greatest concern is found regarding being a carrier and transmitting the virus to relatives, close persons, or patients, surpassing that of being infected, and being associated with the level of PD.

The lack of information about the treatment is the one that generates more PD, except in the group of healthcare professionals, for whom it is the prognosis of the disease. The population of Peru has greater confidence in the ability of healthcare professionals than in the capacity of the health system to diagnose or recognise the disease, both factors with influence on developing PD.

The need for public bodies to generate quality information on COVID-19 has been made evident, so as to counteract the fake news about the pandemic and to guarantee that this quality information is not exclusive of the websites of official bodies or scientific societies but reaches social media as well. Health authorities should use the social media widely used by the population to identify in real time public opinions on the proposed preventive measures and, at the same time, make their messages available to the population.

It is necessary for the population to increase their confidence in the health system and to also increase the credibility of the official information generated by health authorities, something basic for the fulfilment of the preventive measures proposed and for the improvement of the mental health of the population. Occupational physicians and nurses are responsible for ensuring the health of workers and could play an important role in providing quality information and clarifying doubts about fake news that appear on social media.

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